

OUTCOME BASED CURRICULUM 2016

Program Diploma in Information Technology



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Nagpur**

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OUTCOME BASED CURRICULUM 2016



Program: Diploma in Information
Technology



by

Curriculum Development Cell,

Government Polytechnic, Nagpur

Document Written by

Dr. S.W.Rajurkar

and

Mr. G.V.Gotmare

Curriculum Development Cell

Government Polytechnic, Nagpur, India

Curriculum Developed by

Faculties and Experts (Mentioned in individual curriculum)

Approved by

Advisory Board (AB),

Program wise Board of Studies (PBOS),

And

Board of Studies (BOS),

Government Polytechnic, Nagpur

Accepted by

Governing Board (GB),

Government Polytechnic, Nagpur

Published by

Dr. C.S.Thorat

Principal,

Government Polytechnic, Nagpur, India



Government Polytechnic, Nagpur

(An Autonomous Institute of Government of Maharashtra)

OUTCOME BASED CURRICULUM-2016

DIPLOMA IN INFORMATION TECHNOLOGY

The Program Structure and Curriculum Contents for Diploma in Information Technology are approved in Advisory Board (AB), Programwise Board of Studies (PBOS), Board of Studies (BOS), And Governing Board (GB), Government Polytechnic, Nagpur.

(Dr. A.R.Mahajan)
Head of Deptt.
Information Technology
and
Chairman PBOS (IT)

(Shri. G.V.Gotmare)
In-charge
Curriculum Development Cell
and
Member Secretary PBOS (IT)

(Dr. C.S.Thorat)
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Sr. No.	Name of Faculty	Designation
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CHAPTER 1

Government Polytechnic, Nagpur an Introduction

This chapter gives the history of Government Polytechnic, Nagpur.

1.1 History

The **Government Polytechnic, Nagpur** is an oldest technical institution in central India. It was founded on 14th July 1914 as the Government Engineering School. At its commencement the school had 16 students on roll and was located in the Victoria Science College (now the Institute of Science) in Nagpur. During its first year the school provided courses in Civil Engineering & Mechanical Engineering up to diploma standard. Later in 1915 Automobile Engineering Course was also established which was subsequently converted into Post Diploma in Automobile Engineering. The institution has given birth to Engineering College presently known as Visvesvaraya National Institute of Technology, Nagpur (VNIT). The school was expanding rapidly & from 16 students enrolled in 1914 increased to nearly 2000 in current year and Govt. Engineering School converted to Government Polytechnic, Nagpur.

1.2 Autonomy

The Institute has recently celebrated its Centenary year. Government Polytechnic, Nagpur has history of 102 Glorious Years. The Government Polytechnic, Nagpur is committed to contribute to through excellence in technical education, to serve as valuable resource for industry and society. The institute is always upright in responding to educational needs of its changing world's scenario.

From academic session 1995 the institute was conferred with autonomous status by Government of Maharashtra as per Government Resolution No. WBP-1093/(2640) (69)VE-5 Dated- 31st March, 1994, in context of academic matter viz. identification of

need of new programs, requisite curriculum design, implementation of self-designed curriculum, assessment, evaluation and certification of students.

1.3 Awards

Some of the prestigious awards received by Government Polytechnic, Nagpur are as follows:

- State Award “Best Overall Performance 1996” (ISTE Narsee Monjee Award)
- State Award “Best Polytechnic, 1997” , (Govt. of Maharashtra)
- National Awards “Best Polytechnic, Student Chapter 2002”,(Institute of Engineers (India))
- National Awards “Best Polytechnic, Student’s Project ,2002” (ISTE Narsee Monjee)
- State Award “Best Overall Performance 2016” (ISTE Narsee Monjee Award)
- National Education Award for “Best Technical Educational Institute in Maharashtra State-2016”

1.4 Geographical Location of Nagpur City

The latitude of Nagpur, India is 21.146633, and the longitude is 79.088860. Nagpur, India is located at India country in the Cities place category with the gps coordinates of 21° 8' 47.8788" N and 79° 5' 19.8960" E. Nagpur, India elevation is 311 meters height. Nagpur is located at the exact centre of the Indian peninsula. Figure 1.1 shows the location. The city has the Zero Mile Stone locating the geographical centre of India, which was used by the British to measure all distances within the Indian subcontinent. [Wikipedia]. The city gets its name from the river Nag, which flows through the city, originating at a small village called Lavha. It is famous for the Nagpur orange and is known as the "Orange City" for being a major trade centre of oranges cultivated in the region.



Figure 1.1. Location of Nagpur City

1.5 Government Polytechnic, Nagpur Campus

Government Polytechnic, Nagpur is situated in heart of the Nagpur City at “Sadar” area, 2.1 km walking distance from zero mile stone as well as Nagpur railway station. The campus map of GPN is shown in Fig. 1.2.



Figure 1.2. Government Polytechnic, Nagpur Campus

CHAPTER 2

Polytechnic Education System

This chapter describes the polytechnic education system in India. Various bodies responsible for polytechnic education in India are also described below.

2.1 Higher Education System in India

The aim of any country's higher education system is sustainable development and achieving higher growth rates. It is enabled through creation, transmission and dissemination of knowledge. To achieve this, India has setup a school education system and higher education system. The higher education system is one of the strongest parts of the Indian education system.

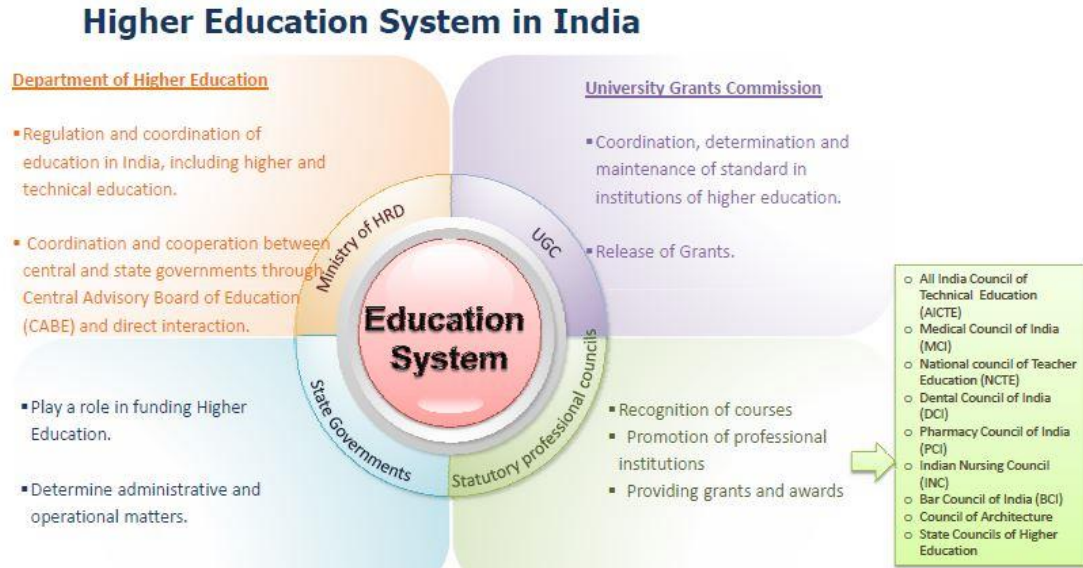


Figure 2.1. Higher Education System in India

Figure 2.1 shows the various bodies responsible for higher education in India, with their roles, as follows:

1. Ministry of Human Resource Development (HRD)

- Regulating and coordination of education in India
 - Coordination and cooperation between central government through central advisory board of education (CABE) and direct interaction
2. University Grant Commission
 - Coordination, determination and maintenance of standards in institutes of higher education
 - Release of grants
 3. State Governments
 - Funding Higher Education
 - Determine administrative and operational matters
 4. Statutory Professional Councils their roles and responsibilities.
 - Recognition of Courses
 - Promotion of Professional institutions
 - Providing grants and awards

The higher education in India is categorised in to following three categories as shown in Fig 2.2:

1. General Education
2. Professional Education
3. Vocational Education

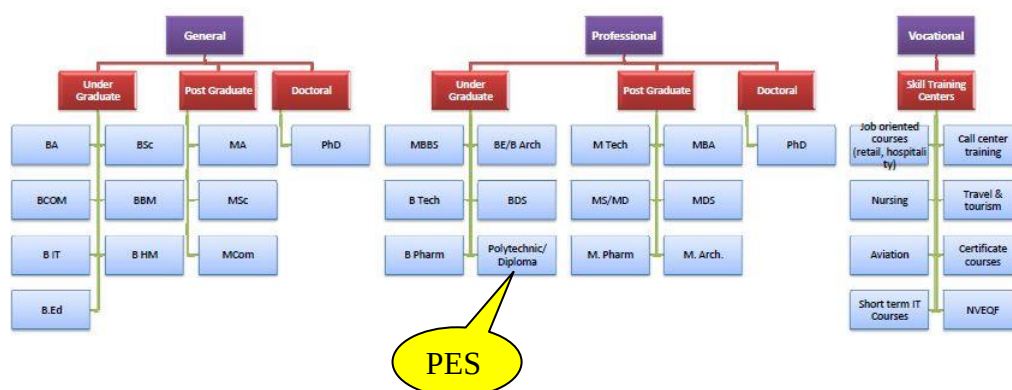


Figure 2.2. Classification of Higher Education System in India

Polytechnic Education System (PES) in India is the undergraduate level category of professional Education.

GPN is one of the autonomous polytechnic of PES in India. It is mandatory for GPN to follow the guidelines framed by the various bodies responsible for technical education, which are as follows:

2.1.1 Department of Higher Education, MHRD

The Department of Higher Education, MHRD, is responsible for the overall development of the basic infrastructure of Higher Education sector, both in terms of policy and planning in India. Under a planned development process, the Department looks after expansion of access and qualitative improvement in the Higher Education, through world class Universities, Colleges and other Institutions

2.1.2 All India Council for Technical Education (AICTE)

The All India Council for Technical Education (AICTE) has been in existence since November 1945 as a national level Apex Advisory Body. AICTE became a statutory body through an act of Parliament 52, in 1987.

AICTE was established with a view to the proper planning and co-ordinated development of the technical education system throughout the country, the promotion of qualitative improvement of such education in relation to planned quantitative growth and the regulation and proper maintenance of norms and standards in the technical education system for matters connected therewith. One of the major functions of AICTE is to lay down norms and standards for courses, curricula, physical and instructional facilities, staff pattern, staff qualifications, quality instructions, assessment and examinations.

2.1.3 National Board of Accreditation (NBA)

The National Board of Accreditation (NBA), India was initially established by AICTE (All India Council of Technical Education) under section 10(u) of AICTE act, in the year 1994, for periodic evaluations of technical institutions & programmes basis according to specified norms and standards as recommended by AICTE council.

NBA in its present form came into existence as an autonomous body with effect from 7th January 2010, with the objective of Assurance of Quality and Relevance of Education, especially of the programmes in professional and technical disciplines, i.e., Engineering and Technology, Management, Architecture, Pharmacy and Hospitality, through the mechanism of accreditation of programs offered by technical institutions.

NBA has introduced a new process, parameters and criteria for accreditation. These are in line with the best international practices and oriented to assess the outcomes of the programme. NBA adopted Outcome Based Education (OBE) model for accreditation of all engineering programs in India from 2013.

2.1.4 Higher and Technical Education, Government of Maharashtra

It is the apex authority responsible for steering and supporting the development and growth of quality Higher and Technical Education that meets educational and social objectives of the state. This department is highly committed towards inclusive education and realizes the importance of quality of education and has undertaken numerous initiatives for achieving highest quality standards in the field of education. Accreditation and Re-accreditation of the Universities and Institutes of higher learning has been made mandatory to ensure the quality of institutions.

2.1.5 Directorate of Technical Education (DTE), Government of Maharashtra

The role of the Directorate is to maintain, enhance the standard, quality of technical education by laying the policies, establishing developing Govt. Institutions, guiding supervising the aided, private institutions, interacting with industry and national level institutions, co-ordinating with other departments of State Government, Government of India Statutory Organisations and to contribute to the development of industry society at large.

2.1.6 Maharashtra State Board of Technical Education (MSBTE)

Maharashtra State Board for Technical Education (MSBTE) was established with the enactment of the Maharashtra State Board of Technical Education Act 1997 to regulate the matters pertaining to diploma level technical education in the state of Maharashtra.

According to act section 34, the autonomous institutions shall be required to obtain equivalence for their courses and programmes from the MSBTE. The MSBTE shall monitor all academic and examination related activities of the Autonomous Institutions such as curriculum, teaching examination scheme, teaching hours, academic schedule, eligibility of candidate to appear for the examination, etc.

2.2 Polytechnic Education System

Polytechnic education in India constitutes an important segment of Technical Education and contributes significantly to the economic development. Aimed at creating a vast amount of technical manpower, the polytechnics have played a vital role in providing skilled manpower at various levels for organized, unorganized and Service Sectors.

The aim of the polytechnic education is to create a pool of skill based manpower to support shop floor and field operations as a middle level link between technicians and engineers. The pass-outs of Diploma level Institutions in Engineering & Technology play an important role in managing shop-floor operations. It is further an established fact that small & medium Industry prefer to employ Diploma Holders because of their special skills in interpreting engineering, drawings, estimating, costing, billing, supervision, measurement, testing, repair & maintenance etc.

Curriculum is an educational programme designed, developed & implemented in formal educational system to achieve pre-determined & pre-stated educational objectives. Every individual social system comes in to existence as a result of need of its output emerged in its environment. Educational objectives of PES can be stated as follows:-

- a) To cater to specific manpower need in overall Technical Manpower Spectrum of industry and society that lies between craftsman on one side and technocrat on other.

- b) To cater the man power need of primary, secondary and tertiary sector of industry.
- c) To cater to individual educational need for development of self, community and society.
- d) To cater to an individual need to update him in tune with advancement in engineering and technology.

Educational objectives stated above talk about manpower with-certain task profile. To develop such task profile in an individual, which consists in general of all duties and associated tasks and sub tasks that an individual is supposed to perform, it is required to organize various experiences in different setups viz. classrooms, laboratories, workshops and fields, through out any educational programme. With such experiences it should be ensured that students acquire requisite knowledge, skills, attitudes and abilities to perform sub tasks and duties and finally job which he is likely to get after passing programme.

Hence, it is essential to design education program taking in to account predetermined objectives in the form of curriculum, then develop requisite resources viz. physical like space, equipment, and furniture etc. human, information and implement it to achieve the educational objectives.

CHAPTER 3

Curriculum Development System

This chapter describes the organization structure, curriculum development system and the various bodies responsible for the development of curriculum of GPN.

3.1 Organizational Structure of GPN

GPN, being part of PES it has been catering needs of individual, community, society and industry since last 102 years. Up to 1995 services being offered by GPN were under different status viz. university, MP DTE and MSBTE.

In 1995 the institute was conferred with autonomous status by Government of Maharashtra as per Government Resolution No. WBP-1093/(2640) (69)VE-5 Dated- 31st March, 1994, in context of academic matter viz. identification of need of new programs, requisite curriculum design, implementation of self-designed curriculum, assessment, evaluation and certification of students. In nutshell accountability regarding academic matters referred above followed by placement of students in world of work is trusted on the institute. Functional organization of students in world of work is entrusted to the institute. Functional organization parallel to hierarchical organization of institute is constituted for running institute under autonomous status effectively and efficiently. Fig. 3.1 shows the organizational structure of GPN.

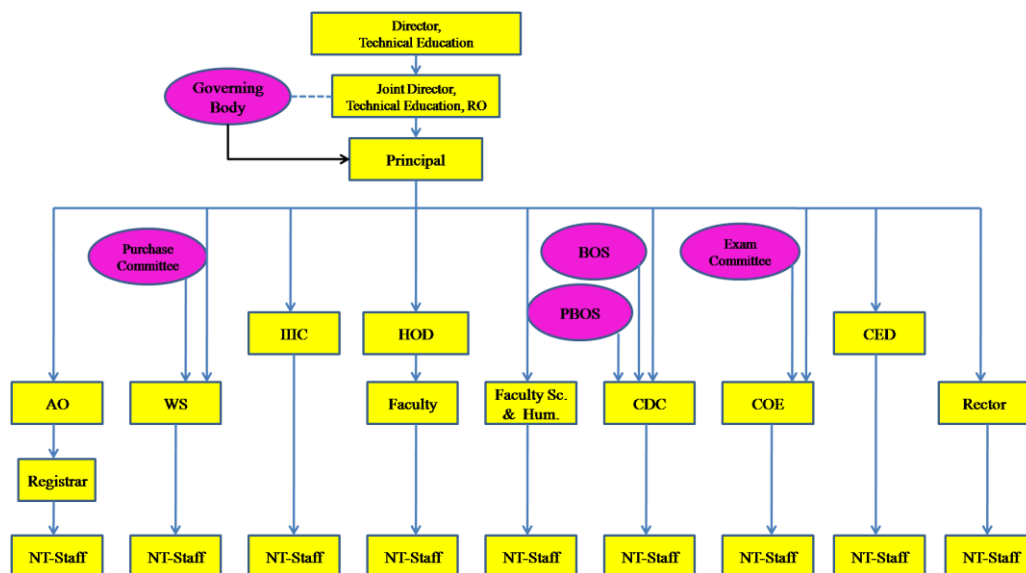


Figure 3.1. Organizational Structure of GPN

3.2 Curriculum Development System

Since, 1995 the institute has been designing/revising and implementing curricula of 11 programmes. This is being done using Curriculum Development System shown in Figure 3.2.

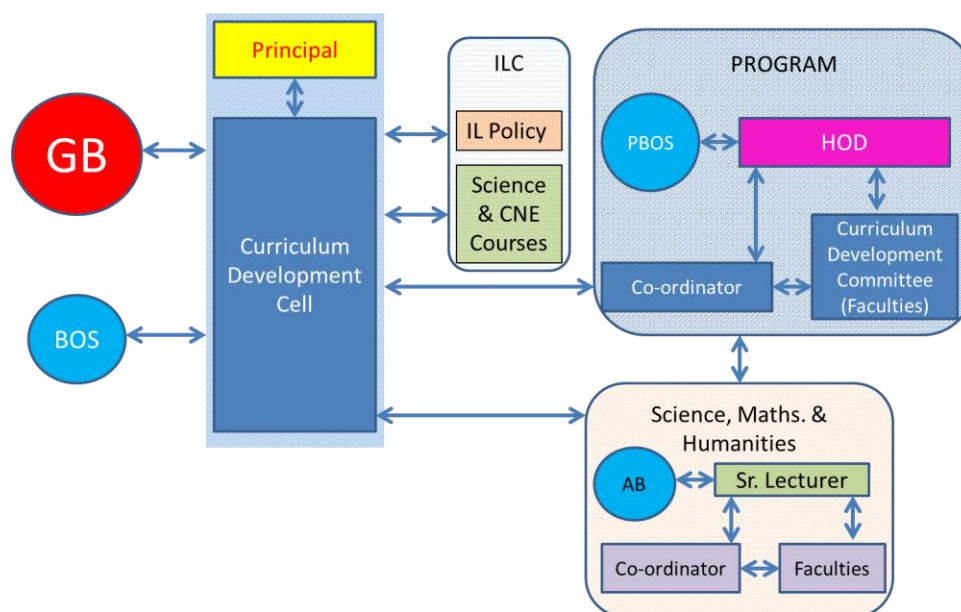


Figure 3.2. Curriculum Development System

Curriculum Development System consists of Programs (Civil, Mechanical, and Electrical etc.), Non Programme Department (Science, Maths, and Humanities), Institute Level Committee (ILC), and Curriculum Developmental Cell (CDC) headed by Principal of the Institute. Institute follows certain process in designing, revising, developing and implementing curriculum and student assessment & evaluation for enhanced students' learning. The constitutional bodies Governing Body (GB), Board of Studies (BOS) and Program wise Board of Studies (PBOS) for programs and non-constitutional body i.e. Advisory Board (AB) for Non Programme Department are responsible for approval of curriculum.

3.2.1 Governing Board (GB)

GB is an apex body. The committee members and roles and responsibilities of GB of GPN are stated below:

- **Committee Members:**

1. Joint Director of Technical Education Maharashtra State, Bombay - Chairman
2. Nominee from Western Regional Committee Govt. of India - Member
3. Regional Officer, Human Resource Development or Co-ordinator, TTTI, Pune - Member
4. Representative from the Local Centre the I.E.(India) - Member
5. Representative from the Engineering Association - Member
6. Representative from the District Industries - Member
7. Project Director, State Project Implementation Unit (World Bank) – Member
8. Principal of the Polytechnic – Member Secretary

- **Functions and Responsibilities:**

1. To decide the policy of the institute and decide guidelines of the function of various committees.
2. To analyse all issues and provide policy directive for developing the scheme and implementing it at the institute level.
3. To appoint the various committees of Governance for smooth functioning of the Institute.

4. To institute scholarships fellowships studentships, Mudat prize and certificates on the recommendation of Board of Studies.
5. Approve new programmes of studies leading to Diploma/Post-Diploma.
6. Approve modifications in present curriculum in order to meet the changed demands of the industry society from time to time.
7. Approve Annual Reports of the Institute
8. Approve Continuing Education Programmes or similar Activities Beneficial to the Students/Community Institute.
9. To approve the fees and other charges payable by the students of the Polytechnics on the recommendation of Board of Studies.

3.2.2 Board of Studies (BOS)

BOS is an Institute level committee. The committee members and roles and responsibilities of BOS of GPN are stated below:

- **Committee Members:**

1. Representative of the Industry - Chairman
2. Head of Department of 5 Programmes - Member
3. Local Experts of 5 Programmes- Member
4. Nominee of Board of Technical Examinations, M.S. Bombay- Member
5. In-charge of Curriculum Development Component– Member Secretary

- **Functions and Responsibilities:**

1. To prepare Syllabi for various courses and develop curriculum keeping in view the objectives of the Institute and the national requirement for consideration. Syllabi shall be equivalent to Syllabi of Board of Technical Examinations.
2. To suggest methodologies for innovative teaching and evaluation techniques.
3. To Co-ordinate research teaching, extension and other academic activities in the various departments/ institute.
4. To recommend books including test books for various courses of studies.

3.2.3 Program Wise Board of Studies (PBOS)

PBOS is a program level committee. GPN is having 11 PBOS committees. The committee members and roles and responsibilities of PBOS of program of GPN are stated below:

- **Committee Members:**

1. Head of the Department concerned- Chairman
2. Two Senior Lecturers- Member
3. One expert in the programme from the neighbouring institution - Member
4. Nominee from the Board of Technical Examinations Bombay - Member
5. One Expert from the local industry in each Programme – Member
6. In-charge of Curriculum Development component - Member-Secretary

- **Functions and Responsibilities:**

1. To decide Philosophy of curriculum design course wise.
2. To analyse present needs and to identify desirable changes, additions, deletions course wise.
3. Analyse of personnel development.
4. Formation of Programme objectives.
5. Selection of contents.
6. Design of student's evaluation.
7. To decide resources required and development thereof.
8. To decide strategy of implementation.
9. Recommend equivalence for granting exemptions.

3.2.4 Advisory Board (AB)

Non Program Department (Science, Maths, and Humanities) are not having PBOS as per the Government Resolution. The AB is constituted in line with the PBOS for Non Program Department. There are 4 AB each for Physics, Chemistry, Mathematics and English Department.

CHAPTER 4

Outcome Based Education Philosophy

Government Polytechnic, Nagpur adopted the OBE approach for curriculum design because, National Board of Accreditation (NBA) focusing on the adoption of OBE approach for all engineering programmes in India from 2013 for accreditation. Programmes to be accredited from 2013 will have to be based on OBE approach. NBA adopted Outcome based Model because, OBE is “Learner Centric” rather than “Teacher Centric”

4.1 Outcome Based Education

Outcome Based Education (OBE) is an education approach that focuses on the graduate attributes or outcomes after completing an academic programme. Outcome based approach means knowing what you want to achieve and then taking the steps to do so.

Some Benefits of OBE are-

1. More directed and coherent curriculum.
2. Graduates (students) will be more “relevant” to industry and other stakeholders.

The framework required for implementation of OBE consists of the following as shown in Figure 4.1 and consists of:

- Outcome Based Curriculum (OBC): What students should able to do?
- Outcome Based Teaching learning (OBTL): Making the students to achieve the outcomes
- Outcome Based Assessment (OBA): How to measure, what the students has achieved?

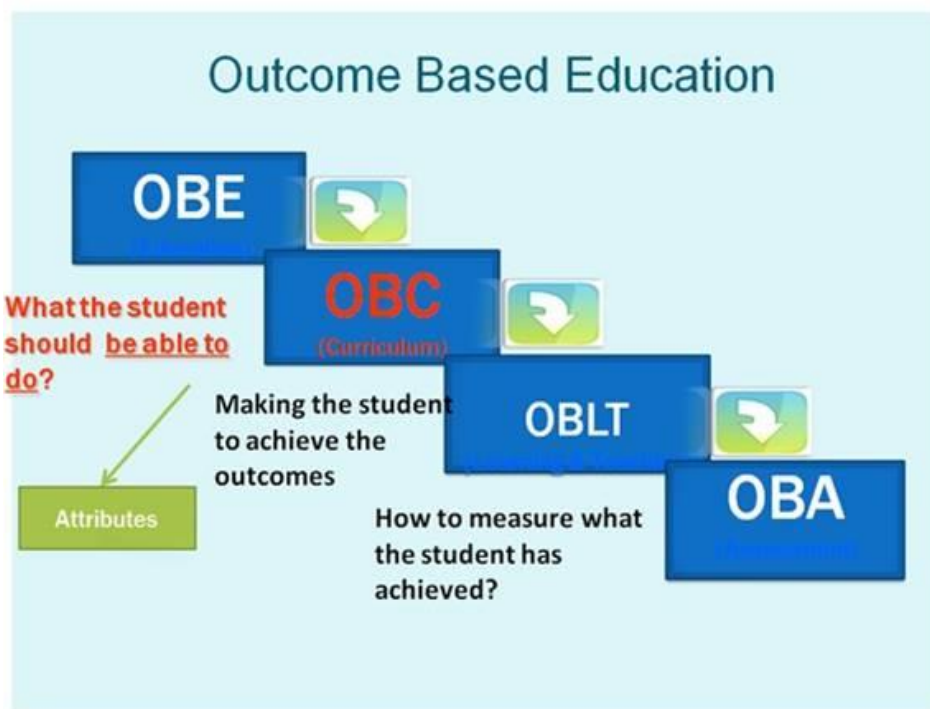


Figure 4.1. Outcome Based Education Framework

4.2 KEY constituents of OBE

Figure 4.2 shows the key constituent of OBE.

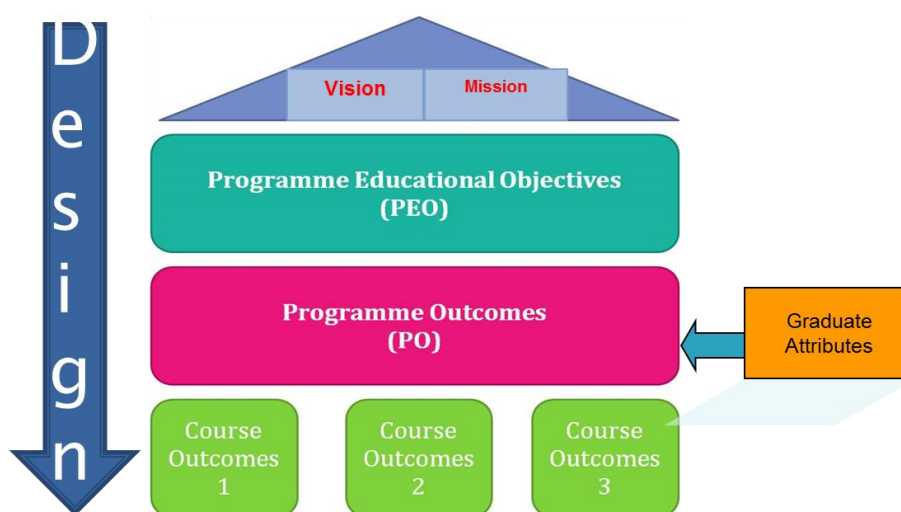


Figure 4.2. Key Constituents of OBE

4.2.1 Vision

Vision is a picture of the future you seek to create, described in the present tense, as if it were happening now. It shows where we want to go, and what we will be like when we get there.

4.2.2 Mission

Mission statement defines what an institution is, why the institution exists, and its reason for being. It defines what we are here to do together.

4.2.3 Graduate Attributes (GA's)

Graduate attributes are the qualities, skills and understandings a university community agrees its students should develop during their time with the institution. These attributes include but go beyond the disciplinary expertise or technical knowledge that has traditionally formed the core of most university courses. WA (Washington Accord) defines 12 GA's for Engineering Graduates.

4.2.4 Program Outcomes (PO's)

Programme Outcomes (POs) describe what students should know and be able to do at the end of the programme. They are to be in line with the graduate attributes (GAs) of NBA. PO's are to be specific, measurable and achievable. POs transform the PEOs into specific student performance and behaviors that demonstrate student learning and skill development.

Following are POs (Ten) for all diploma engineering programs as per NBA guidelines-

1. **Basic Knowledge:** Ability to apply knowledge of basic Mathematics, Science and Engineering to solve the engineering problems
2. **Discipline Knowledge:** Ability to discipline specific knowledge to solve core and/or applied engineering problems
3. **Experiments and Practice:** Ability to plan and perform experiments and practices and use the results to solve engineering problems

4. **Engineering tools:** Apply appropriate technologies and tools with an understandings of limitations
5. **The Engineer and Society:** Demonstrate knowledge to assess the societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to engineering practice.
6. **Environment and Sustainability:** Understand the impact of engineering solutions in societal and environmental context, and demonstrate knowledge and need for sustainable development.
7. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
8. **Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse/ multidisciplinary teams.
9. **Communication:** An ability to communicate effectively.
10. **Life-long learning:** Recognize the need for, and have preparation and the ability to engage in independent and life-long learning in context of technological changes.

4.2.5 Program Educational Objectives (PEO's)

The Program Educational Objectives (PEOs) are broad statements that describe the career and professional accomplishments that the programme is preparing graduates to accomplish. PEOs should be measurable, appropriate, realistic, time bound and achievable.

4.2.6 Program Specific Outcomes (PSO's)

No definition for PSO's is found in literature. According to Dr. B.L. Gupta, NITTTR, Bhopal, PSO's are the broad statements of Program specific outcomes as per the local needs.

4.2.7 Course Outcomes (CO's)

Course Outcomes (COs) are clear statements of what a student should be able to demonstrate upon completion of a course. They should be assessable and measurable knowledge, skills, abilities or attitudes that students attain by the end of the course. It

is generally a good idea to identify between four and seven. All courses in a particular programme would have their own course outcomes. These course outcomes are designed based on the requirement of the programme outcomes (POs). Each course outcomes are mapped to a relevant PO and they are mapped to the programme educational objectives (PEO). The teaching learning process and assessment methods are to be designed in such a way to achieve the COs. It is important to ensure that the student is able to acquire the knowledge or skill required. Table 4.1 clarifies the difference between Course Objectives Vs Course Outcomes

Table 4.1. Difference between Course Outcomes and Course Objectives.

Course Objectives	Course Outcomes
Describe what a teacher needs to teach, and what needs to be planned to teach.	Describe what students should demonstrate upon the completion of a course.
Example- At the end of the course, students will- Understand the types of wiring system.	Example- At the end of the course, students will be able to- Choose a suitable wiring system for particular installation.

4.2.8 Specific Learning Outcomes (SLO's) or Learning Outcomes (LO's)

Learning outcomes (LO's) or Specific Learning Outcomes (SLO's) are “*statements of what is expected that the student will be able to do as a result of learning the activity*”. (Jenkins and Unwin, 2001); i.e at the end of each unit or chapter. SLO's should also be assessable and measurable knowledge, skills, abilities or attitudes that students attain by the end of the unit

CHAPTER 5

Bloom's Taxonomy

Outcome-based education is an educational model in which curriculum and pedagogy and assessment are all focused on student learning. Learning is a relatively permanent change in behaviour potentiality that results from reinforced practice or experience. A group of educational psychologists led by Benjamin Bloom develops a taxonomy, or classification system, for learning. Some aspects of Bloom's Taxonomy is described below.

5.1 Introduction to Bloom's Taxonomy

Benjamin Bloom (1948) developed classifications of intellectual behaviour and learning in order to identify and measure progressively sophisticated learning. Bloom's taxonomy is especially important in higher education where outcomes need to address the student ability to use information, not just recall and regurgitate concepts. Lower levels of learning are easier to assess but do not adequately display what the student can do with the knowledge. However, learning is not a purely cognitive function; learning occurs differently when it entails performing a skill or re-evaluating behavior. This approach is based on biological structure of human being as shown in figure 5.1.

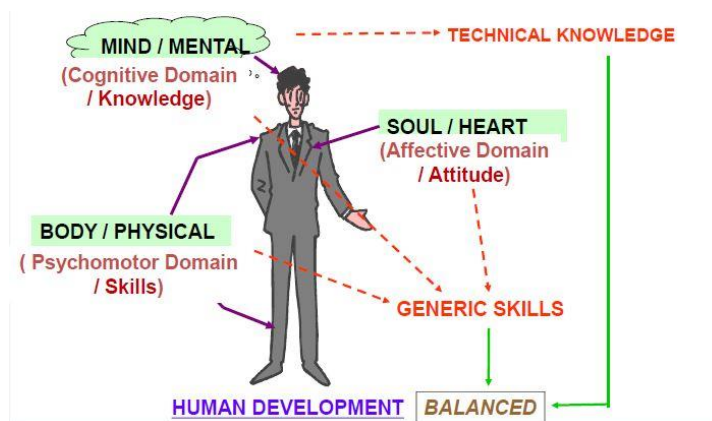


Figure 5.1. Human Being and Domains of Learning

Important elements of this approach which form basics of learning are explained below.

5.2 Domains of Learning

Learning is a process by which students develop relatively permanent change in mental associations through experience. This is how learning is defined by cognitive psychologists. Behavioral; psychologists define learning as a relatively permanent change in behavior. However, learning is not a purely cognitive function; learning occurs differently when it entails performing a skill or re-evaluating behavior.

There are following domains of learning:

- A: Cognitive Domain relates to intellectual skills or abilities
- B: Affective Domain relates to emotions, feelings, likes, dislikes etc.
- C: Psychomotor Domain relates to manipulative skills of hands, legs. Eye-hand coordination

In Engineering & Technology courses, endeavor is made to design curriculum with a focus on development of cognitive skills through classroom teaching, whereas manipulative (psychomotor) skills are developed in workshops, laboratories & seminars where students work individually or in a group. Development of affective skills attitudes and value is supposed to be acquired through projects and co-curricular activities. These are also developed from the work culture or institutions.

How far a student has developed these abilities/skills especially from cognitive and psychomotor domains is assessed on the basis of suitable examinations. When classroom and laboratory teaching is viewed in this light, evaluation becomes an integral part of teaching – learning process.

5.2.1 Cognitive Domain

Dr. Benjamin Bloom (1956) analysed questions asked in various examinations in American situation and proposed a hierarchical arrangement of instructional objectives (Intellectual abilities) tested by these questions.

The lowest level of cognitive learning achieved by a student is demonstrated by the recall of information that the student retrieves from his long term memory. So, the storage and retrieval of specific facts, concepts, principles, laws, definitions, properties, procedures etc. directly from memory was classified as a knowledge level objective. Thus questions

testing memory of students were treated as at the lowest level of the hierarchy of intellectual abilities. The other levels of hierarchy proposed by Dr. Bloom in 1956 relate to the degree of information processing required in the brain needed to provide answer to a question. The various levels in the cognitive hierarchy proposed by Dr. Bloom in 1956 and further revised in 2001 are shown in figure 5.2.

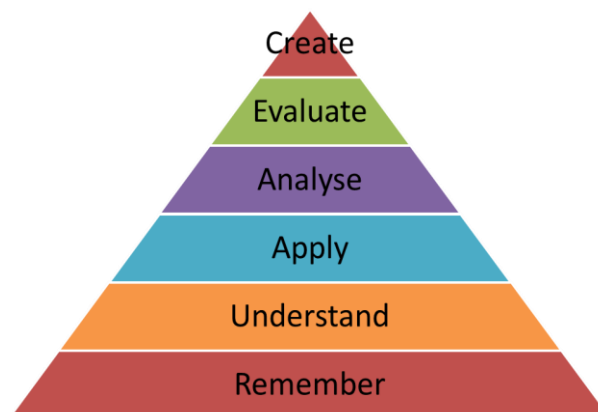


Figure 5.2. Revised cognitive hierarchy Levels

Table 5.1. Cognitive Domain Levels Action Verbs

Cognitive Domain Levels	Behavior descriptions	Action Verbs
Remember	Recall or recognize information	Define, Duplicate, List, Name, Identify, Recall, Reproduce, Recognize, Retrieve
Understand	Understand meaning, re-state data in one's own words, interpret, extrapolate, translate	Calculate, Categorize, Clarify, Classify, Compare, Conclude, Contrast, Describe, Exemplify, Expand, Illustrate, Infer, Interpret, Locate, Paraphrase, Predict, Report, Restate, Summarize, Translate
Apply	Use or apply knowledge, put theory into practice, use knowledge in response to real circumstances	Carry out, Classify, Demonstrate, Execute, Illustrate, Implement, Practice, Solve, Use, Utilize

Analyse	Interpret elements, organizational principles, structure, construction, internal relationships; quality, reliability of individual components	Appraise, Attribute, Compare, Contrast, Deconstruct, Detect, Differentiate, Discriminate, Distinguish, Examine, Formulate, Infer, Integrate, Organize, Parse, Relate, Select, Sequence, Structure, Test
Evaluate	Assess effectiveness of whole concepts, in relation to values, outputs, efficacy, viability; critical thinking, strategic comparison and review; judgment relating to external criteria	Appraise, Check, Coordinate, Critique, Defend, Detect, Dispute, Judge, Monitor, Prioritize, Rate, Reconstruct, Select, Support, Verify
Create	Develop new unique structures, systems, models, approaches, ideas; creative thinking, operations	Change, Combine, Compile, Compose, Construct, Create, Design, Formulate, Generate, Hypothesize, Improve, Invent, Plan, Predict, Produce

5.2.2 Psychomotor Domain

The Psychomotor Domain (RH Dave's version, 1970) was established to address skills development relating to the physical dimensions of accomplishing a task. Because, 'motor' skills extend beyond the originally traditionally imagined manual and physical skills, always consider using this domain, even if you think your environment is covered adequately by the Cognitive and Affective Domains. Whatever the situation, it is likely that the Psychomotor Domain is significant.

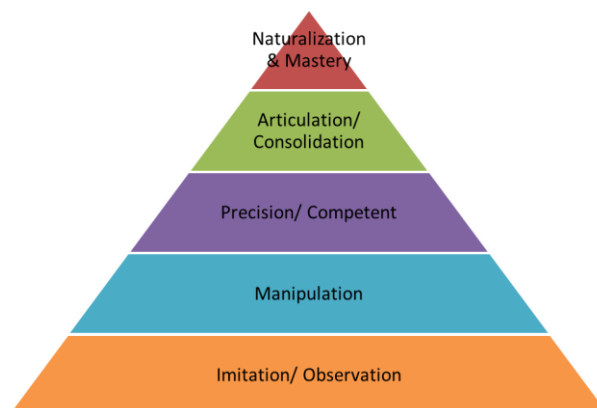


Figure 5.3. Psychomotor hierarchy Levels

Table 5.2. Psychomotor Domain Levels Action Verbs

Psychomotor Domain Levels	Behavior descriptions	Action Verbs
Imitation/ observation	Copy action of another; observe and replicate	Copy, follow, replicate, repeat, adhere, attempt, reproduce, organize, sketch, duplicate
Manipulation	Reproduce activity from instruction or memory	Re-create, build, perform, execute, implement, acquire, conduct, operate
Precision/ competent	Execute skill reliably, independent of help, activity is quick, smooth, and accurate	Demonstrate, complete, show, perfect, calibrate, control, achieve, accomplish, master, refine
Articulation/ consolidation	Adapt and integrate expertise to satisfy a new context or task	Solve, adapt, combine, coordinate, revise, integrate, adapt, develop, formulate, modify, master
Naturalization & Mastery	Instinctive, effortless, unconscious mastery of activity and related skills at strategic level	Construct, compose, create, design, specify, manage, invent, project-manage, originate

5.2.3 Affective Domain

Affective Domain, was detailed by Bloom, Krathwhol and Masia (1964, *Taxonomy of Educational Objectives: Vol. II, The Affective Domain*.) Bloom's theory advocates this structure and sequence for developing attitude - also now commonly expressed in the modern field of personal development as 'beliefs'. As with the other domains, the Affective Domain detail provides a framework for teaching, training, assessing and evaluating the effectiveness of training and lesson design and delivery, and also the retention by and affect upon the learner or trainee.

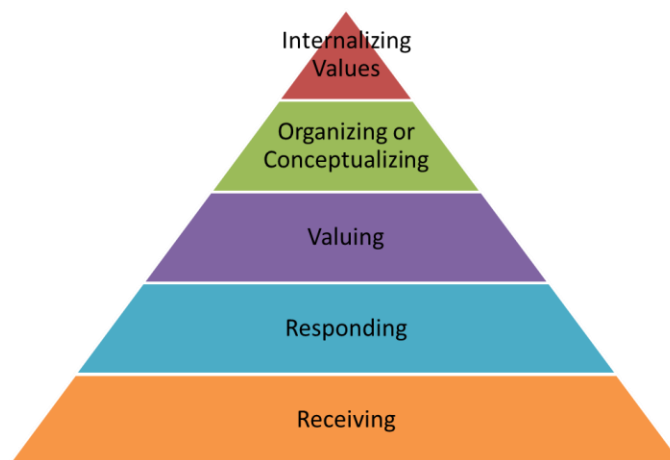


Figure 5.4. Affective Domain hierarchy Levels

Table 5.3. Affective Domain Levels Action Verbs

Affective Domain Levels	Behavior descriptions	Action Verbs
Receiving	Open to experience, willing to hear	Ask, listen, focus, attend, take part, acknowledge, hear, be open to, retain, follow, concentrate, read, do, feel
Responding	React and participate actively	React, respond, interpret, clarify, contribute, question, present, cite, write, perform
Valuing	Attach values and express personal opinions	Argue, challenge, debate, refute, confront, justify, persuade, criticize,
Organizing or Conceptualizing	Reconcile internal conflicts; develop value system	Build, develop, formulate, defend, modify, relate, prioritize, reconcile, contrast, arrange, compare
Internalizing Values	Adopt belief system and philosophy	Act, display, influence, solve, practice,

5.3 Program Outcomes and Domains of Learning

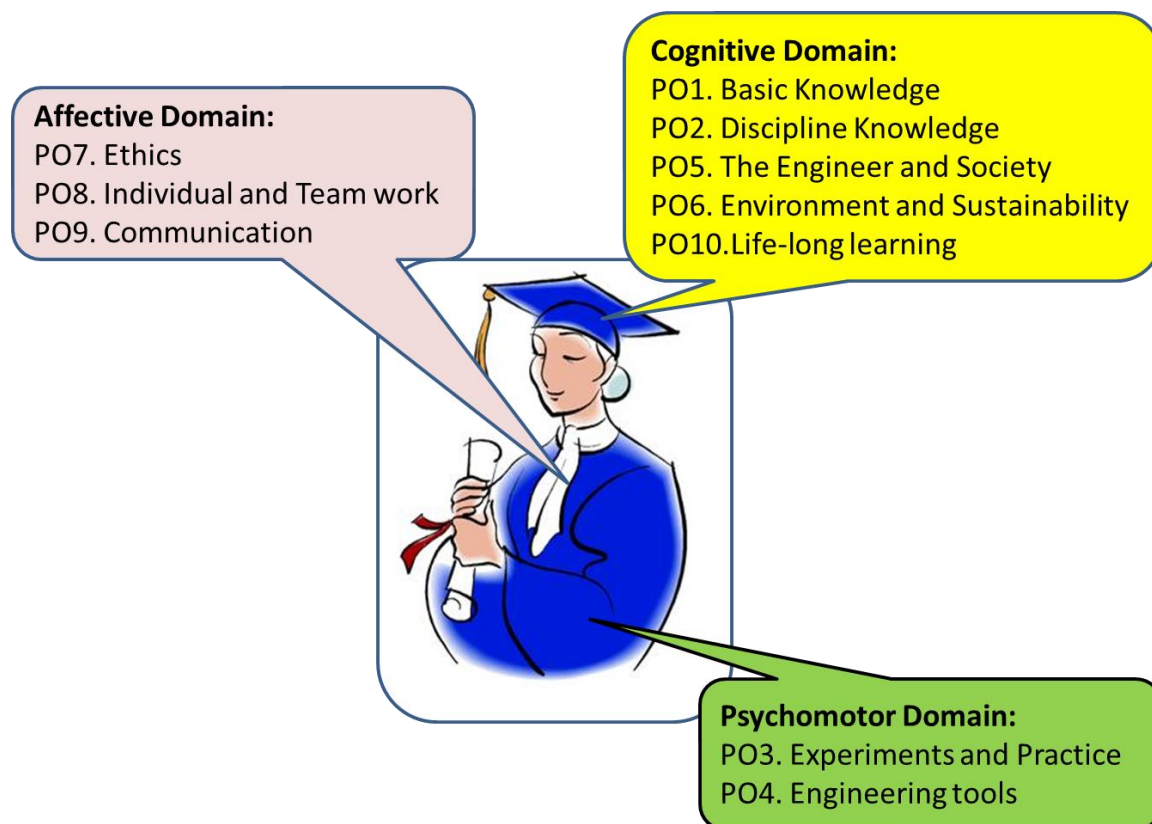


Figure 5.5. Program Outcomes and Domains of Learning

Program Outcomes (POs) framed by NBA for diploma students are the specific characteristics required by the stake holders in the students. There is definite relation between these outcomes with the three different domain of learning, which are described in figure 5.5. These classification plays major role while framing curriculum.

CHAPTER 6

Curriculum Revision Process

Since, autonomous status GPN revised curriculum after every 5 years. 2016 revision is the fifth revision. Concept of Bloom's Taxonomy is included in GPN curriculum since the beginning; however the complete model of OBE is adopted first time in the curriculum revision process. The complete curriculum revision process is described below.

6.1 Change Management

GPN is the diploma level educational institute is having total 12 diploma program, out of which 11 programs are under autonomous status. Curriculum revision of such 11 programs in a short period with the new unknown model is a huge task before CDC. It is natural reaction of human being even in the best circumstances for any change, is to resist.

GPN used ADKAR model for change management. This diagnostic tool helps our organization and our employees understand where they are in the change process. We use this tool to identify gaps in your change management process and to provide effective coaching for our faculties.

The ADKAR model is used to:

- manage faculties resistance
- help faculties transition through the change process
- create a successful action plan for curriculum development
- develop a strategy of curriculum development

6.1.1 ADKAR Model for Change Management

ADKAR has become very popular with managers and project teams because this change management model is easily applied and simple to teach to others, including executive sponsors of change. ADKAR stands for:

- **Awareness** : Awareness of the need for change
- **Desire** : Desire to participate and support the change
- **Knowledge** : Knowledge on how to change
- **Ability** : Ability to implement required skills and behaviors
- **Reinforcement** : Reinforcement to sustain the change

Following change management tools are used in curriculum revision process.

1. Communication
2. Motivation
3. Workshop
4. Resistance Management
5. Training

Figure 6.1 shows the mapping of these tools with ADKAR.

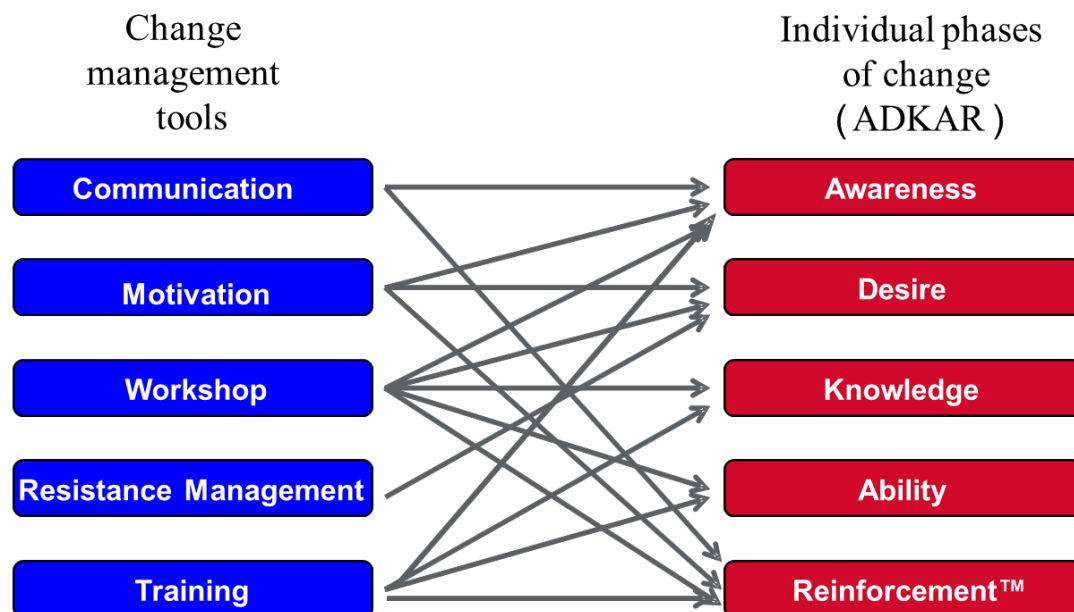


Figure 6.1. Mapping of change management tools with ADKAR

6.1.2 Results of ADKAR Model

As a result of using ADKAR model for change we got following results:

- Date of Starting curriculum Revision process : 23/01/2016
- Date of Completion of curriculum Revision process : 24/11/2016
- Time Period to complete curriculum Revision : 11 Months.
- No. of Programs for curriculum Revision : 11
- No. of Courses for curriculum Revision : 293
- Implementation of OBE curriculum from : July 2016

6.2 Curriculum Revision Process

Following Method is adopted for Development of Curriculum

- Study Outcome Base Education Philosophy
- Analyse OBE Curricula of Diploma in Engineering in India and Autonomous Institute (MS) curricula
- Analyse Model Diploma in Engineering curriculum by AICTE
- Compare 2011 curriculum with MSBTE existing curriculum
- Study NBA/AICTE/MSBTE/NSQF guidelines
- Organize Search Conference for validation of skills
- Collect Feedback (Program-wise) on existing curriculum from stake holders
- Curriculum mapping with POs to identify curriculum gaps
- Decide Institute Level policies
- Develop Model
- Prepare Action Plan for development
- Analyse and Brain storming at program level
- Develop Vision, Mission and PEOs and curriculum at program Level (Framing, Mapping, Editing, Revising)
- Approve from PBOS, BOS and GB.

6.2.1 Study of OBE Philosophy

CDC studies the OBE philosophy, which is described previously in this document. The training of faculties are arranged for awareness of faculties.

6.2.2 Analysis of OBE curricula

Following Boards in India adopted Outcome based curriculum for Diploma in Engineering:

- Gujarat Technological University-2014-15
- Board of Technical Examinations, Bengaluru, Karnataka- 2015-16
- State Board of Technical Education, Kerala state- 2015-16
- MSBTE is going for OBE from- 2017-18

The analysis of above OBE curriculum of each and every program is a huge task; however CDC studied curriculum of Diploma in Electrical Engineering of above said boards and analyze their curriculum based on the following points.

- Credits
- Credits Ratio TH:PR
- Total Courses
- Examination Scheme
- Comparison of Autonomous Curriculum in State

The results are shown in table 6.1 to 6.5

Table 6.1. Credits Comparison

Boards	Theory Periods	Practical Periods	Credits
GTU, Ahmedabad (OBE)	95	87	182
BTE, Bengaluru (OBE)	88	108 (2Pr=1Cr)	142
SBTE, Kerala (OBE)	NA	(2Pr=1Cr)	47 per Year
MSBTE, Mumbai (G scheme)	106	93	199
AICTE Model Curriculum	90	102 (2Pr=1Cr)	145
G. P. Nagpur (2011)	113	87	200

Table 6.2. Credit Ratio TH:PR Comparison

Boards	TH:PR
GTU, Ahmedabad (OBE)	52:48
BTE, Bengaluru (OBE)	62:32
SBTE, Kerala (OBE)	70:30 (I yr)
MSBTE, Mumbai (G scheme)	53:47
AICTE Model Curriculum	64:36
G. P. Nagpur (2011)	57:43

Table 6.3. Courses Comparison

Boards	Theory Courses	Practical Courses
GTU, Ahmedabad (OBE)	28	06
BTE, Bengaluru (OBE)	22	18
SBTE, Kerala (OBE)	NA	NA
MSBTE, Mumbai (G scheme)	31	12
AICTE Model Curriculum	29	16
G. P. Nagpur (2011)	29	12

Table 6.4. Examination Scheme Comparison

Boards	Theory		Practical	
	TEE	CA	TEE	CA
GTU, Ahmedabad (OBE)	70	30	20/40	30/60
BTE, Bengaluru (OBE)	100	25	50	25
SBTE, Kerala (OBE)	100	50	50	50

MSBTE, Mumbai (G scheme)	100	25	50	25/50
AICTE Model Curriculum	70	20*+10**	50	25
G. P. Nagpur (2011)	80	20	25	25/50

*Progressive Test

** Assignments

Table 6.5. Comparison of Autonomous Curricula

Institute	TH	TU	PR	Total	Theory Papers	Practical	Total Courses
G.P. Mumbai	96	12	68	176	25	13	38
VJTI, Mumbai	92	16	86	194	27	19	46
G.P. Aurangabad	103	00	81	184	26	13	39
G.P. Kolhapur	104	00	76	180	31	10	41
G.P. Nasik	111	03	82	196	29	11	40
G.P. Nagpur	113	05	82	200	29	12	41

6.2.3 Comparison with MSBTE Existing Curriculum

As mentioned 2.1.1, autonomous institutions shall be required to obtain equivalence for their courses and programs from the MSBTE, it is essential to compare GPN curriculum with existing curriculum for variation in content, Existing Courses for Revision/Deletion, New Courses proposed, detailed Comparison of Examination Scheme. This task is performed at program level. The analysis of this task is used to decide the course outcomes, course contents as well as to finalize the program structure of revised curriculum. The formats for the same are shown in table 6.6 to 6.9.

Table 6.6. Comparison of Existing Curriculum-2011 with MSBTE-2012 Curriculum

SN	MSBTE Curriculum				Equivalent course in Autonomous Curriculum				Content Variation if any with MSBTE
	Subject Code	Name of Subject	TH Periods	PR Periods	Course Code	Name of course	TH Credits	PR Credits	

Table 6.7. List of Existing Courses for Revision/Deletion etc.

Sr. No.	Course Code	Name of Course	Write-R (Revision) NR (No Revision) D (Deletion)	Reason for R/NR/D	Name of New title if proposed

Table 6.8. List of New Courses proposed

Sr. No.	Name of new courses proposed (if any)	Reason for introduction of New courses

Table 6.9. Comparison of Examination Scheme with MSBTE Curriculum

Sr. No.	Points	MSBTE Curriculum	Autonomous Curriculum	Remarks if any
1	Theory Paper Maximum marks			
2	Practical Maximum marks			
3	Progressive Test Maximum marks			
4	Term work Maximum marks			
5	No. of subject/courses having internal practical exam.			

6	No. of subject/courses having external practical exam			
7	No. of subject/courses having internal oral exam			
8	No. of subject/courses having external oral exam			
9	No. of subject/courses having term work			
10	No. of non-exam subject/courses			
11	Industrial training included in curriculum (Yes/No)			

6.2.4 Study of NBA/AICTE/MSBTE Guidelines

The guidelines given in following documents are studied, and the final conclusions are made to framed curriculum documents.

1. Orientation Workshop on Outcome Based Accreditation NBA training text material- to frame Vision, Mission of the Institute, Vision, Mission, PEOs of the program.
2. AICTE Guidelines- 21st Academic Council Meeting of AICTE on 3rd April, 2013 to decide percentage of various level courses. The abstract of the guidelines is mentioned in the table 6.10.

Table 6.10. Abstract of Guidelines

S. N.	Levels	Percentage	Course Heads
1	General	5 to 10%	Language / Communication skills
			Humanities and Social Science
			Economics & Principle of management
			NSS, NCC, NSO, Rural Development
2	Basic Science	15 to 25%	Computer literacy with numerical analysis
			Mathematics
			Physics

			Chemistry
3	Engineering Sciences and Technical Arts	15 to 25%	Engineering Graphics
			Workshop Practice
			Engineering Mechanics
			Electrical Science I (Basic Electrical Engineering)
			Thermodynamics and Heat Transfer
			Material Science and Engineering
			Electrical Science II (Electronics and Instrumentation)
4	Professional Subjects	55 to 65%	
i)	Professional Core	22.5 to 27.5%	Minimum number of Core courses suggested by experts
ii)	Professional Elective	12.5 to 15%	About 10% Electives should be made available to the students
iii)	Free Elective	7.5 to 10%	Open interdisciplinary electives allow a student to diversify his/her spectrum of knowledge
iv)	Project	5 to 10%	
v)	Seminar & Industrial Training	2.5 to 5%	

3. MSBTE Guidelines MSBTE/D-10/Director/2012/303 Dt.1st October, 2012-

The important guidelines given by MSBE are as follows:

- Credits should not be more than 160 and should be uniform across the program
- Curriculum should be laboratory based and having more practical weightage
- Curriculum should be restricted to five levels
- 4th and 5th level courses are considered for award of diploma
- Practical Examination should be based on performance only.

- Implant training should be made compulsory any time in vacation after first year and separate credits should be given.
- Online examination of courses should be start gradually. To begin with one course per semester.

6.2.5 Search Conference

The search conference is organized at institute level on dated 12/02/2016. The experts from the industries, academic institutions and alumni were present. The main objectives of organization of search conference are as follows:

- Validate generic and technical skills identified by the program.
- Suggest new skills to be developed in a technician pertaining to specific work area by industry/ field experts.
- Collect Feedback on existing curriculum and suggestions on previous received feedback.
- Suggest new course content to be incorporated in curriculum.
- Obtain suggestions on various topics related to program structure.
- Analyze and prepare a final list of generic skills and technical skills and from courses based on validated skills later on.
- Formation of Courses

6.2.6 Curriculum mapping

The 2011 curriculum is mapped to identify Program strengths (attributes that are widely addressed) and Gaps (attributes that are addressed by only a few learning experiences).

The simplest form of curriculum map is a matrix whose rows are the learning experiences (curriculum courses) and columns are the Graduate attributes (or Program Outcomes).

The curriculum courses include General Studies Courses, Basic Science Courses, Engineering Sciences and Technical Arts Courses, Professional Courses (Core, project, seminar etc.), Elective Courses.

To establish the curriculum map, each faculty member reviews his/her courses and identifies the attributes that are addressed in the course based on its content and materials.

A sample curriculum mapping sample is shown in Table 6.10. Program wise curriculum mapping is given in subsequent chapter.

Table 6.11. Curriculum mapping (Sample)

SN	Course code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
			Basic Knowledge	Discipline Knowledge	Experiments and Practice	Engineering tools	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Team work	Communication	Life-Long Learning	Maintain Electrical Equipment's	Maintain Electrical Power System
1	EV1101	Environmental science	X	-	-	-	X	X	X	X	X	X	-	-
2	EE1301	Basic Electrical Engineering	X	X	X	X	-	-	X	X	X	X	X	X
3	EE1401	Electrical Circuit and Network	X	X	X	X	-	-	-	X	-	X	X	X
4	EE1402	Electrical Measurement	-	X	X	X	X	-	X	X	-	X	X	X

6.2.7 Institute Level Policies

Institute level policy for curriculum development is decided by the CDC on the basis of followings:

- OBE Model
- Analysis of various curriculum Autonomous Institute/ MSBTE curriculum/ OBE curriculum
- NBA/AICTE/MSBTE Guidelines
- Feed Back from stake holders
- Search Conference Outcomes
- Curriculum Mapping of 2011 curriculum and
- GPN 2011 Curriculum

The following institute level suggestions are forwarded to the various programs for framing program structure.

1. Levels of Courses V

- **Level I- General studies courses- 5 (5 to 10%)**

1. English
2. Communication Skill
3. Environmental science
4. Economics & Management
5. Rural development (Non Theory)

- **Level II- Basic Science Courses- 6 (15 to 25%)**

6. C programming (including introduction to office tools) (Non Theory) (Note: Letter on this course is changed to Computer Applications as suggested in CM/IT PBOS)
7. Physics
8. Chemistry
9. Mathematics-I
10. Mathematics-II
11. Mathematics- III

(Note: The program which does not require mathematics-III course, may opt for more Computer literacy with numerical analysis courses. Letter on three mathematics courses are converted into two mathematics courses, by increasing the credits)

- **Level III Engineering Sciences and Technical arts courses- 7 (15 to 25%) (should be programme specific)**

12. Engineering Graphics (Theory)
13. Workshop Practice (program specific) (Non Theory)
14. Electrical Science I (Basic Electrical Engineering)
15. Electrical Science II (Electronics and Instrumentation)
16. Material Science and Engineering (program specific)

17. Engineering Mechanics

18. Thermodynamics and Heat Transfer (or mechanical related e.g. Elements of Mechanical Engineering for EE or program specific as per the experts suggestions)

- **Level IV- i) Professional Core Courses– 11- 22.5% to 27.5%**

19. to 27- Theory cum Practical Courses

28 to 29 – Practical courses (Non-Theory)

(Note: Letter on number of core courses are increased to 14)

- ii) **Project Courses- 5 to 10%**

30 to 31 – Practical Courses prerequisite for project (Non-Theory) Department specific workshop + program related design laboratory

32. Industrial Project

- iii) **Seminar and Industrial Training Courses- - 2.5 to 5%**

33. Seminar

34. Industrial Training/Practices

- **Level V- Elective Courses– 11- 22.5% to 27.5%**

- i) **Professional Elective Courses- 5/8 - 12.5 to 15%**

35. to 42- Theory cum Practical Courses

(Note: Letter on number of professional electives are changed to 3/6)

- ii) **Free Elective- 7.5 to 10%**

43. Finishing School (Common for all Branch)

44 to 53. Any one Elective Course each from 10 programs

(Note: Letter on number of electives courses are changed to 1/12)

2. **Detailed Curriculum Response**

CDC has suggested the various responses on various criteria based on the above study and are given in table 6.12

Table 6.12. Suggestive Curriculum at a Glance

SN	CRITERION	Suggestive RESPONSE
1	Total No. of Courses in a Program	55*
2	Total courses required.	41
3	No. of courses having theory papers.	29
4	No. of courses having non Theory exam.	12
5	No. of General Studies courses	5
6	No. of Basic Science Courses	6
7	No. of Engineering Science courses	7
8	No. of Professional Core courses	11
9	No. of Professional Elective courses	5/8
10	No. of Professional Free Elective courses	2/10*
11	No. of Project courses	3
12	No. of Seminar courses	2/3
13	Total credits (1 Th Hr = 1Credit & 2 Pr Hr = 1Credit)	150-155
14	Total marks	4600 (approx.)
15	Proportion of Hours (Periods), Th : Pr	50:50 (approx.)
16	Proportion of credits, Th : Pr	65:35 (approx.)
17	Proportion of marks; Th : Pr	50:50 (approx.)
18	Total courses for Award of Class	12
19	Total theory paper courses for Award of Class	10
20	Total marks for Award of Class	1600

6.2.8 Development of Curriculum Revision Model

Top to bottom design approach model of OBE described in Figure 4.2 is found in literature. No other model is found in literature. OBE is not only top to bottom design approach; it is a 360⁰ approach model. Based on this 360⁰ CDC developed our own model based on the study of described above. Government Polytechnic, Nagpur model is named as GoPoNa Model. The model is as shown in figure 6.2.

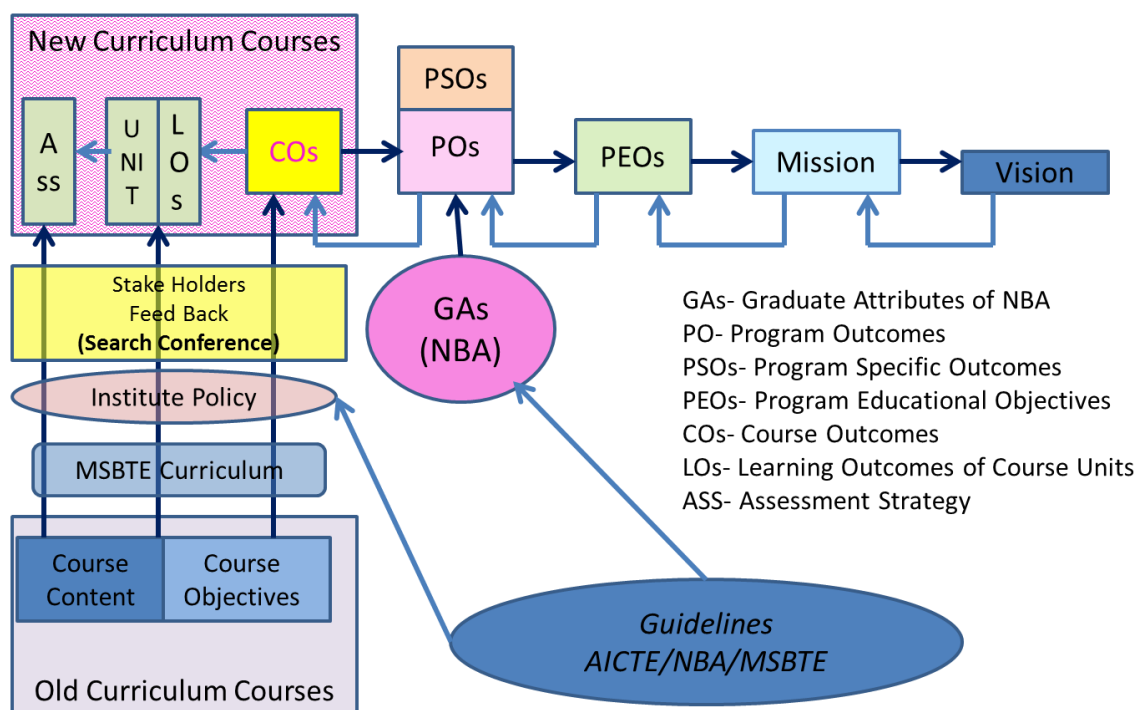


Figure 6.2. GoPoNa Model

GoPoNa Model is based on the OBE philosophy, various guidelines framed by the AICTE/NBA/MSBTE, and Search conference outcomes (feedback from stake holders). As OBE is 360⁰ approach various feedback loops are provided in the model for continuous improvement. The model is self-explanatory.

6.2.9 Preparation of Action Plan

Due to time constraint it is decided that the curriculum development process should be divided in to two phases. In first phase Curriculum of common courses i.e. Level I, II, III

are to be develop. And in second phase program specific courses of level IV and V are to be developed. The action plan is prepared for the both phases and is shown in table 6.13 and table 6.14 respectively.

Table 6.13. First Phase Action Plan

S.N.	Activity	Period/Date of Completion, up to
1	- Formation of PBOS at departmental level - Formation of institute level committee for deciding common policies. - Formation of committee for deciding Basic Engg. , Science and CNE courses policies	31/12/2015
2	Comparison of 2011 curriculum with MSBTE curriculum (Preliminary Task)	02/01/2016
3.	Meeting for deciding common policies of outcome based curriculum at institute level.	19/01/2016
4	Meeting for deciding policies of Basic Engg. , Science and CNE courses.	19/01/2016
5	Workshop for outcome based design procedure	22/01/2016
6	Preparation of Vision, Mission statements, POs and COs at program level	01/02/2016
7	Preparation of program structure based on outcome based education (course titles, scheme etc) by all programs (first draft, based on the information/data received from industries) & submission to I/C CDC.	10/02/2016
8	Checking of first draft of program structure of all program by curriculum revision committee (CDC) and return to respective program suggesting necessary corrections if any.	17/02/2016
9	Preparation of revised draft, if required, of program structure by the program and submission to CDC.	24/02/2016
10	Search conference for Validation of skills, program structure and course content detailing by all programs at department level.	02/03/2016
11	Course Content detailing of I, II & III sem. courses strictly as per Guideline of Curriculum Revision , information obtained from industries, content detailing format , feedback of MSBTE equiv. committee etc.	11/03/2016
12	Revising program structure, course content based on the outcome of search conference(if required)	19/03/2016

13	Arranging Program-wise Board of studies meeting (PBOS) of all program for courses of all levels by respective Program.	31/03/2016
	Suggestions in PBOS if any to be incorporated for getting approval from PBOS.	
14	Submission of curriculum of I, II & III sem. courses (soft copy) by program head/ “coordinator – curriculum” of program, to I/C CDC.	07/04/2016
15	Finalizing/checking of curriculum of I, II & III sem. courses of all program by Curriculum Revision Committee & submission to respective programs.	14/04/2016
16	Presentation of curriculum structure and courses in BOS meetings.	20/04/2016
17	Presentation of curriculum structure and courses in G.B. meetings	27/04/2016

Table 6.14. Second Phase Action Plan

S.N.	Activity	Period/Date of Completion, upto
1	Course Content detailing of III (if any), IV & V Level. courses strictly as per Guideline of Curriculum Revision , information obtained from industries, content detailing format , feedback of MSBTE equiv. committee etc.	06/06/2016 to 07/08/2016
2	Revising program structure, course content based on the outcome of search conference(if required)	14/08/2016
3	Arranging Program-wise Board of studies meeting (PBOS) of all program for courses of all levels by respective Program.	Up to 24/08/2016
4	Suggestions in PBOS if any to be incorporated for getting approval from PBOS.	
5	Submission of curriculum of IV & V level courses (soft copy) by program head/ “coordinator – curriculum” of program, to I/C CDC.	31/08/2016
6	Finalizing/checking of curriculum of IV & V level courses of all program by Curriculum Revision Committee & submission to respective programs.	01/09/2016
7	Presentation of curriculum structure and courses in BOS meetings.	07/09/2016 08/09/2016
8	Presentation of curriculum structure and courses in G.B. meetings	Before Diwali Vacation

6.2.10 Analysis and Brain Storming at Program Level

As per the action plan, OBE philosophy, guidelines and outcomes of search conference faculties in the program develops the program Structure (PS) and curriculum of courses as a group task.

The draft program structure of Electrical Engineering (Described in chapter 7) and draft curriculum of Basic Electrical Engineering is developed (shown in table 6.16) by CDC as a model for development of various programs PS and curricula.

Table 6.15. Program Structure Level I (sample)

PROGRAM STRUCTURE												
Level I: General Studies												
DIPLOMA IN ELECTRICAL ENGINEERING												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
1	EN101E	English	Nil	03	00	02	04	70	30	50 [@]	25	175
2	EN102E	Communication Skills	Nil	03	00	02	04	70	30	50 [@]	25	175
3	MN101E	Industrial Organization & Management	Min.60 credits	04	00	00	04	70	30	Nil	Nil	100
4	EV101E	Environmental Science	Nil	01	01	00	02	70**	30	Nil	Nil	100
5	RD101E	Rural Development	Nil	00	00	02	01	Nil	Nil	50 [@]	25	75
Total				11	01	06	15	280	120	150	75	625

- Abbreviations:
TH – Theory ; PR- Practical; TU- Tutorial; TEE- Term End Examination; CA- Continuous Assessment
- *Credit Formula: 1 TH Hr. = 1 Credit; 1 TU Hr. = 1 Credit; 2 PR Hrs. = 1 Credit
- Symbolic Representation
** Online Examination, @ Internal Practical Examination, # External Practical Examination, \$ Award of class course.

6.2.11 Development of Vision, Mission and PEOs and Curriculum

Vision and Mission of the Institute is revised by the CDC in consultation with all the programs, industry experts, academic expert and alumni in search conference. Vision,

Mission, PSOs and PEOs of the programs are developed by program itself in consultation with industry experts, academic expert and alumni in search conference. Vision and Mission of the Institute is approved in BOS and PBOS and Vision, Mission, PSOs and PEOs of the programs are approved in PBOS, BOS and GB.

6.2.12 Approval from AB, PBOS, BOS and GB

Program Structure, Curriculum of Science, Maths and Humanities departments are approved in AB and program specific courses are approved in PBOS of individual departments, Science, Maths and Humanities courses are also put before the PBOS of each program for approval, the suggestions obtained in PBOS are carried out before put it to BOS and all approved courses are put before BOS for approval. The approved curricula are put before GB for final approval. Table shows the details of PBOS, BOS and GB meetings.

6.3 Curriculum Revision at a Glance

• No. of Programs	:	11
• No. of Courses	:	291
• No. of GB Meetings	:	2
• No. of BOS Meetings	:	3
• No. of PBOS Meetings	:	33
• No. of AB Meetings	:	4
• No. of ILC Meetings	:	5
• No. of SCC Meetings	:	4
• No. of Coordinators Meetings	:	5
• Trainings Workshops	:	3
• Individual Department Trainings	:	13
• Search Conference	:	1
• No. of Faculties Involved	:	108
• No. of outside Experts Involved	:	46
• Days Spent for Curriculum Editing	:	26

CHAPTER 7

Model Course Curriculum

Model Course Curriculum of Basic Electrical Engineering is framed by CDC of GPN and circulates among the programs for development of various curricula. The workshop is arranged to describe the contents in it. The details are described below.

7.1 Basic Information

Following introductory information related to course is given in each curriculum.

PROGRAMME : **DIPLOMA IN ELECTRICAL ENGG.**
LEVEL NAME : **ENGINEERING SCIENCES AND TECHNICAL ARTS COURSES**
COURSE CODE : **EE301E**

The unique method is developed for assigning course code for the various courses, which is described in Figure 7.1.

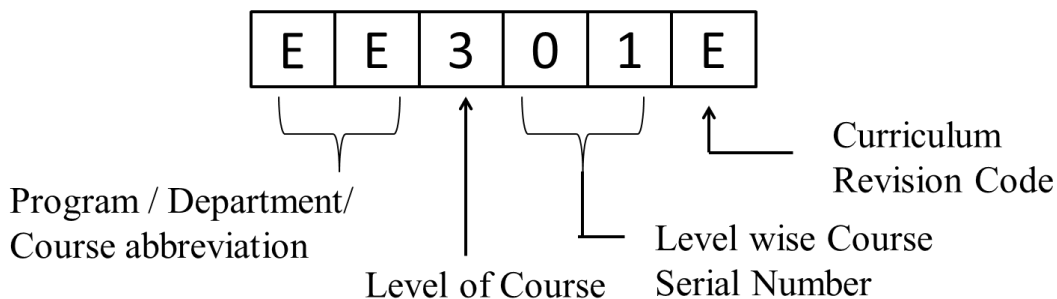


Figure 7.1. Course Code

COURSE TITLE : **BASIC ELECTRICAL ENGINEERING**
PREREQUISITE : **NIL**
TEACHING SCHEME: **TH: 04; TU: 00; PR: 02(CLOCK HRs.)**
TOTAL CREDITS : **05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)**
TH. TEE : **03 HRs**
PR. TEE : **02 HRs (Internal)**
PT. : **01 HR**

7.2 Rationale

In rationale the importance of the course is described in brief.

7.3 Course Outcomes (COs)

COs are “Building Blocks” of OBE system. COs are measured at the end of the course. They are aligned with one or more POs and are closely related to the assessments. COs are measurable and assessable. Every course is having six COs.

Blooms taxonomy is important in higher education, where outcomes needs to be address the student ability to use information, not just recall, therefore all course outcomes are written in higher levels of learning. COs are based on all domains of learning to fulfill maximum POs and start with the action verb. The example of CO is given below showing domains of learning. CO1, CO2 and CO3 are in cognitive domain. CO4, CO5 and CO6 are in psychomotor domain. CO3 falls also under affective domain.

1. **Apply** electrical safety concept
2. **Use** principle and basic laws in electrical engineering for different applications
3. **Solve** simple electrical circuits.
4. **Connect** electrical measuring instruments in the circuit
5. **Record** the readings of various electrical meters.
6. **Operate** electrical equipment.

7.4 Course Details: Theory

In course content is limited to six units. Each unit is having topic and subtopic. Based on the content Specific Learning Outcomes (SLOs) in cognitive Domain are mentioned. Action verbs of Cognitive Domain in all levels of learning;

1. Knowledge,
2. Comprehension,
3. Application, Analysis, Synthesis, Evaluation.

These SLOs are in line levels of learning domains mentioned in specification table or vice versa. Table 7.1 shows example.

Table 7.1. Course Details Theory (sample)

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs .
1. Electrical Safety	1. Apply electrical safety rules while working 2. Remove the electrocuted person from live conductor 3. Interpret electrical safety signs and symbols 4. Apply different methods of artificial respiration on electrocuted person 5. Select fire-fighting equipment on different types of fires.	1.1 Electrical Safety, Causes of accidents, General safety rules, Concept of electrical shock, Effect of electric shock, Method of removing electrocuted person, Safety signs and symbols. 1.2 Artificial respiration-schaefer's method, silvester's method, mouth to mouth respiration. 1.3 First Aid 1.4 Fire, Causes of Fire, Basic ways of extinguishing the fire Classification of fire, Class A, B,C, D, Fire fighting equipments, fire extinguishers, and their types .	06

7.5 Course Details Practical

All Specific Learning Outcomes (SLOs) are in psychomotor domain to develop the practical skills. Table 7.2 shows example.

Table 7.2. Course Details: Practical (sample)

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Identify electrical measuring instruments, sources, ICDP/ITDP, switches, loads, wires and execute safety precautions in laboratory.	1. Electrical Safety	4
2	Connect voltmeter, ammeter and wattmeter in electrical circuit.	2. Fundamentals of electricity	2
3	Measure the current, voltage and resistance with the help of multi-meter or tong tester.		2
4	Find unknown resistance using ohms law.		2
5	Find temperature coefficient of materials.		2

Skill test is mandatory to assess the skills acquire during the course work before term end examination.

7.6 Specification Table

Specification table is a blue print for setting question paper. It is useful for designing a valid question paper. In OBE 2016 curriculum; specification table is provided for question paper setting (as well as for student); which shows the level wise cognitive process dimensions. The sample Specification table is shown on table

Table 7.3. Specification Table (sample)

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Electrical Safety	00(02)	04(00)	00(00)	04(02)
02	Fundamentals of Electricity	06(02)	08(08)	06(00)	20(10)
03	DC Circuits	02(00)	04(00)	06(06)	12(06)
04	Electrostatics	02(00)	06(04)	00(00)	08(04)
05	Magnetism and Electromagnetism	06(04)	04(08)	06(00)	16(12)
06	AC Fundamentals	02(00)	08(00)	00(06)	10(06)
	Total	18(08)	34(20)	18 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

It is suggested that for:

- Basic Courses: R=30%; U=50%; A=20%
- Higher Level Courses: R=20%; U=50%; A=30%

7.7 Question Paper Profile (QPP)

Question paper profile (QPP) is the steps to words the step of e-governance. We can generate the question paper using computer program with the help of QPP and question bank on each bit of QPP. QPP is also the ready reckoner to the setter for setting questions on different levels of cognitive domain and topics. QPP reduces the process time of printed Question Paper for Examination.

Table 7.4. Question Paper Profile (sample)

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	1	R	2	5/7
	2	R	2																
02	2	R	4	1	U	4	2	U	4	2	U	4	2	U	4				3/5
03	5	R	4	2	U	4	3	U	4	4	U	4	5	U	4				3/5
04	5	U	4	6	U	4	6	U	4	5	U	4	5	R	4				3/5
05	4	U	6	2	A	6	3	A	6										2/3
06	3	A	6	5	A	6	6	A	6										2/3

2 Marks Bit- 5(2) = 7 Bits

4 Marks Bit- 9(6) = 15 Bits

6 Marks Bit- 4(2) = 6 Bits

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

7.8 Assessment and Evaluation Scheme

A detailed assessment and evaluation scheme is mentioned in curriculum in tabulated form as mentioned in table 7.5, which is self-explanatory.

Table 7.5. Assessment and Evaluation Scheme (Sample)

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Scripts	1, 2, 3
		Class Room Assignments		Assignments	10	--	Assignment Book	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Scripts	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	ST	Students	One skill test at end of term	20	--	Practical Answer Scripts	4,5,6
		Journal Writing		Assignments	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Practical Answer Scripts	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First PT	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course Survey			End Of The Course	Questionnaires			

7.9 Scheme of Practical Evaluation

A detailed scheme of practical evaluation is mentioned in curriculum having practical examination in tabulated form, which is a guideline for development of rubrics for assessment purpose. A sample scheme of practical evaluation of EE301E is shown in table 7.6.

Table 7.6. Scheme of Practical Evaluation (Sample)

S.N.	Description	Max. Marks
1	Drawing circuit diagram, selection of equipment's. writing procedure etc.	10
2	Performance	20
3	Calculation, Result, Drawing Graphs (if any)	10
4	Viva voce	10
	TOTAL	50

7.10 Mapping of Course Outcomes with POs and PSOs

All developed curricula are mapped with POs and PSOs of the program. The POs and PSOs which fulfilled by the curriculum content are identified first. Individual course outcomes written previously are then mapped with the POs and PSOs. A sample mapping of EE301E is shown in table 7.7.

Table 7.7. Mapping of COs with POs and PSOs (Sample)

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
CO1	3	3	-	-	-	-	1	-	-	-	3	3
CO2	3	3	-	-	-	-	-	-	-	-	3	3
CO3	3	3	-	-	-	-	-	-	-	-	3	3
CO4	3	3	2	2	-	-	-	2	2	2	3	3
CO5	3	3	2	2	-	-	-	2	2	2	3	3
CO6	3	3	2	2	-	-	-	2	2	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

7.11 Reference & Text Books

A reference and text books required as per the content of curriculum are mentioned as a reference for the student as well as faculties. Only standard books having ISBN numbers are given priority in the document. A sample of EE301E is shown in table 7.8.

Table 7.8. Reference & Text Books (Sample)

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Principle of Electrical Engineering and Electronics	V.K.Mehta, S.Chand & Company Ltd., Reprint, 1996	81-219-1053-6
2.	A Text Book Of Electrical Technology Vol-I	B.L.Theraja, A.K.Theraja, S.Chand & Co Ltd., Reprint,2006	81-219-2440-5
3.	Basic Electrical Engineering	V.N.Mittle, Arvind Mittal, The McGraw Hill Education Pvt. Ltd, Reprint, 2011	13: 978-0-07-059357-2
4.	Experiments in Basic Electrical Engineering	S.K.Bhattacharya and K.M.Rastogi., New Age International Publisher, Reprint, 2009.	978-81-224-1042-6
5.	A Text Book on laboratory courses in Electrical Engineering	S.G.Tarnekar and P.K.Kharbanda, S.Chand& Company Ltd., Third, 1990	13: 978-8121901048

7.12 E-References

E-references as per the content of curriculum are mentioned as a reference for the student as well as faculties. Standard e-references are given priority in the document. These references are useful for students learning. A sample of EE301E is shown below.

- <http://nptel.ac.in/courses/108108076/1> , assessed on 18th January 2016
- <http://www.electrical4u.com> , assessed on 18th January 2016
- <https://www.youtube.com/watch?v=A9KSGAnjo2U>, assessed on 18th January 2016

7.13 List of Major Equipment's/Instruments with Specification

The list of major equipment's/ instruments required for performing the practical to developed psychomotor skills is mentioned in the document. A sample list of EE301E is shown below.

1. Ammeter MI 0-5-10 A
2. Voltmeter MI 0-150-300 V
3. Wattmeter 0-3000 W
4. Digital Multi-meter
5. Rheostat assorted sizes
6. Variable Inductor

7.14 List of Experts & Teachers who Contributed for Curriculum

The list of experts & teachers who contributed for curriculum is mentioned in the document followed by the signature of chairman PBOS and member secretary of PBOS for the authenticity of the curriculum.

S.N.	Name	Designation	Institute / Industry
1.			
2.			

 Sign. _____
 (Member Secretary PBOS)

 Sign. _____
 (Chairman PBOS)

CHAPTER 8

Curriculum Document

Detailed curriculum document of Diploma in **Information Technology** is given below.

8.1 Vision of Institute

To become a Center of Excellence, providing quality technical education and training

8.2 Mission of Institute

The mission of Government Polytechnic, Nagpur is-

1. To frame institutional policies for effective implementation of teaching learning process
2. To inculcate values and ethics for life-long learning through curricular, co-curricular and extra-curricular activities
3. To develop facilities and services for academic excellence
4. To enhance the skills of faculties and staff through industry institute collaboration.

8.3 Vision of Program

Vision of the Information Technology Program:

To promote excellence in teaching and learning to produce lifelong learners who can compete globally to serve information industry and society.

8.4 Mission of Program

Mission of the Information Technology Program:

M1: To enhance the educational experience that inspires students to reach for the highest level of accomplishment and personal growth throughout their lives.

- M2:** To provide an environment that enables students and faculty to make lasting contributions to the advancement of knowledge and the creative practice of Information Engineering.
- M3:** To fulfill expectations of the society and industry by equipping students with state of art technology resources for developing sustainable solutions.
- M4:** Design and deliver curricula to meet the national and global changing needs through student-centric learning methodologies.

8.5 Program Educational Objectives (PEOs)

The Program Educational Objectives of (PEOs) Information Technology Program are:

- PEO1:** To prepare students who have strong foundation in mathematics, science, engineering fundamentals, laboratory and work-based experiences to formulate and solve engineering problems in Information Technology domains.
- PEO2:** To impart comprehensive knowledge with equal emphasis on theory and practice.
- PEO3:** To improve personality, induce team spirit and leadership quality among students and to promote cultural, social and spiritual values in all activities.
- PEO4:** To sharpen the problem solving skills to acquire competency for interdisciplinary problem solving and train them to excel in application or System development, System analysis and design, Project management in areas of socio-technological issues like environment and sustainability.
- PEO5:** To provide quality education for making the students competent to enter into the Global IT World as well as in the field of Research.

8.6 Program Outcomes (POs)

- PO1: Basic Knowledge:** Ability to apply knowledge of basic Mathematics, Science and Engineering to solve the engineering problems
- PO2: Discipline Knowledge:** Ability to discipline specific knowledge to solve core and/or applied engineering problems
- PO3: Experiments and Practice:** Ability to plan and perform experiments and practices and use the results to solve engineering problems

PO4: Engineering tools: Apply appropriate technologies and tools with an understandings of limitations

PO5: The Engineer and Society: Demonstrate knowledge to assess the societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to engineering practice.

PO6: Environment and Sustainability: Understand the impact of engineering solutions in societal and environmental context, and demonstrate knowledge and need for sustainable development.

PO7: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO8: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse/ multidisciplinary teams.

PO9: Communication: An ability to communicate effectively.

PO10: Life-long learning: Recognise the need for, and have preparation and the ability to engage in independent and life-long learning in context of technological changes.

8.7 Program Specific Outcomes (PSOs)

PSO1: Ability to formulate, simulate and use knowledge of IT domains to solve hardware and Networking problem.

PSO2: Ability to code and test engineering problems using various programming languages and testing techniques.

8.8 Mapping of Vision, Mission, PEOs, POs, PSOs

8.8.1 Mapping of Vision and Mission

Table 8.1. Mapping of Vision-Mission

	Mission Statements			
	M1	M2	M3	M4
Vision Statement	✓	✓	✓	✓

8.8.2 Mapping of Mission and PEOs

Table 8.2. Mapping Mission-PEOs

Mission Statements	Program Educational Objectives (PEOs)				
	PEO1	PEO2	PEO3	PEO4	PEO5
M 1	✓	✓	✓	-	✓
M 2	✓	-	✓	✓	-
M 3	-	-	✓	✓	✓
M 4	-	✓	-	✓	✓

8.8.3 Mapping of PEOs and POs- PSOs

Table 8.3. Mapping PEOs-POs & PSOs

PEOs	Program Outcomes (POs)										PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PSO 1	PSO 2
PEO1	✓		✓									
PEO2		✓	✓									✓
PEO3						✓	✓	✓		✓	✓	
PEO4			✓			✓			✓		✓	
PEO5				✓	✓							✓

8.9 Identified Skills in Search Conference

8.9.1 Technical skills for Information Technology Diploma Students

1. Develop professional documents using MS-Word.
2. Analyze data and graphically represent it using MS Excel.
3. Prepare professional presentations using MS-Power Point.
4. Assemble and de-assemble the computer system.
5. Work with Internet technology.
6. Develop Programs using C Language.
7. Develop applications using object oriented features of C++.
8. Develop Java Applications using Abstract Window Toolkit (AWT) & Java Applets.
9. Create PL/SQL block using exceptions, triggers.
10. Do conversion of number system.
11. Develop programs for stack, queue, linked list, tree, graphs, and sorting, searching etc. algorithms.
12. Create Database relationship and execute queries to Manage the Database using Structured Query Language (SQL) with Oracle.
13. Create static web pages using HTML tags.
14. Develop a web application using Database Connectivity.
15. Develop Dynamic Web Application using Active Server Page (ASP) and Extensive Markup Language (XML) Technology.
16. Develop a VisualBasic.NET Application with ADO.net.
17. Comprehend the Concepts of data Communication and Computer Networks.
18. Comprehend the various Wireless Technologies for data Communication.
19. Comprehend the various Mobile Computing Technologies.
20. Develop Mobile based Application
21. Install, Configure, administer, manage Computer Networks using Window and Linux Operating Systems.
22. Troubleshoot and Maintain Computer Networks.
23. Test the working of different digital building blocks.

- 24 Design various digital circuits like combinational circuits, Sequential circuits.
- 25 Comprehend system software and ability to design and use application software.
- 26 Install, configure, manage and maintain computer hardware.
- 27 Comprehend, Implement various Data Security Algorithms and configure firewall.
- 28 Comprehend the Management Function of Operating System.
- 29 Write shell programs and other high level language programs in Linux.
- 30 Apply the Concepts of Software Engineering to Implement a Software Project.
- 31 Identify Design, Develop and Execute an Industry Related project.
- 32 Prepare project report.
- 33 Use Enterprise Resource Planning (ERP) software for an organization.
- 34 To present sample case studies of natural disasters.
- 35 Analyze the working of computers and peripherals.
- 36 Use diagnostic test programmes to test hardware .
- 37 Analyze the construction and characteristics of semiconductor devices.
- 38 State the uses of semiconductor devices in electronic circuits.
- 39 Analyze the principle of working of simple electronic circuits.
- 40 Apply the basic concept of network technology to design and maintain local area network (LAN) and wide area network (WAN).
- 41 Use data structure and programming techniques.
- 42 Develop the logical abilities in students.
- 43 Develop modular programs.
- 44 Apply the networking principle for data and resource sharing.
- 45 Comprehend the different concepts of an operating system.
- 46 Apply principles of digital data transmission, communication methodologies used in data transmission.
- 47 Create and manage procedures, functions and packages.
- 48 Develop the database applications using Visual Basic as front end tool with database connectivity.
- 49 Comprehend the Logical Architecture of Computer.
- 50 Apply the concepts of interfacing techniques and interrupts.
- 51 Develop assembly language programs.

- 52 Analyze the architecture of microprocessor.
- 53 Analyzing the current market scenario for the development of software-market analysis, risk analysis, requirement gathering.
- 54 Analyze technological advancements and forthcoming areas of development.
- 55 Analyze current trends in Information Technology.
- 56 Develop Programs using Computer Graphics Algorithms.
- 57 Apply various data compression algorithms.
- 58 Apply various software testing techniques.
- 59 Comprehend Data warehousing Architecture.
- 60 Apply Data Mining Algorithms.

8.9.2 Generic skills for Information Technology Diploma Holder

- 61 Communicate effectively in English in oral and written form with superiors, subordinates and peers
- 62 Manage people at work
- 63 Work as a group leader & as a team member to achieve goals
- 64 Lead group discussions and meetings independently
- 65 Creatively think and apply innovative skills in problem solving
- 66 Take Critical and logical decisions
- 67 Prepare detailed project proposals and reports
- 68 Prepare tender documents & comparative statements
- 69 Use all resources like media, market survey, technical literature etc. to gather information for taking decisions
- 70 Adapt according to the market trends
- 71 Apply basic science skills
- 72 To cultivate the taste of good reading and to be able to comprehend

8.10 2011 Curriculum Mapping with Program Outcomes (POs)

The 2011 curriculum is mapped to identify Program strengths (attributes that are widely addressed) and Gaps (attributes that are addressed by only a few learning experiences). The mapping table is shown below.

Table 8.4. 2011 Curriculum Mapping with POs & PSOs

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO2
		Basic Knowledge	Discipline Knowledge	Experiments and Practice	Engineering tools	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Team work	Communication	Life-Long Learning	Ability to formulate, simulate and use knowledge of IT domains to solve hardware and Networking knowledge of IT domains to solve hardware and Networking	Ability to code and test engineering problems using various programming languages
EN1101	English	X	-	X	-	-	-	-	X	X	X	-	-
EN1102	Communication skills	X	-	X	-	-	-	-	X	X	X	-	-
ME1101	Industrial Org. & Management	X	-	-	-	X	X	X	-	-	X	-	-
EV1101	Environmental Science	X	-			X	X	X	X	X	X	-	-
PH1201	Engg. Physics	X	-	X	X	-	-	-	X	-	X	-	-
MH1201	Basic Engg. Math.	X	-	X	-	-	-	-	X	-	X	-	-
MH1202	Engg. Mathematics	X	-	X	-	-	-	-	X	-	X	-	-
MH1204	Applied Mathematics	X	-	X	-	-	-	-	X	-	X	-	-
CM1301	Computing Essentials	X	X	X	X	-	X	-	X	-	X	X	X
IT1301	Office Tools	X	X	X	X	-	-	-	X	-	X	X	X
CM1302	C-Programming-I	X	X	X	X	-	-	-	X	-	X	X	X
CM1303	C Programming-II	-	X	X	X	-	-	-	X	-	X	X	X
IT1302	Data Communication	-	X	X	X	-	-	-	X	-	X	X	X
CM1305	Data Structures	-	X	X	X	-	-	-	X	-	X	-	X
CM1306	OOPS	X	X	X	X	-	-	X	X	X	X	X	X
EC1309	Fundamentals of Electronics	X	-	X	X	X	-	-	X	-	X	-	-
EC1311	Digital	-	X	X	X	-	-	-	X	-	X	-	-

	Technique												
EE1302	Electrical Engg.	X	-	X	X	-	-	X	X	-	X	-	-
EC1312	Electronic Workshop	X	-	X	X	X	-	-	X	-	X	-	-
ME1301	Engg. Graphics	X	-	X	X	-	-	X	X	X	X	-	-
CM1402	VB Programming	-	X	X	X	-	-	-	X	-	X	-	X
IT1401	Computer Networking	-	X	X	X	-	-	-	X	-	X	-	X
IT1402	Software Engg & Testing	-	X	X	X	-	-	-	X	X	X	X	X
IT1403	Java Programming	-	X	X	X	-	-	-	X		X	X	X
CM1403	RDBMS	-	X	X	X	-	-	-	X		X	X	X
EC1410	Microprocessor	X	-	X	X	-	-	-	X	-	X	-	-
CM1404	Computer Hardware & Maintenance	-	X	X	X	-	X	-	X	-	X	X	-
IT1404	Unix/Linux OS	-	X	X	X	-	-	-	X	-	X	-	X
IT1405	Software Project Management		X	X	X	-	-	X	X	X	X	-	X
IT1407	Seminar	-	X	X	X	X	-	X	X	X	X	X	-
CM1407	VC++ Programming	-	X	X	X	-	-	-	X	-	X	X	X
IT1408	Soft Skills	-	-	-	-	X	-	X	X	X	X	-	-
IT1409	Web Designing	-	X	X	X	-	-	X	X	X	X	X	X
IT1410	Project	-	X	X	X	X	-	X	X	X	X	X	X
IT1503	Advanced JAVA	-	X	X	-	-	-	-	X	-	X	X	X
IT1507	Web Programming	X	X	X	X	-	-	X	X	X	X	X	X
IT1502	Network Security	-	X	X	-	-	-	-	X	-	X	X	X
IT1511	ECommerce	-	X	X	X	-	-	-	X	-	X	-	-
IT1405	Network Administration	-	X	X	-	-	-	-	X	-	X	X	X

8.10.1 Identified Gaps in 2011 Curriculum

2011 curriculum mapping with Program Outcomes (POs) and Program Specific Outcomes (PSOs) are carried out. It is found that, the content in 2011 curriculum related to following POs are less related to other POs.

1. PO4:Engineering Tools
2. PO5: The Engineer and Society
3. PO6: Environment & Sustainability
4. PO7: Ethics
5. PO9: Communication

Therefore, to fulfill these gaps some common courses and program specific courses are suggested in curriculum

Common Courses:

1. Rural Development
2. Finishing school
3. Industrial Training / Industrial practices
4. Free Electives (Total twelve courses)

Program related courses:

1. Linux Programming
2. Internetworking with TCP/IP

8.11 Courses Identification

Courses are formed based on identified skills in search conference, identified gaps in 2011 curriculum, AICTE guidelines and institute policy framed by ILC. The following table shows the identified skills and courses formed based on it.

Table 8.5. Courses Identification from Identified Skills

Identified Skills	Courses
61. Communicate effectively in English in oral and written form with superiors, subordinates and peers. 68. Prepare tender documents & comparative statements. 72. Cultivate the taste of good reading and to be able to comprehend.	1.English

64. Lead group discussions and meetings independently.	
61. Communicate effectively in English in oral and written form with superiors, subordinates and peers. 62. Manage people at work. 72. To cultivate the taste of good reading and to be able to comprehend. 70. Adapt according to the market trends.	2.Communication skills
62. Manage people at work. 63. Work as a group leader & as a team member to achieve goals. 69. Use all resources like media, market survey, technical literature etc. to gather information for taking decisions. 33. Use Enterprise Resource Planning (ERP) software for an organization.	3.Industrial Organization & Management
67. Prepare detailed project proposals and reports. 34. Present sample case studies of natural disasters. 70. Adapt according to the market trends. 65. Creatively think and apply innovative skills in problem solving.	4.Environmental Science
35. Apply the working of computers and peripherals. 1. Develop professional documents using MS-Word. 2. Analyze data and graphically represent it using MS Excel. 3. Prepare professional presentations using MS-Power Point.	5. Computer Fundamentals
71. Apply basic science skills.	6. Physics
71. Apply basic science skills.	7.Chemistry
Common Course to fulfill POs	8.Engineering Graphics
26. Install, configure, manage and maintain computer hardware. 4. Assemble and de-assemble the computer system. 35. Analyze the working of computers and peripherals. 36. Use diagnostic test programmes to test hardware.	9.Computer Workshop
Common Course to fulfill POs	10.Engineering Mechanics
Common Course to fulfill POs	11.Basic Electrical Engineering
37. Analyze the construction and characteristics of semiconductor devices. 38. State the uses of semiconductor devices in electronic circuits. 39. Analyze the principle of working of simple electronic circuits. 23. Test the working of different digital building blocks.	12.Principles of Electronics
40. Apply the basic concept of network technology to design	13.Computer Network

and maintain local area network (LAN) and wide area network (WAN). 22. Troubleshoot and Maintain Computer Networks. 17. Comprehend the Concepts of data Communication and Computer Networks. 44. Apply the networking principle for data and resource sharing.	
23. Test the working of different digital building blocks. 39. Analyze the principle of working of simple electronic circuits 24. Design various digital circuits like combinational circuits, Sequential circuits. 10. Do conversion of number system.	14.Digital Technique
6. Develop Programs using C Language. 41. Use data structure and programming techniques. 42. Develop the logical abilities in students. 43. Develop modular programs.	15.Programming in 'C'
7. Develop applications using object oriented features of C++. 41. Use data structure and programming techniques. 42. Develop the logical abilities in students. 43. Develop modular programs.	16.Object Oriented Programming
11. Develop programs for stack, queue, linked list, tree, graphs, and sorting, searching etc. algorithms. 41. Use data structure and programming techniques. 42. Develop the logical abilities in students. 43. Develop modular programs.	17.Data Structure
45. Comprehend the different concepts of an operating system. 54. Analyze technological advancements and forthcoming areas of development. 55. Analyze current trends in Information Technology. 28. Comprehend the Management Function of Operating System.	18. Operating System
17. Comprehend the Concepts of data Communication and Computer Networks. 18. Comprehend the various Wireless Technologies for data Communication. 46. Apply principles of digital data transmission, communication methodologies used in data transmission. 22. Troubleshoot and Maintain Computer Networks.	19.Data Communication
12. Create Database relationship and execute queries to Manage the Database using Structured Query Language (SQL) with Oracle. 9. Create PL/SQL block using exceptions, triggers. 47. Create and manage procedures, functions and packages.	20.Relational Database Management System

48. Develop the database applications using Visual Basic as front end tool with database connectivity.	
49. Comprehend the Logical Architecture of Computer. 50. Apply the concepts of interfacing techniques and interrupts. 52. Analyze the architecture of microprocessor. 51. Develop assembly language programs.	21. Microprocessor
22. Troubleshoot and Maintain Computer Networks. 17. Comprehend the Concepts of data Communication and Computer Networks. 21. Install, Configure, administer, manage Computer Networks using Window and Linux Operating Systems. 44. Apply the networking principle for data and resource sharing.	22. Internetworking with TCP/IP
28. Comprehend the Management Function of Operating System. 54. Analyze technological advancements and forthcoming areas of development. 29. Write shell programs and other high level language programs in Linux. 45. Comprehend the different concepts of an operating system.	23. Linux Programming
53. Analyzing the current market scenario for the development of software-market analysis, risk analysis, requirement gathering. 48. Develop the database applications using Visual Basic as front end tool with database connectivity. 54. Analyze technological advancements and forthcoming areas of development. 55. Analyze current trends in Information Technology.	24. Management Information System
55. Analyze current trends in Information Technology. 56. Develop Programs using Computer Graphics Algorithms. 57. Apply various data compression algorithms. 54. Analyze technological advancements and forthcoming areas of development.	25. Multimedia Techniques
25. Analyze the working of computers and peripherals. 4. Assemble and de-assemble the computer system. 26. Install, configure, manage and maintain computer hardware. 36. Use diagnostic test programmes to test hardware.	26. Computer Hardware & Maintenance
8. Develop Java Applications using Abstract Window Toolkit (AWT) & Java Applets. 41. Use data structure and programming techniques. 42. Develop the logical abilities in students. 43. Develop modular programs.	27. Java Programming

53. Analyze the current market scenario for the development of software-market analysis, risk analysis, requirement gathering. 30. Apply the Concepts of Software Engineering to Implement a Software Project. 54. Analyze technological advancements and forthcoming areas of development. 55. Analyze current trends in Information Technology.	28. Software Engineering
13. Create static web pages using HTML tags. 14. Develop a web application using Database Connectivity. 5. Work with Internet technology. 54. Analyze technological advancements and forthcoming areas of development.	29. Web Page Design
31. Identify ,Design, Develop and Execute an Industry Related project. 54. Analyze technological advancements and forthcoming areas of development. 67. Prepare detailed project proposals and reports. 68. Prepare tender documents & comparative statements.	30. Software Project Management
31. Identify Design, Develop and Execute an Industry Related project. 32. Prepare project report. 63. Work as a group leader & as a team member to achieve goals. 65. Creatively think and apply innovative skills in problem solving.	31. Industrial Project
61. Communicate effectively in English in oral and written form with superiors, subordinates and peers. 69. Use all resources like media, market survey, technical literature etc. to gather information for taking decisions. 70. Adapt according to the market trends. 67. Prepare detailed project proposals and reports.	32. Seminar
65. Creatively think and apply innovative skills in problem solving. 32. Prepare project report. 66. Take Critical and logical decisions. 67. Prepare detailed project proposals and reports.	33. Industrial Practices/ Industrial Training
21. Install, Configure, administer, manage Computer Networks using Window and Linux Operating Systems. 27. Comprehend, Implement various Data Security Algorithms and configure firewall. 22. Troubleshoot and Maintain Computer Networks. 40. Apply the basic concept of network technology to design and maintain local area network (LAN) and wide area	34. Network Administration & Security

network (WAN).	
54. Analyze technological advancements and forthcoming areas of development. 55. Analyze current trends in Information Technology. 58. Apply various software testing techniques. 68. Prepare tender documents & comparative statements.	35. Software Testing
54. Analyze technological advancements and forthcoming areas of development. 59. Comprehend Data warehousing Architecture. 60. Apply Data Mining Algorithms. 55. Analyze current trends in Information Technology.	36. Data Mining & Data Warehousing
19. Comprehend the various Mobile Computing Technologies. 20. Develop Mobile based Application. 54. Analyze technological advancements and forthcoming areas of development. 55. Analyze current trends in Information Technology.	37. Mobile Computing
54. Analyze technological advancements and forthcoming areas of development. 41. Use data structure and programming techniques. 42. Develop the logical abilities in students. 43. Develop modular programs.	38. Advance Java
16. Develop a VisualBasic.NET Application with ADO.net. 5. Work with Internet technology. 15. Develop Dynamic Web Application using Active Server Page (ASP) and Extensive Markup Language (XML) Technology. 14. Develop a web application using Database Connectivity.	39. Web Technologies
Common Course to fulfill POs	40. Finishing School
Common Course to fulfill POs	41. Free Electives
Common Course to fulfill POs	42. Rural Development

8.12 Program Structure

The program structure of the Information Technology program is developed as described in chapter 6 previously and is given below.

8.12.1 Program Structure Level I: General Studies

Table 8.6. Program Structure Level I: General Studies

DIPLOMA IN INFORMATION TECHNOLOGY												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
1	EN101E	English	Nil	03	00	02	04	70	30	50 [@]	25	175
2	EN102E	Communication Skills	Nil	03	00	02	04	70	30	50 [@]	25	175
3	MN101E	Industrial Management	Min.60 credits	04	00	00	04	70	30	Nil	Nil	100
4	EV101E	Environmental Science	Nil	01	01	00	02	70**	30	Nil	Nil	100
5	RD101E	Rural Development	Nil	00	00	02	01	Nil	Nil	50 [@]	25	75
Total				11	01	06	15	280	120	150	75	625

No. of Compulsory Courses : 05

No. of Optional Courses : Nil

Abbreviations:

TH – Theory ; PR- Practical; TU- Tutorial; TEE- Term End Examination; CA- Continuous Assessment

Credit Formula: 1 TH Hr. = 1 Credit; 1 TU Hr. = 1 Credit; 2 PR Hrs. = 1 Credit

Symbolic Representations:

** Online Examination,

@ Internal Practical Examination,

External Practical Examination,

\$ Award of class course

8.12.2 Program Structure Level II: Basic Science Courses

Table 8.7. Program Structure Level II: Basic Science Courses

DIPLOMA IN INFORMATION TECHNOLOGY												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
1	CM201E	Computer Fundamentals	Nil	00	00	04	02	Nil	Nil	50 [@]	25	075
2	PH201E	Engineering Physics	Nil	04	00	02	05	70	30	50 [@]	25	175
3	CH202E	Applied Chemistry	Nil	04	00	02	05	70	30	50 [@]	25	175
4	MH201E	Engineering Mathematics	Nil	04	01	00	05	70	30	Nil	Nil	100
5	MH203E	Applied Mathematics	MH201E	04	01	00	05	70	30	Nil	Nil	100
Total				16	02	08	22	280	120	150	75	625

No. of Compulsory Courses : 05

No. of Optional Courses : Nil

Abbreviations:

TH – Theory ; PR- Practical; TU- Tutorial; TEE- Term End Examination; CA- Continuous Assessment

Credit Formula: 1 TH Hr. = 1 Credit; 1 TU Hr. = 1 Credit; 2 PR Hrs. = 1 Credit

Symbolic Representations:

** Online Examination,

@ Internal Practical Examination,

External Practical Examination,

\$ Award of class course

8.12.3 Program Structure Level III: Engineering Sciences and Technical Arts Courses

Table 8.8. Program Structure Level III: Engineering Sciences and Technical Arts Courses

DIPLOMA IN INFORMATION TECHNOLOGY												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
1	ME302E	Engineering Graphics	Nil	02	00	04	04	Nil	Nil	50	25	75
2	CM301E	Computer Workshop	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
3	AM301E	Engineering Mechanics	Nil	03	01	02	05	70	30	50 [@]	25	175
4	EE303E	Electrical Engineering	Nil	04	00	02	05	70	30	50 [@]	25	175
5	EC308E	Principles of Electronics	Nil	04	00	02	05	70	30	50 [@]	25	175
6	CM302E	Computer Network	Nil	04	00	02	05	70	30	50 [@]	25	175
7	EC310E	Digital Technique	Nil	03	00	02	04	70	30	50 [@]	25	175
Total				20	01	18	30	350	150	300	175	1025

No. of Compulsory Courses : 07

No. of Optional Courses : Nil

Abbreviations:

TH – Theory ; PR- Practical; TU- Tutorial; TEE- Term End Examination; CA- Continuous Assessment

Credit Formula: 1 TH Hr. = 1 Credit; 1 TU Hr. = 1 Credit; 2 PR Hrs. = 1 Credit

Symbolic Representations:

** Online Examination,

@ Internal Practical Examination,

External Practical Examination,

\$ Award of class course

8.12.4 Program Structure Level IV: Professional Courses

Table 8.9. Program Structure Level IV: Professional Courses

DIPLOMA IN INFORMATION TECHNOLOGY												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
a) Core Courses												
1	IT401E	Data Communication	-	03	00	00	03	70**	30	Nil	Nil	100
2	IT402E	Java Programming ^{\$}	-	03	00	04	05	70	30	50#	25	175
3	IT403E	Linux Programming ^{\$}	CM404E	03	00	04	05	70	30	50#	25	175
4	IT404E	Management Information System	-	03	00	00	03	70	30	Nil	Nil	100
5	IT405E	Network Administration & Security	-	03	00	04	05	70	30	50@	25	175
6	IT406E	Software Engineering ^{\$}	-	04	00	02	05	70	30	50#	25	175
7	IT407E	Internetworking with TCP/IP		03	00	00	03	70	30	Nil	Nil	100
8	CM401E	Programming in ‘C’	-	03	00	04	05	70	30	50#	25	175
9	CM402E	Object Oriented Programming	CM401E	03	00	04	05	70	30	50#	25	175
10	CM403E	Data Structure ^{\$}	CM401E	03	00	04	05	70	30	50#	25	175
11	CM404E	Operating System ^{\$}	-	03	00	02	04	70	30	50#	25	175
12	CM406E	Relational Database Management System ^{\$}	-	03	00	04	05	70	30	50#	25	175
13	CM407E	Microprocessor	-	03	00	02	04	70	30	50#	25	175
14	CM412E	Computer Hardware & Maintenance		00	00	04	02	Nil	Nil	50#	25	75
Sub Total (a)				40	00	38	59	910	390	550	275	2125

8.12.5 Program Structure Level IV: Professional Courses (Project Courses)

Table 8.10. Program Structure Level IV: Professional Courses (Project Courses)

DIPLOMA IN INFORMATION TECHNOLOGY												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
b) Project Courses												
15	CM413E	Web Page Design	--	00	00		02	Nil	Nil	50 [#]	50	100
16	CM414E	Software Project Management ^{\$}	--	00	00		02	Nil	Nil	50 [#]	50	100
17	IT408E	Industrial Project ^{\$}	Min 90 credits	00	00		02	Nil	Nil	100 [#]	50	150
Sub Total (b)				00	00		06	Nil	Nil	200	150	350
c) Seminar courses												
18	SE401E	Seminar	Min 60 credits	00	00	02	01	Nil	Nil	50 [@]	50	100
19	ID401E	Industrial Training	Min.60 credits	00	00	02	01	Nil	Nil	50 [@]	50	100
	ID402E	Industrial Practices										
Sub Total (c)				00	00	04	02	Nil	Nil	100	100	200
Total (a) + (b) + (c)				40	00	54	67	910	390	850	525	2675

8.12.6 Program Structure Level V: Elective Courses

Table 8.11. Program Structure Level V: Elective Courses

DIPLOMA IN INFORMATION TECHNOLOGY												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
a) Professional Electives (Any one from Each group)												
1	IT501E	Advance Java ^{\$}	IT402E	03	00	02	04	70	30	50#	25	175
2	IT502E	Web Technologies ^{\$}	CM413E	03	00	02	04	70	30	50#	25	175
3	IT503E	Multimedia Techniques ^{\$}	Nil	03	00	02	04	70	30	50#	25	175
4	IT504E	Data Mining & Data Warehousing ^{\$}	Nil	03	00	02	04	70	30	50#	25	175
5	IT505E	Mobile Computing ^{\$}	CM413E	03	00	02	04	70	30	50#	25	175
6	CM502E	Software Testing ^{\$}	Nil	03	00	02	04	70	30	50#	25	175
Sub Total (a)				09	00	06	12	210	90	150	75	525
b) Free Elective – Non-Technical												
1	FS501E	Finishing School	Nil	00	00	04	02	Nil	Nil	50@	25	75
Sub Total (b)				00	00	04	02	00	00	50	25	75

8.12.7 Program Structure Level V: Elective Courses

Table 8.12. Program Structure Level V: Elective Courses

DIPLOMA IN COMPUTER ENGINEERING												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
c) Free Electives Technical (Any one)			% Not offered for CM/IT									
1	FE501E	Basic Building Drawing	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
2	FE 502E	RAC Maintenance	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
3	FE503E	Electrical Maintenance	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
4	FE504E	Hobby Electronics	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
5	FE505E	Basic Packaging Technology	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
6	FE506E	Industrial Metallurgical Practices	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
	FE507E	Computer Network %	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
	FE508E	PC Architecture & Maintenance %	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
7	FE509E	Fabric Selection and Care	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
8	FE510E	Two and Four Wheeler Technology	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
9	FE511E	Energy Conservation and Management	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
10	FE512E	Learning Ability Development	Nil	00	00	04	02	Nil	Nil	50 [@]	25	75
Sub Total				00	00	04	02	Nil	Nil	50	25	75
Total (a) + (b) + (c)				09	00	14	16	210	90	250	125	675

- No. of Compulsory Courses : 05 No. of Optional Courses : 13
- Abbreviations: TH – Theory ; PR- Practical; TU- Tutorial; TEE- Term End Examination; CA- Continuous Assessment
- 1TH Hr =1 Credit ; 1 TU Hr = 1 Credit ; 2 PR Hr = 1 Credit ** Online Examination @ Internal Practical Examination # External Practical

8.12.8 Program Structure Abstract

Table 8.13. Program Structure Abstract

DIPLOMA IN INFORMATION TECHNOLOGY											
Sr. No	Level	Course Title Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
			TH	TU	PR		Theory		Practical		Total Marks
							TEE	CA	TEE	CA	
1	I	General Studies	11	01	06	15	280	120	150	75	625
2	II	Basic Science Courses	16	02	08	22	280	120	150	75	625
3	III	Engineering Sciences and Technical Arts Courses	20	01	18	30	350	150	300	175	1025
4	IV	Professional Courses	40	00	54	67	910	390	850	525	2675
5	V	Elective Courses	09	00	14	16	210	90	250	125	675
Total			96	4	100	150	2030	870	1700	975	5625

Above program structure is approved in PBOS meeting held on 6th April, 2016 for implementation from Academic session 2016-17.

8.13 Award of Class Courses

Table 8.14. Award of Class Courses

DIPLOMA IN INFORMATION TECHNOLOGY												
Sr. No	Course Code	Course Title	Prerequisite courses/credits	Teaching Scheme (TH,TU,PR Hrs./Week)*			Total Credits*	Examination Scheme (Max. Marks)				
				TH	TU	PR		Theory		Practical		Total Marks
								TEE	CA	TEE	CA	
A) Core Courses												
1	CM402E	Object Oriented Programming	CM401E	03	00	04	05	70	30	50#	25	175
2	CM403E	Data Structure	CM401E	03	00	04	05	70	30	50#	25	175
3	CM404E	Operating System	Nil	03	00	02	04	70	30	50#	25	175
4	CM406E	Relational Database Management System	Nil	03	00	04	05	70	30	50#	25	175
5	IT403E	Linux Programming	CM404E	03	00	04	05	70	30	50#	25	175
6	IT402E	Java Programming	Nil	03	00	04	05	70	30	50#	25	175
7	IT406E	Software Engineering	Nil	04	00	02	05	70	30	50#	25	175
8	IT408E	Industrial Project	IT1408E	00	00		02	Nil	Nil	100 [#]	50	150
9	CM414E	Software Project Management	Nil	00	00		02	Nil	Nil	50 [#]	50	100
A) Professional Electives(Any Three)												
1	IT501E	Advance Java	IT402E	03	00	02	04	70	30	50#	25	175
2	IT502E	Web Technologies	CM413E	03	00	02	04	70	30	50#	25	175
3	IT503E	Multimedia Techniques	Nil	03	00	02	04	70	30	50#	25	175
4	IT504E	Data Mining & Data Warehousing	Nil	03	00	02	04	70	30	50#	25	175
5	IT505E	Mobile Computing	Nil	03	00	02	04	70	30	50#	25	175
6	CM502E	Software Testing	Nil	03	00	02	04	70	30	50#	25	175
TOTAL (A+B)				31	00	38	50	350	300	650	325	2000

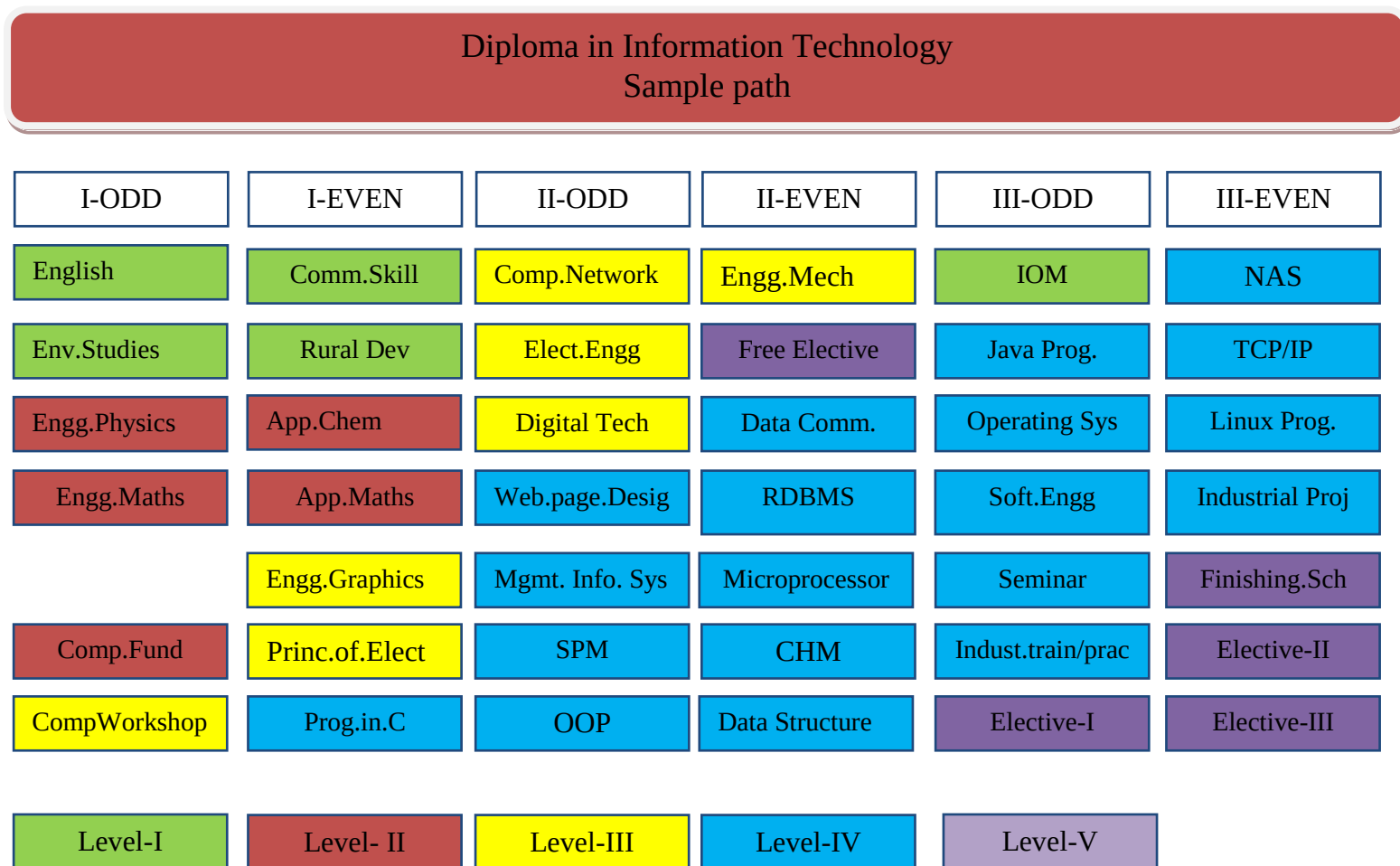
8.14 Curriculum at a Glance

Table 8.15. Curriculum at a Glance

SN	CRITERION	RESPONSE
1	Total No. of Courses in a Program	54
2	Total courses required	41
3	No. of courses having Theory papers	29
4	No. of courses having non Theory exam.	12
5	No. of General Studies Courses	5
6	No. of Basic Science Courses	5
7	No. of Engineering Science Courses	7
8	No. of Professional Core Courses	14
9	No. of Professional Elective Courses	3/6
10	No. of Professional Free Elective Courses	2/11
11	No. of Project Courses	3
12	No. of Seminar Courses	2/3
13	Total Credits (1 Th Hr = 1Credit & 2 Pr Hr = 1Credit)	152
14	Total Marks	5625
15	Proportion of Hours (Periods), Th : Pr	50:50 (approx.)
16	Proportion of Credits, Th : Pr	66:34 (approx.)
17	Proportion of Marks; Th : Pr	51:49 (approx.)
18	Total courses for Award of Class	12
19	Total theory paper courses for Award of Class	10
20	Total marks for Award of Class	2000

8.15 Courses Flow Diagram

Figure 8.1. Courses Flow Diagram (Sample Path)



APPENDIX A

Curriculum

LEVEL - I

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE,ME,EE,EC,PK,MT,IT,AE,CM,TX,TR
LEVEL NAME	: GENERAL STUDIES
COURSE CODE	: EN101E
COURSE TITLE	: ENGLISH
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (Internal)
PT.	: 01 HR

❖ RATIONALE:

The basic structure of English through Grammar enhances Holistic development as an individual as well as their role in the world. While teaching this course, complete emphasis will be laid on enhancing expression of ideas in English by the students. Excellence in this language enables a technician to develop his professional career as well as a strong standing in society.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Construct grammatically correct sentences.
2. Express ideas effectively in oral and written form.
3. Enhance comprehending abilities.
4. Develop interest in and appreciate literature.
5. Use social skills and be conversant.
6. Speak sentences with correct intonations.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
1. Application of Grammar	1. Identify grammatical rules to form correct sentences. 2. Use correct sentence pattern in writing and speaking. 3. Enrich vocabulary. 4. State and identify various tenses to be used in a situation.	1.1 Articles :Appropriate use of definite and indefinite articles 1.2 Prepositions: To use correct prepositions as per context. 1.3 Phrases: Combining words to form various phrases. 1.4 Tenses: Appropriate uses of tenses in given situations. 1.5 Voice: use of active and passive voice. 1.6 Narration: Conversion of direct and indirect speech.	12
2. Text	1. Present oral summary of topics read or heard. 2. Adjust speed of reading. 3. Follow oral instructions and interpret them to others 4. Present summary of topics read and heard.	2.1 Text: Learning to read fluently and to develop insight through prose and poetry. Selected prose and poetry prescribed in the text. 2.2 Prose: 1. Positive Thinking- By Stephen 2. Vision 2020- Dr. A.P.J. Abdul Kalam. 3.What India Wants: A.Our muddled Generation- DineshKumar. B. Employers want Employees not Exam results –Manish Sabharwal. 4. The Last Cab Ride- Kent Newburn 2.3 Poem: 1.Kalahandi-Jaganath Prasad Das 2.Money Madness-D.H. Lawrence 3. Where the mind is without fear- Rabindranath Tagore. 4. Voice of the unwanted Girl-Sujata Bhatt.	16
3. Success stories And Seen passages for Comprehension.	1. Take down lecture notes while listening. 2. Write single or multiple sentences. 3. Comprehend main ideas and reproduce them. 4. Ask pertinent question as well as to answer them.	3.1 Success stories:(selected Two success stories from text) 1."It happed in India" Kishor Biyani 2. Aditya Kumar Birla. 3.2 Comprehension: (Selected two passages from the text)	06

4. Vocabulary Building	1. Use word formation devices. 2. Use new words in sentences. 3. Read/write new words from various media. 4. Enrich vocabulary through reading.	4.1 Synonyms and Antonyms 4.2 One word substitution. 4.3 Using words and expressions appropriate to audience.(peers, superiors, subordinates and others)	04
5. Conversational Practice.	1. Use correct pronunciations 2. Pronounce the words correctly. 3. Speak sentences with correct intentions. 4. Use correct accent/stress for the words.	Sample situations for conversational practice. 5.1 Introducing yourself and others. 5.2 Meeting and parting. 5.3 Requests 5.4 Inquiries and information. 5.5 Asking, Giving and Refusing Permission. 5.6 Apologizing.	04
6 Writing Techniques.	1. Expand ideas into paragraphs 2. Prepare speeches as per situations 3. Connect multiple sentences.	6.1 Paragraph writing: Elaborate and expand ideas. 6.2 Speech writing: Welcome speech, Farewell speech, Introducing the guests and vote of thanks.	06
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical's	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Tense Busters -All levels(To be performed in language lab)	Application of Grammar)	04
2.	Reading and making notes	Prose	02
3.	Summarizing poems	Poetry	02
4.	Reading and making notes	Short stories	02
5	Reading and making notes	Prose	02
6	Comprehending passage	Comprehension passage	02
7	Issues in English(to be performed in language lab)	Vocabulary building	06
8	Formal conversations-Telephonic ,Video conferencing	Conversation practice	02
9	Introducing –self and others	Conversation practice	02
10	Observation of oratory speeches of renowned speakers	Conversation practice	02
11	Preparing speech and presenting	Writing techniques	02
12	Writing a paragraph on given topic	Writing techniques	02
Skill Assessment			02
Total Hrs.			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Application of Grammar	06(04)	06(04)	00(00)	16(12)
02	Text	04(04)	16(04)	06(00)	26(08)
03	Short stories	04(04)	08(04)	00(00)	08(04)
04	Vocabulary Building	04(00)	04(04)	00(00)	08(04)
05	Conversational Practice	00(00)	00(00)	06(06)	06(06)
06	Writing Techniques	00(00)	00(00)	06(06)	06(06)
	Total	18(12)	34(16)	18 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Application

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	U	2	1	U	2	1	U	2	1	U	2	1	U	2	1	U	2	5/7
	1	R	2																
02	2	U	4	2	R	4	2	R	4	2	U	4	2	U	4				3/5
03	3	U	4	3	U	4	2	R	4	2	R	4	3	U	4				3/5
04	4	R	4	4	A	4	1	R	4	1	R	4	1	U	4				3/5
05	5	A	6	5	A	6	5	U	6										2/3
06	6	A	6	6	A	6	6	U	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Performance	05
2	Overall presentation of given assignment	05
3	Viva voce	10
4	Activity	05
	TOTAL	25

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	-	3	-	-	-	-	-	3	3	-	-
2	3	-	3	-	-	-	-	-	3	-	-	-
3	-	-	3	-	-	-	-	-	3	3	-	-
4	-	-	3	-	-	-	-	-	-	-	-	-
5	-	-	3	-	-	-	1	1	3	3	-	-
6	3	-	3	-	-	-	-	1	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1	Positive Thinking	Stephen, Inspirational Stories ,June 2011	-
2	Vision 2020	Dr.A.P.J. Abdul Kalam 'Prism', Macmillan Publication.	1403928282
3	What India Inc-	Dinesh Kumar, Manish Sabharwal, Golden Harvest,	9788125059523
4	The Last Cab Ride	'Life',by Stephen	-
5	Kalahandi	Jaganath Prasad Das, Reflection on vital issues', by P.J.George	9788125041764
6	Money Madness	D.H.Lawrence by P.J.George Orient Blackswan 2010	9788125041764
7	Where the mind is without fear	Rabindranath Tagore Prism, Macmillan Publication	1403928282

8	Voice of the unwanted girl	Sujata Bhatt Prism, Macmillan Publication	1403928282
9	High School English Grammar and Composition	Wren and Martin Revised by Dr.N.D.V. Prasada Rao, S.Chand Publication.	81-219-0009-3
10	Business communication	Urmila Rao Himalaya Publication, 2011	81-8318-438-3
11	Contemporary English Grammar-structure and composition	David Green Revised Edition,2004 Himalaya Publication	033392183-6
12	Interactive English	S.K.Gangal, Revised Edition 1997 Allied Publishers	81-7023-678-9
13	Applied English Grammar and composition.	Dr. P.C. Das, 2013, New Central Book Agency.	978-81-7381-542-3
14	English for Practical Purposes	Z. N. Patil, B.S. Valke	033935098

❖ **E-REFERENCES:**

www.talkenglish.com-grammar , assessed on 12th March, 2016

www.edufind.com-englishgrammar ,assessed on 12th March, 2016

www.perfect-english-grammar.com, assessed on 12th March, 2016

www.yosuccess.com, assessed on 13th March, 2016

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. Sadiya Raza	Lecturer in English & Coordinator	Government Polytechnic, Nagpur.
2.	Dr. Nutan Chotai	Expert, Head of Dept.	LAD College, Nagpur.
3.	Mrs. K.N. Deshmukh	Expert, Head of Humanities	SDMP, Nagpur.
4.	Dr. Shilpa Sarode	Expert, Asst. Professor	LAD, Nagpur
5.	Mrs. M.M. Machale	Lecturer in English	Government Polytechnic, Nagpur.
6.	Ms. Humeera Quraishi	Visiting Lecturer in English	Government Polytechnic, Nagpur.
7.	Ms. Marlyn Fernandes	Visiting Lecturer in English	Government Polytechnic, Nagpur.
8.	Ms. Nazish Ahmed	Visiting Lecturer in English	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA INCE,ME,EE,EC,PK,MT,IT,AE,CM,TX,TR
LEVEL NAME	: GENERAL STUDIES
COURSE CODE	: EN102E
COURSE TITLE	: COMMUNICATION SKILLS
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03 TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM.	: 03 HRs
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: 01 HR

❖ RATIONALE:

In this present competitive scenario, proficiency in communication skills is one of the basic needs of technical students. A diploma holder is therefore expected to meet the challenges of communicating with his peers, superiors, subordinates and clients. Communication skills will help him towards achievement of perfection.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Apply concepts of communication in the given situation.
2. Modify language skills.
3. Execute requisite qualities as per industry requirements.
4. Compose official documentation.
5. Participate in and conduct group discussions and meetings effectively
6. Use correct pronunciations and intonations.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
1. Communication	1. Identify modern concept of communication. 2. Breaks down barriers to communicate effectively. 3. Modify appropriate body language. 4. Derive confidence while conversing.	1.1 Definition, Process, Types: Verbal-Non Verbal, Formal-Informal, Upward-Downward, Horizontal. 1.2 Barriers of communication: Physical, Mechanical, Psychological, Language, Status . Ways to overcome barriers. 1.3 Selection of proper channels of communication. 1.4 Non-verbal communication in detail: Body language, Eye contact, Dress and appearance, color, sound, Gestures, Postures, Pictorial representations.(Maps, Charts ,Graphs)	14
2. Inculcation of various generic skills.	1. Identify their receptive skills to strengthen their productive skills. 2. Derive listening abilities. 3. Use detailed write-ups 4. Participate in conversations.	2.1 Listening and reading skills- Importance of listening skills, levels of listening, Types of reading, Phonetics, IPA 2.2 Speaking and writing – Importance of Pronunciation, Importance of Debate.	08
3. Areas of self-Development.	1. Identify strengths and weakness. 2. Classify different types of motivation in one's life. 3. Plan presentations properly. 4. Modify leadership qualities.	3.1 Aims of self-development, self-awareness with respect to strength and weakness, How to overcome weakness for acquiring self-confidence. 3.2 Motivation –Introduction, Definition, Types with example. 3.3 Presentation skills – Parameters, Appearance, use of body language, Eye contact, content preparation, Depiction of interest of audience. 3.4 Time management- Importance, Process of time planning. 3.5 Team Building and Leadership qualities.	10
4. Development of	1. Plan group discussion. 2. Relate behavior during and post	4.1 Interview Techniques: Preparation, Behavior during interview, post interview. 4.2 Group discussion: Being the first	06

soft skills.	interview. 3. State and justify one's abilities.	member, how to make a general discussion, to give a concrete shape to discussion, purpose.	
5. Business correspondence	1. Identify various types of letters. 2. List down one's qualities by writing resume. 3. Use various reports to express ideas effectively in English	5.1 Letters: Job application and Resume writing Leave letter, Sales letter, Enquiry letter, order letter, complaint letter. 5.2 Report writing: Progress, Accident, Trouble, Feasibility. 5.3 Notices, circular, Memorandum-mail messages.	10
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practic al's	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Master the skill of face -to -face communication	Communication	02
2.	Sharpen one's body language while communicating with the help of Extempore/Impromptu.		02
3.	Demonstrate through role-play skills of a good communicator like RJ, News reader, commentator.		04
4.	Master the art of reading, writing, listening skill(to be performed in Language lab using software)	Inculcation of various Generic skills	06
5	Execute the art of Debate		02
6	Transcribe the given words phonetically		02
7	Master the skill of oral presentation by presenting a topic through PowerPoint presentation.	Areas of self-development.	02
8	Demonstrate leadership qualities		02
9	Manipulate Group Discussion by active participation	Development of soft skills	02
10	Build interview techniques through Mock Interview		02
11	Implement the art of writing E-mails and reports	Business correspondence	02
12.	Implement the art of writing Formal drafting's by preparing resume, letters.		02
Skill Assessment			02
Total Hrs.			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Communication	06(06)	04(04)	06(04)	16(14)
02	Inculcation of various Generic skills among future engineers	02(00)	08(10)	00(06)	10(16)
03	Areas of self Development	06(00)	06(06)	06(00)	18(06)
04	Development of soft skills	02(04)	08(00)	00(00)	10(04)
05	Business Correspondence	00(00)	08(04)	08(00)	16(00)
	Total	20(08)	30(20)	20 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	4	R	2	5	A	2	3	U	2	5/7
	1	R	2																
02	1	R	4	1	R	4	2	U	4	2	U	4	5	U	4				3/5
03	3	R	4	4	R	4	2	U	4	3	U	4	5	U	4				3/5
04	1	U	4	5	U	4	4	U	4	1	A	4	4	U	4				3/5
05	2	A	6	3	A	6	3	U	6										2/3
06	1	A	6	5	A	6	2	U	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Performance	05
2	Overall presentation of given assignment	05
3	Viva voce	10
4	Activity	05
	TOTAL	25

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	2	-	3	-	-	-	-	3	3	3	-	-
2	-	-	3	-	-	-	-	-	3	-	-	-
3	-	-	3	-	-	-	-	3	3	3	-	-
4	2	-	3	-	-	-	-	-	3	3	-	-
5	-	-	3	-	-	-	-	3	3	3	-	-
6	-	-	-	-	-	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Professional Communication skills	S.R.Pravin, S.Chand Publications	81-219-2092-02
2.	Developing Communication skills	Macmillan Publications, Revised Edition, 2011	0333929195
3.	Business communication and Soft skills.	G.S.R.K , Himalaya Publication, First Edition, 2009	978-81-8488-596-5
4.	Secret of face to face communication.	Peter Urs, Bender, Macmillan Publication	0333937139
5.	Technical communication principles and practices	Meenakshi Raman, Prakash Singh, Oxford University Press,	0-19-567695-5
6	Effective English Communication	Krishna Mohan, Raman Tata McGraw Hills,	13978-0-19-566804-9
7	Modern Commercial Correspondence	R.S.Pillai, Bhagwati, S.Chand & Co.	812190519-2

❖ E-REFERENCES:

www.mindtools.com.au, assessed on 12th March, 2016

www.interviewbest.com, assessed on 12th March, 2016

www.skillsyouneed.com-presentationskills, assessed on 12th March, 2016

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

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2.	Dr. Nutan Chotai	Expert, Head of Dept.	LAD College, Nagpur.
3.	Mrs. K.N. Deshmukh	Expert, Head of Humanities	SDMP, Nagpur.
4.	Dr. Shilpa Sarode	Expert, Asst.Professor	LAD, Nagpur
5.	Mrs. M.M. Machale	Lecturer in English	Government Polytechnic, Nagpur.
6	Ms. Humeera Quraishi	Visiting Lecturer in English	Government Polytechnic, Nagpur.
7.	Ms. Marlyn Fernandes	Visiting Lecturer in English	. Government Polytechnic, Nagpur.
8.	Ms. Nazish Ahmed	Visiting Lecturer in English	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN ME/EE/EC/CM/IT/AE/MT/PK/TX
LEVEL NAME	: GENERAL STUDIES
COURSE CODE	: MN101E
COURSE TITLE	: INDUSTRIAL MANAGEMENT
PREREQUISITE	: 50 Credits
TEACHING SCHEME:	TH: 04; TU: 00; PR: 00
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: NIL
PT.	: 01 HR

❖ RATIONALE:

Managing personnel and scarce resources in any organization is one of the primary & most challenging functions in industries. Scientific Management studies have evolved techniques for the same. The success of an enterprise depends upon how effectively the manpower is organized to work. The students of engineering who will be joining as technicians in the industrial organization are expected to have preliminary information about these said procedures

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Illustrate various forms of organization and its necessity and different aspects of entrepreneurship.
2. Analyze different sources of finance for industry to fulfill capital needs.
3. Interpret principles of human resource management, safety engineering and supervisory management along with various industrial acts
4. Illustrate various functions of marketing management and inventory control.
5. Calculate various cost of production, selling price of a product and its depreciation.
6. Analyze concept of TQM and modern techniques of quality control.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1.Introduction to Management & Entrepreneurship	1. Define Management, Organization, Administration and Entrepreneurship. 2. Compare Management, Organization, Administration. 3. Interpret appropriate type of ownership. 4. Carry out different methods of selection of organization. 5. Define Function of Management. 6. Describe Entrepreneurial qualities/traits. 7. Acquire industrial work culture 8. Describe successful entrepreneurs 9. Select Government subsidies	1.1 Definitions: Management, Organization, Administration and Entrepreneurship. Forms of ownership: Proprietorship, Partnership, Joint stock co. 1.2 Co-operative sector, Public sector, Government Undertaking, Advantages, limitations & Application of each type, comparison between different forms 1.3 Types of Organization: Line, Functional, line & staff organization, Advantages, limitations & Applications of each type, comparison between different types. 1.4 Functions of Management: - Forecasting, Planning, Organizing Directing, Motivating, Controlling, Coordinating, Decision-making, 1.5 Principles of management, Levels of management - Function of each level. 1.6 Entrepreneurship: Concept, Types of Entrepreneur, Characteristics of Entrepreneur, Women entrepreneurship, problem faced by women entrepreneur. 1.7 Case studies on successful entrepreneurs 1.8 Government subsidies for entrepreneur: Expert lecture on it. (No questions should be asked on the subtopic 1.7 & 1.8)	12
2.Financial Management	1. State the need and sources of finance. 2. Define and differentiate Shares and debentures. 3. Construct Break Even point in an Industry. 4. Analyse Break even point 5. Calculate E.O.Q. 6. Compare types of capital. 7. Acquire basics & financial Management techniques.	2.1 Need of Finance and Sources of finance for enterprises -Short term, Medium term and long term sources. 2.2 Shares, debentures, types of shares and Comparison between shares & debentures 2.3 Break Even Analysis- Importance of Breakeven point, E.O.Q. (numerical on EOQ) 2.4 Types of capital: fixed and working capital	10

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
3. Human Resource Management	1. State Concept, aim,& objectives of HRM. Describe Functions of HRM. 2. Interpret the need of welfare & safety, Industrial Hygiene. 3. Define functions of Supervisors. 4. Identify&/choose proper style of supervision. 5. Describe industrial act	3.1 Concept, aim , & objectives of HRM. 3.2 Functions of HRM: planning, organizing, staffing, recruitment, education & training- need, methods of training, , Motivation, controlling, compensation, integration and maintenance. Labour welfare , Industrial relations 3.3 Safety engineering: need, organization, committee, programme, instructions & training. Accidents: causes & prevention. 3.4 Characteristics of supervisors, functions of supervisors and styles of supervision& its advantages and limitations. 3.5 Industrial act: Need, Factory act 1948, ESI act, Workmen compensation act only	10
4. Marketing and inventory management	1. Describe the activities of Marketing Management. 2. State inventory management technique. 3. Use marketing strategies. 4. Select sales promotion and media	4.1 Definition of Market, Functions of Marketing Department 4.2 Marketing strategies, Marketing environment, Consumer behavior, Market research, Market survey, marketing mix. 4.3 Sales forecasting, Sales promotion, advertising, media selection. 4.4 Definition of inventory & inventory control. 4.5 Types of inventory items in industries, ABC and VED analysis only	12
5. Estimation and Costing	1. Define & calculate various cost and expenses involving in Product manufacturing. 2. Calculate the selling price of product. 3. Describe balance sheet. 4. Define& compare depreciation and obsolescence. 5. Describe& Calculating depreciation.	5.1 Product cost determination, Direct Cost and Indirect Cost, Material Cost And Labour Cost, Expenses- Factory and Overheads. 5.2 Determination of Selling Price of product- Profit and Loss Statement, Balance sheet description. 5.3 Depreciation &, Obsolescence- Concept and Comparison. 5.4 Methods of Calculating depreciation- straight line, reducing balance, annuity, sinking fund & sum of the digit methods. (Simple Numericals on subtopic 5.1, 5.2 & 5.4)	10

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
6. Total Quality Management	1. Define terms related to TQM 2. Describe various quality control techniques. 3. Interpret importance of quality circle and ISO 9000 4. Compare ISO9000 and TQM	6.1 Concept and definition of Quality, Quality Control, Quality Conformance and Quality Assurance. 6.2 TQM- Concept and Objectives, Process 6.3 Quality control techniques: Lean Manufacturing -JIT,5”S”, Six sigma, Kaizen, BPR 6.4 Quality Circle and ISO 9000, ISO 14000, ISO 9001: 2015, ISO 14001: 2015, Difference between ISO9000 and TQM,	10
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
Nil			

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01.	Management	04(04)	10(04)	00(00)	14(08)
02.	Financial Management	04(00)	04(06)	04(00)	12(06)
03.	Human Resource Management	02(00)	04(06)	06(00)	12(06)
04.	Marketing And Inventory Management	04(04)	06(00)	00(04)	10(08)
05.	Estimation And Costing	06(04)	04(02)	02(00)	12(06)
06.	Total Quality Management	04(04)	06(00)	00(02)	10(06)
	Total	24(16)	34(18)	12 (06)	70(40)

R – Remember U – Understand A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	2	R	2	2	R	2	3	R	2	1	A	2	5/7
	1	R	2																
02	1	U	4	2	A	4	2	U	4	1	A	4	4	A	4				3/5
03	4	R	4	3	U	4	5	R	4	4	U	4	5	U	4				3/5
04	5	A	4	5	U	4	6	R	4	6	U	4	6	A	4				3/5
05	3	A	6	4	U	6	2	U	6										2/3
06	1	U	6	6	U	6	3	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3, 4,5,6
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	--	--
		Journal Writing		Continuous	--	--	--	--
				TOTAL	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
	Nil	

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****For Mechanical Engineering Program:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	–	–	–	–	–	–	–	–	3	3	–
2	3	–	–	–	–	–	–	–	–	3	3	–
3	3	–	–	–	3	2	3	–	–	3	3	–
4	3	–	–	–	3	–	3	–	–	3	3	–
5	3	–	–	–	3	–	3	–	–	3	3	2
6	3	–	–	–	3	2	3	–	–	3	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

For Other than Mechanical Engineering Program:

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	–	–	–	–	–	–	–	–	3	–	–
2	3	–	–	–	–	–	–	–	–	3	–	–
3	3	–	–	–	3	2	3	–	–	3	–	–
4	3	–	–	–	3	–	3	–	–	3	–	–
5	3	–	–	–	3	–	3	–	–	3	–	–
6	3	–	–	–	3	2	3	–	–	3	–	–

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Industrial Engineering & Management	T.R.Banga & S.C.Sharma, Khanna Publishers, Edition-25, 20142	10: 81-7409-078-9 13:978-81-7409-078-9
2.	Industrial Engineering And Management	O.P. Khanna, Dhanpat Rai, New Delhi, 1980	81-885-9777-5
3.	Industrial organization and management	Lawrence L Bethel & James L Riggs, New York, McGraw-Hill [1971], 6 th , 1979	09-322-3849-1
4.	Industrial Management	I.K.Chopde & A.M.Sheikh, S.Chand & Co. Ltd, Delhi, 2 nd , 1999	81-219-1480-9
5.	Industrial engineering: Organization and management	Tara Chand, Publisher: Nem Chand, 5 th , 1982	B0007BSSB0
6.	Engineering Economics	Tara Chand, Publisher: Nem Chand, 14 th , 2014	81-85240-82-5
7.	Entrepreneurial Development	S.S.Khanka, S.Chand & Co. Ltd, Delhi, 1 st , 1999, reprint 2006	81-219-1801-4

❖ **E-REFERENCES:**

- <http://www.free-management-ebooks.com/index.htm> , assessed on 22th March 2016 .
- <https://www.youtube.com/watch?v=oQ1OTaJ9Sfc&list=PLB628C837430CB736&index=3> assessed on 23th March 2016
- <https://www.youtube.com/watch?v=2PkrT1ko3Yk&list=PLB628C837430CB736&index=10> assessed on 24th March 2016
- <http://www.slideworld.com/pptslides.aspx/industrial-management> assessed on 24th March 2016
- http://www.powershow.com/view/e4cd2mMwY/Industrial_Organization_I_powerpoint_ppt_presentation assessed on 25th March 2016

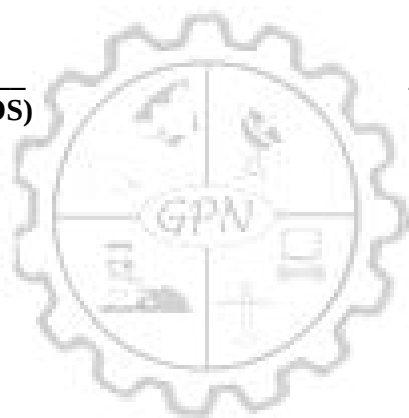
❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

Nil

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. V.S Ikhar	Lecturer in Mechanical Engineering	Government Polytechnic, Nagpur.
2.	Mrs. R A Gadekar	Lecturer in Mechanical Engineering	Government Polytechnic, Nagpur.
3.	Mr. G. H. Dahole	Lecturer in Mechanical Engineering	Government Polytechnic, Nagpur.
4.	Er. A.M.Onkar	Chief Executive Officer	Onkar Furnitures, MIDC, Nagpur
5.	Shri. G.F.Potbhare	Principal	NIT, Polytechnic, Nagpur
6.	Dr.S.S.Baraskar	Lecturer in Mechanical Engineering	Govt. Polytechnic, Arvi

(Member Secretary PBOS)



(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/CM/IT/AE/PK/MT/TX/TR
LEVEL NAME	: GENERAL STUDIES
COURSE CODE	: EV101E
COURSE TITLE	: ENVIRONMENTAL SCIENCE
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 01; TU: 01; PR: 00 (CLOCK HRs.)
TOTAL CREDITS	: 02 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 01 Hr. (Objective Type Online Examination)
PR. TEE	: NIL
PT.	: 15 MINUTES (Objective Type offline Examination)

❖ RATIONALE:

The world today is facing the biggest challenge of survival. Degradation of ecosystem, depletion of natural resources, increasing levels of pollution, poses major threat to the survival of mankind. The need of the hour, therefore, is to concentrate on the area of environmental science, which shall provide an insight into various environment related issues.

Environmental science is an interdisciplinary academic field that integrates physical and biological sciences, with the study of the environment. It provides an integrated, quantitative, and interdisciplinary approach to the study of environmental systems & gives an insight into solutions of Environmental problems

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Define the terms related to Environmental Studies.
2. Identify natural resources and resolve problems associated with them.
3. Identify alternate energy resources and use them efficiently during their engineering practices.
4. Develop habits which will cause less harm to environment
5. Analyze key issues about environment and create public awareness about those environmental issues.
6. Follow environmental ethics as lifelong learning.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs .
1. Earth Systems and Resources	1. Name the historical events of earthquakes, volcanoes, Tsunami, cyclone & landslides in the world. 2. Identify problems associated with soil, water 3. Define weather and climate. 4. Analyze the global water problems.	1.1 Earth Science: Concepts of Geologic time scale; earthquakes, volcanoes , Tsunami , cyclone & landslides 1.2 The Atmosphere: Weather and climate; the Coriolis Effect 1.3 Global Water Resources and Use: Present scenario, surface and groundwater issues; global problems; and its conservation. 1.4 Soil : soil erosion and other soil problems; methods of soil conservation	02
2. Concept of Biodiversity	1. Define Biodiversity 2. List Levels of biodiversity 3. Define and list the biodiversity hotspots 4. List the endangered species 5. Prepare a report on value of Biodiversity 6. Suggest methods /steps for Biodiversity conservation	2.1 Definition of Biodiversity 2.2 Levels of biodiversity 2.3 Value of biodiversity 2.4 Threats to biodiversity, loss of biodiversity (biodiversity hotspots) 2.5 Conservation of biodiversity (modern methods of biodiversity conservation)	02
3. Energy Resources and Consumption	1. Match the energy forms projects 2. List various forms of energy 3. State advantages and disadvantages of forms of energy 4. Select appropriate solutions of Efficient Use energy 5. Utilize techniques for energy consumption to reduce impact on environment.	3.1 Energy Consumption history 3.2 Present global energy use, Future energy needs 3.3 Energy forms:(conventional and non conventional) 3.4 Energy Conservation 3.5 Renewable Energy: Solar energy; solar electricity; biomass; wind energy; ocean waves and tidal energy; geothermal	03
4. Pollution	1. Define pollution and pollutants 2. List the types of pollutants. 3. Identify the Pollutants and their sources 4. Develop habits to reduce pollution 5. State the standard / limiting/ controlling values	4.1 Definition of pollution. 4.2 Air pollution: Definition, Classification, sources, effects, Prevention and ambient air quality standards. 4.3 Water Pollution: Definition, Classification, sources effects, Prevention And WHO and BIS water quality standards.	04

	of various types of pollution.	4.4 Soil Pollution/land pollution: Definition, sources, effects, prevention 4.5 Noise Pollution: Definition, sources, effects, prevention. 4.6 Biomedical Waste and E-Waste -- Origin, Effects and control Measures. 4.7 CPCB and MPCB norms and roles and responsibilities.	
5 Social Issues and Environment	1. Define sustainable development 2. Evaluate sources of Green house effect, acid rains, Global warming 3. List the incidences of Nuclear Accidents,	5.1 Concept of development, sustainable development 5.2 Watershed management , rain water harvesting 5.3 Global Warming, greenhouse effect; ozone depletion, relevant laws and treaties 5.4 Nuclear Accidents and Holocaust: Basic concepts and their effect on climate, , relevant laws and treaties	03
6. Environmental Education	1. Differentiate between formal and non formal education 2. List the various acts and their provisions 3. Develop awareness about environment.	6.1 Formal and non-formal education 6.2 Role of Govt. and Non-Govt. Organization 6.3 Indian constitutional provisions regarding the environment. Brief description of the following acts and their provisions: Environmental Protection Act and Prevention of Water, air and noise Pollution Act. 6.4. Concept EIA and environmental Ethics	03
Total Hrs.			16

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Prepare report on Loss of biodiversity, its conservation and also describe biodiversity hotspots.	Concept Of Biodiversity	4
2	Prepare report on use of various renewable energy sources.	Energy Resources And Consumption	4
3	Group discussion and Assignment on article collection from news papers, magazines and internet on local environmental pollution.	Pollution	4
4	Prepare report on case study of Industrial/Nuclear/any other Disaster in India.	Social Issues And Environment	4

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Earth Systems And Resources	02(00)	04(00)	02(00)	08(00)
02	Concept Of Biodiversity	04(00)	08(00)	02(00)	14(00)
03	Energy Resources And Consumption	04(00)	08(00)	04(06)	16(00)
04	Pollution	04(00)	10(04)	06(00)	20(04)
05	Social Issues And Environment	02(00)	04(00)	00(00)	16(12)
06	Environmental Education	02(00)	02(00)	02(00)	06(00)
	Total	18(00)	36(00)	16 (00)	70 (00)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Bit 7		
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M
01 To 35	1	R	2	2	R	2	3	R	2	4	R	2	1	U	2	2	R	2	1	U	2
	3	U	2	2	A	2	1	A	2	2	U	2	3	R	2	4	U	2	2	U	2
	4	A	2	4	U	2	4	U	2	5	R	2	2	U	2	3	U	2	4	R	2
	2	U	2	3	U	2	5	R	2	4	U	2	3	U	2	5	U	2	3	A	2
	4	U	2	3	A	2	4	A	2	6	R	2	6	U	2	6	U	2	4	A	2

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3, 4,5,6
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Online Examination Report	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	--	--
		Journal Writing		Continuous	--	--	--	--
				TOTAL	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

Nil

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	--	--	--	3	3	3	3	--	3	-	-
2	3	--	--	--	--	3	--	--	--	3	-	-
3	3	--	--	--	3	3	--	--	--	3	-	-
4	3	--	--	--	3	3	3	3	--	3	-	-
5	--	--	--	--	3	3	3	3	2	3	-	-
6	--	--	--	--	3	--	3	3	2	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Environmental studies	Oxford University Press, New Delhi. 2011	0-19-807228-2
2.	Environmental Science	Y.K. Singh, New Age International, New Delhi	8122418481, 9788122418484
3.	A Text Book Of Environmental Science	Arvind Kumar, APH Publishing, New Delhi	817648590X, 9788176485906
4.	Environmental Engg	A Kamla & D.L.Kanth Rao, Tata Mc Graw-Hill, New Delhi	0-07-451708-2
5.	A Textbook of Environmental Studies	Shashi Chawla, Tata Mc Graw-Hill, New Delhi	9781259006388

❖ **E-REFERENCES:**

1. https://en.wikipedia.org/wiki/Lists_of_nuclear_disasters_and_radioactive_incident_s, accessed on 20 January 2016
2. www.legalserviceindia.com/articles/noip.htm accessed on 18 March 2016
3. <https://prezi.com/8mnz--ldkybc/apes-unit-1-earth-systems-resources/> accessed on 23 March 2016
4. <http://www.conserve-energy-future.com/AlternativeEnergySources.php>, 18 March 2016

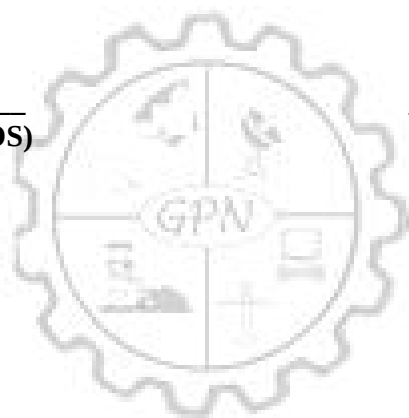
❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

Nil

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1	Dr. S J Patil	Head of Civil Engineering, (I Shift)	Government Polytechnic, Nagpur.
2	R N Giradkar	Head of Civil Engineering, (II Shift)	Government Polytechnic, Nagpur.
3	N. U Sulbhewar	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
4	B. R. Ambade	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
5	D. A. Khandare	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
6	Mr. M. R. Shelote	Consultant Engineer	M R Associates, Nagpur
7	Dr. R. N. Khapre	Associate Professor	Ramdeobaba College of Engineering and Management, Nagpur
8	Mr. A. J. Fulzele	Assistant Secretary (Tech.)	MSBTE, RO, Nagpur

(Member Secretary PBOS)



(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/CM/IT/AE/PK/MT/TX/TR
LEVEL NAME	: GENERAL STUDIES
COURSE CODE	: RD101E
COURSE TITLE	: RURAL DEVELOPMENT
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 02 (CLOCK HRs.)
TOTAL CREDITS	: 01(1TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT.	: NIL

❖ RATIONALE:

India is a rural developing country. About 70 percent of the total inhabitants are living in rural area. The development of India as a whole cannot be possible without development of the rural areas. The Central and state Governments tried to develop rural area through various welfare, health, economic, and social schemes. But it is the moral duty of each urban person to think about the development of rural area.

Young students are said to be new Nation. Therefore, this subject has been introduced so that the students should aware about the rural scenario in India. They should think and work for the overall rural development as per the development indicators prescribed at International level. They should write, and work for the Rural – Urban Linkage to upgrade the rural level.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Interpret Indian development indicators with International level.
2. Use and record questionnaire for rural survey.
3. Apply engineering knowledge for rural economy.
4. Suggest suitable scheme for rural development.
5. Prepare sustainable development plan for rural development.
6. Create suitable environment in rural area for development of every individual.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Write report of Development, Indicators of development, Rank of India in various development indexes (Individual task). Report includes: • Development, Modern Concepts, Indicators of development, • Importance, Scope and Objectives of RD. • Agriculture development, Agricultural allied development, Social and Human Development. • Rank of India in Human development index, Water and Sanitation Index, Shelter index, Education to all indexes, Health and wellness index.	Overview of Rural Development	04
2	Write report related to particular village (Group of 10 students). Survey, observe and evaluate Educational issues, Occupational issues, Agricultural issues, irrigation issues, migration issues, landless issues, Water supply and sanitation issues, Health issues, Poverty issues, Nutrition issues, Unemployment issues, Economy issues, Market for agriculture products issues, in Rural Development. Report includes: • Social structure of Rural India, Educational issues, Occupational issues, Agricultural issues, irrigation issues, migration issues, landless issues, Water supply and sanitation issues, Health issues, Poverty issues, Nutrition issues, Unemployment issues, Economy issues, Market for agriculture products issues, etc	Issues of Rural Development	06
3	Write report related to particular village (Group of 10 students). Survey, observe, evaluate and propagate Rural Development programmes (Sarva Shiksha Mission, Jal Swarajya Scheme, Water shed Management, Gobar Gas Scheme, Water Harvesting, MNREGA etc.) Run by Central and State Govt, according to directive principles in Indian Constitution. Report includes: • Constitutional provisions for Rural Development, Directive Principles. • Schemes of Central and State Govt. for Rural Development. • Role of GOs and NGOs. • Empowerment –Social, Educational, Economic, Women and Human. • Private Public Partnership (PPP), its advantages and disadvantages.	Constitutional Provisions and Programs for Rural Development	06

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
4	Write report related to particular village (Group of 10 students). Survey, observe and propagate Modern Technology (Rural Housing, Non Conventional Energy, Rural Water Supply and Sanitation, Agricultural allied industries etc.) in Rural Development. Report includes: • Low cost housing. • Rural water supply and sanitation, • Water conservation and Water shed management, • Non-conventional energy. • Computer application and Management Information system, Info – literacy, Global village • Solid waste management.	Technology for Rural Development	06
5	Write report related to particular village (Group of 10 students). Survey issues and challenges in Rural Development programs and suggest Rural – Urban link for social change in rural development and Nation Building. Report includes: • Basic micro-economic theories and concepts, Growth, Income, Employment, Finance. • Rural resources – Land, Forest, Water, Human, Capital and Market. • Rural Economy - Agriculture Reforms, Rural Finance, Rural Urban linkage. • Understanding BUDGET of Central and State Govt. • Corporate Social Responsibilities. • SEZ, Advantages and disadvantages on rural development.	Economical Developments	06
6	Present a report on Rural Development experiences of the same village, challenges, opportunities, suggestions. Presentation includes: • Success stories of rural development in India, Asia and other countries.	Rural Development Success Stories	04
Total			32

Note – The students shall select any one village and perform all practical based on experiences in that village.

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	--	--
		Journal Writing		Continuous	25	10	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing skills, Data collection from internet, Writing references, etc.	05
2	Survey skills, Preparation of questionnaire, Gathering information through interviews, etc.	10
3	Knowledge of rural development schemes, its salient features, its role in rural development, etc.	10
4	Knowledge of modern technology, Tech terms, its need in rural area, rural development through technology, etc.	10
5	Rural urban linkage, sustainable human development, global village, etc.	05
6	Presentation and viva-voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	3	-	-	-	-	-	1	-	3	-	-
2	3	3	-	3	-	-	-	3	3	3	-	-
3	3	3	-	3	-	-	2	3	3	3	-	-
4	3	3	2	3	3	-	3	3	3	3	-	-
5	3	3	2	3	3	2	1	3	3	3	-	-
6	3	3	2	3	1	-	1	-	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Micro Enterprise & Rural Development In India,	Subrata Kumar Ray, Neha Publishers & Distributors.	9788183875752
2.	Rural Development Indian Context,	Expert Panel Of GPH, Publisher: GPH.	9789382688976
3.	Rural Development Planning And Management,	Expert Panel Of GPH, Publisher: GPH	9789382688990
4.	RURAL DEVELOPMENT, Concept and Recent Approaches, ,	A. Thomas William and A.J. Christopher, Edition – 2011.	9788131602652,
5.	Rural Development & Policies	Dr. B.D. Sharma,	9789381385418

6	Empowering Rural Development Through Panchayats.	Dr. H.K. Lal, Publisher: Neha Publishers & Distributors	9788174456250
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❖ **E-REFERENCES:**

- www.un.org/esa/agenda21/natlinfo/countr/israel/ruraldevelopment.pdf , assessed on 5th March 2016
- rural.nic.in/sites/downloads/NewReleases/Greening_RD_Report.pdf , assessed on 5th March 2016
- planningcommission.nic.in/plans/stateplan/sdr_punjab/sdrpun_ch5.pdf, assessed on 5th March 2016
- jica-ri.jica.go.jp/IFIC_and_JBICI-Studies/english/.../pdf/chapter4.pdf. assessed on 5th March 2016
- www.fao.org/3/a-ah885e.pdf, assessed on 5th March 2016
- [yojana.gov.in/CMS/\(S\(y4dqr55g1m1qhnd4soqih45\)\)/pdf/.../January.pdf](http://yojana.gov.in/CMS/(S(y4dqr55g1m1qhnd4soqih45))/pdf/.../January.pdf), assessed on 5th March 2016
- <https://www.youtube.com/watch?v=LXgyAfnBgWo>, assessed on 5th March 2016
- <https://www.youtube.com/watch?v=jCpEh78M4xE> assessed on 5th March 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

Not Applicable

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. S.J. Patil	Head of Civil Engineering	Government Polytechnic, Nagpur.
2.	Mr. B. R. Ambade	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
3.	Mr. T. K. Rangari	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
4.	Ms. D. A. Khandare	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
5.	M. R. Shelote	Consultant	M.R. Associates, Nagpur
6.	Dr. R. N. Khapre	Associate Professor	RCOEN, Nagpur
7.	A. J. Fulzele	Assistant Secretary (Tech)	MSBTE, RO, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

LEVEL - II

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/ IT
LEVEL NAME	: BASIC SCIENCE COURSES
COURSE CODE	: CM201E
COURSE TITLE	: COMPUTER FUNDAMENTALS
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04 (CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: NIL
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: NIL

❖ RATIONALE:

Engineering students should know the basics of handling the computers. This course describes the basics of word processing, table handling, power point presentations for the understanding of elementary knowledge related to IT applications. It also describes basics of Internet and basics of logic development. It is very useful course for understanding the higher level knowledge in the field of IT applications and software engineering.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Use various formatting tools available in Word processing.
2. Manipulate data in tables using formulae / functions and present in form of graphs.
3. Draw block diagrams, figures using Open office
4. Write formulas, add tables using LATEX and generate project report.
5. Use Internet efficiently.
6. Draw a flow chart and write an algorithm for solving the given problem.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Create new document , open existing document and perform various operations on text like Font setting , delete, select, insert, copy- paste, cut- paste, find and replace.	Word Processing	2
2	Perform various page setup operations like paragraph setting, page margin, size, orientation, watermark, page borders.		2
3	Insert and remove Picture/ Image, Tables, Hyperlink, page break, Headers-Footers, bulleted lists in document.		2
4	Perform Mail merge operation.		2
5	- Open blank /existing worksheet and perform operations like select, delete, insert, copy- paste, cut- paste, find and replace text / data in cell and range of cells. - Perform various formatting operations like, Data Alignment, Wrap text, merge / unmerge cells, change column width , row height, setting page margin, size, orientation, print area.	Spreadsheet	2
6	- Insert and remove Picture/ Image, Hyperlink, page break, Headers-Footers, in worksheet. - Insert and remove cells, rows, columns. Draw various types of graphs / charts.		2
7	Perform various Functions like sum, average, count, countif, countblank, min, max, upper, lower, len, trim, left, right, mid, date, day, today, month, year, abs, int, exp, floor, sign, sum, sumif, sqrt and formulae like calculating simple interest, compound interest etc. on data in a worksheet.		4
8	- Sort data in ascending and descending order, on one and more than one field. - Apply Filter and obtain desired data.		2
9	Create new presentation, add /delete slides, insert / delete tables, wordArt, header/footer ,slide number, cliparts, images in slide, hyperlink.	Presentation	2
10	Apply various slide transition methods, apply animation effect, setup slide show, for selected slides.		4

11	Draw diagrams in a slide, using various available shapes, insert / modify/ delete charts in slide.	Presentation	4
12	• Draw block diagrams, circuit diagrams etc. • Save diagrams in jpg/ TIFF formats • Insert saved diagrams in documents	Drawing Tool	4
13	• Open LATEX document • Write simple mathematical equations in LATEX document • Insert figures and tables in LATEX document • Generate the reports using templates	Latex	4
14	• Create icons, folders & shortcut. • Arrange icons by name, type on desktop • Perform operations using options of Taskbar, Start button and My computer. • Manage files / folders like Copy, move, delete, search, rename files, and folders, • Install / uninstall the APPLICATION software. • SET firewall settings.	Fundamentals Of General Purpose Applications	4
15	• Create e-mail account on Web-mail, configuring e-mail account on POP-mail. • Navigate the web, send and receive information on email, , send and receive pictures and other data using email attachment. • Manage Calendar, Contacts, Tasks. • Search and download the Information from Internet.	Internet	4
16	• Write and execute two simple C programs using standard formatted I/O functions . • Write and execute two simple C programs using various operators and typecasting	Fundamentals Of Programming	4
17	• Write and execute two programs each using if else, nested if- else and switch statement.		6
18	• Write and execute two programs each using for loop and while loop.		6
Skill Assessment			4
Total Hrs			64

❖ SPECIFICATION TABLE FOR THEORY PAPER: Nil

❖ QUESTION PAPER PROFILE FOR THEORY PAPER: Nil

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of The Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Activities/ Writing program and Drawing flow chart	20
2	Performance / Execution of program	20
3	Viva voice	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	3	3	3	-	-	-	3	3	3	2	2
2	3	3	3	3	-	-	-	3	3	3	-	-
3	3	3	3	3	-	-	-	3	3	3	-	-
4	3	3	3	3	-	-	-	3	3	3	-	-
5	3	3	3	3	-	-	-	3	3	3	-	-
6	3	3	3	3	-	-	-	3	3	3	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	3	3	3	-	-	-	3	3	3	2	2
2	3	3	3	3	-	-	-	3	3	3	-	-
3	3	3	3	3	-	-	-	3	3	3	-	-
4	3	3	3	3	-	-	-	3	3	3	-	-
5	3	3	3	3	-	-	-	3	3	3	-	-
6	3	3	3	3	-	-	-	3	3	3	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Programming in ANSI 'C'	E. Balagurusamy , Publication Mc Graw Hill Education , 6th Edition, 2012	13: 9781259004612
2.	Let us C	Yashwant Kanetkar BPB Publication , 13th Edition, 2015	13: 9788183331630

❖ **E-REFERENCES:**

- <http://www.computer-pdf.com/programming/c-cpp/284-c-programming-book.html> accessed on 30th March 2016
- <http://www.w3schools.org.in> accessed on 30th March 2016
- <https://www.latex-tutorial.com/tutorials/> accessed on 11/4/2016
- <http://www1.maths.leeds.ac.uk/LaTeX/TableHelp1.pdf> accessed on 11/4/2016
- showmedo.com/videotutorials/openoffice accessed on 29/4/2016
- www.tutorialsforopenoffice.org accessed on 29/4/2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer (Dual CORE and above) with Internet connection.
2. Network printer.
3. Office Suite
4. C compiler

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
2.	Dr. Mrs. A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
1.	Ms.V.A. Raje	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
2.	Ms.D.M. Shirke	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
3	Ms.G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4	Shri. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
5	Shri. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
6	Shri. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/IT/CM /MT/PK/AE/TX
LEVEL NAME	: BASIC SCIENCE COURSES
COURSE CODE	: PH201E
COURSE TITLE	: ENGINEERING PHYSICS
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 04; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (Internal)
PT.	: 01 HR

❖ RATIONALE:

Engineering physics is an essential part of the educational system and of an advanced society, therefore this course essentially required for engineering courses. The different streams of physics provides fundamental facts, principals and laws are very helpful in having better understanding of the other technology courses which contributes to the technological infrastructure and provides trained personnel needed to take advantage of scientific advances and discoveries. Physics is an exciting intellectual adventure that inspires young people and expands the frontiers of our knowledge about Nature.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Apply the principal and laws of Physics on physically observable things to their respective disciplines.
2. Illustrate broad ideas about different physical phenomena.
3. Apply fundamental physics in various Engineering fields.
4. Select proper measuring instruments on the basis of range and least count to measure the physical quantities.
5. Calibrate different measuring instruments.
6. Handle instruments carefully to avoid any type of devastation.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. General Properties of solids	1. Relate Deformation in bodies by the action of external forces. 2. Identify least count and range of instruments. 3. State hook's law of elasticity. 4. Define different terms related to elasticity. 5. Differentiate accuracy and precision. 6. Describe the types of modules of elasticity. 7. Illustrate the Searle's apparatus. 8. Solve the numerical based on Elasticity.	1.1 Elasticity, Plasticity, Rigidity. Deformation in bodies by the action of external forces, Stress and Strain with their types, Elastic Limit, Hook's Law, yield point, factor of safety, breaking stress, ultimate stress. Applications of elasticity. Types of modulus of Elasticity with relation between them. 1.2 Searle's method to find out Young's modulus of elasticity. Least count and range of instruments: Vernier caliper, outside micrometer screw gauge, Travelling microscope. (Numerical based on above)	06
2. General Properties of liquids	1. Define the terms related with general properties of liquid. 2. State the factors affecting surface tension and viscosity. 3. Select the laws of viscosity to find the coefficient of viscosity of freely falling body. 4. Classify the types of flow of liquid with significance of Reynold's number. 5. Illustrate the phenomenon of Capillarity and angle of contact of liquid and glass. 6. Solve the numerical based on general properties of matter.	2.1 Surface Tension, Factors affecting surface tension, Molecular force, cohesive and adhesive force, Angle of contact with its significance and capillary action (no derivation), Effect of impurity and temperature on surface tension. Application. (Numerical based on above) 2.2 Viscous force, Definition of viscosity, Newton's law of viscosity, Reynolds's number and its significance, critical velocity, streamline flow, turbulent flow, Stoke's law, statement and formula (no derivation), Coefficient of viscosity and S.I. unit. Application. (Numerical based on above)	08
3. Transmission of heat and Gas laws	1. List the modes of transmission of heat. 2. Define the terms related to expansion of solid due to heat. 3. State the laws related to gas and specific heat. 4. Describe Mayor's relation. 5. Apply the adiabatic and isothermal expansion for bulk modulus of elasticity. 6. Solve the numerical related to gas laws and heat.	3.1 Heat: Three modes of transmission of heat- conduction, convention, radiation. Good and bad conductor of heat with examples, Law of thermal conductivity and S.I. units, Coefficient of linear, aerial and cubical expansion, relation between them (no derivation). (Numerical based on above) 3.2 Boyles law, Charle's law, Gay Lussac's law, absolute zero temperature, Kelvin scale of temperature, General gas equation (statement only), two specific heats	10

		of gases, relation between them, Mayer's relation. . Isothermal process and adiabatic process(Numerical based on above)	
4. Wave motion and Acoustics	1. Define different terms related to Acoustics. 2. Reproduce the formula for velocity of sound with end correction. 3. Classify the different types of wave by their characteristics. 4. Recognize sound absorbing textile material. 5. Describe the phenomenon of resonance with examples. 6. Describe the Doppler effect and Sabine's formula. 7. Implement the conditions for good acoustics in auditorium. 8. Solve the numerical related to wave motion and acoustics.	4.1 Definition of wave motion, amplitude, period, frequency & wavelength, relation between velocity, frequency & wavelength. Progressive wave, Stationary waves, longitudinal and transverse wave. Node, Antinode. forced and free vibration, definition of resonance with example, procedure to find resonance with the help of tuning fork. Formula for velocity of sound with end correction, various factors which depends on it.(Numerical based on above) 4.2Introduction to Doppler Effect and its applications. Echo, Reverberation, Reverberation Time. Absorption coefficient of material, Sabine's formula for reverberation time, Factors affecting the Reverberation of time and acoustics of building. Sound absorbing materials. (Numerical based on above)	14
5. Modern Physics	1. Define the terms related to topics in modern physics. 2. List the properties applications of LASER. 3. State the characteristics of photo electric effect. 4. State the applications related to X-ray, LASER, and photo cell. 5. Implement the photoelectric effect to develop photocell. 6. Illustrate the construction and working of Ruby LASER 7. Describe the production of X-rays. 8. Solve the numerical base on Photo-electricity and X-rays.	5.1 Photon, properties of photons, Planck's hypothesis, Threshold frequency, threshold wavelength and work function, Photoelectric effect with characteristics properties. Principle, Construction and working of Photoelectric cell with applications. Einstein's photoelectric equation. (Numerical based on above) 5.2 Properties of laser, Types of laser, absorption, spontaneous and stimulated emission. Definition of Pumping and its type, Population inversion, Metastable state. Ruby laser: Principle, construction and working. Applications of LASER in Engineering and biomedical Engineering. 5.3Introduction to X-rays, Properties of X-rays, production of X-ray using Coolidge tube. Formula for Minimum wavelength of X-rays, Applications of X-rays in Engineering, medical and scientific field.(Numerical based on above)	18

6. Optical Fiber and Nanotechnology	1. Define the terms related to Optical fiber and nanotechnology. 2. Draw the diagram for inner structure of optical fiber. 3. State the applications of Optical fiber and nanotechnology. 4. Clarify the properties of nanoparticles are different than other particles. 5. Describe the principle of optical fiber. 6. Solve the numerical based on optical fiber.	6.1 Optical fiber, Material of Optical fiber. Structure of optical fiber and its types. Principle of Optical fiber-total internal reflection. Acceptance angle, Numerical aperture. Applications of Optical Fiber.(Numerical problems) 6.2 Definition of nanoscale, nanometer, nanoparticle, nanostructured materials with examples, Application of nanotechnology in Engineering and Technology, medical, cosmetics, environmental, space and defense.	08
Total Hrs.			64



B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Pract-icals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Identify the various instruments used in Physics laboratory and follow precautionary measures.	General Properties of solids	2
2	Determine least count and range of Vernier Caliper, Outside micrometer screw gauge and calculate its zero error.		2
3	Calculate the diameter of a small spherical body by Outside micrometer screw gauge.		2
4	Measure the outer diameter of a cylindrical body by Vernier Caliper.		2
5	Calculate the value of Young's modulus of elasticity of given wire and identify the type of material from standard value.		2
6	Find rise of liquid in capillary tube and compute surface tension of liquid.	General Properties of liquids	2
7	Compose the relation between terminal velocity and radius of spherical body with different materials passing through the liquid.		2
8	Find the most viscous fluid from given fluids by calculating coefficient of viscosity.		2
9	Analyze the effect of volume on pressure at constant temperature.	Transmission of heat and gas laws	2
10	Calculate mechanical equivalent of heat, J by electrical method.		2
11	Determine inner diameter of resonance tube using Vernier Caliper.	Wave Motion and Acoustics	2
12	Find the velocity of sound with the help of resonance tube. OR Determine the unknown frequency of tuning fork by sonometer.		2
13	Measure the angle of divergence of Laser.	Modern Physics	2
14	Find total internal reflection of light by pin method. OR Calculate the surface area (SA), volume (V) and SA/V of an object and measure dimensions required for it.	Optical Fiber and Nanotechnology	2
Skill Assessment			4
Total Hrs.			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	General Properties of solids	06(00)	00(04)	00(00)	06(04)
02	General Properties of liquids	02(00)	08(06)	00(00)	10(06)
03	Transmission of heat and gas laws	02(00)	04(04)	06(04)	12(08)
04	Wave Motion and Acoustics	04(04)	04(02)	06(00)	14(06)
05	Modern Physics	02(04)	10(04)	06(00)	18(08)
06	Optical fiber and Nanotechnology	02(02)	08(00)	00(06)	10(08)
	Total	18(10)	34(20)	18(10)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	5	R	2	6	R	2	6	R	2	5/7
	4	U	2																
02	1	R	4	2	U	4	2	U	4	1	U	4	3	U	4				3/5
03	3	U	4	4	R	4	4	U	4	4	R	4	3	A	4				3/5
04	6	U	4	5	U	4	6	U	4	5	R	4	5	U	4				3/5
05	5	A	6	4	A	6	2	U	6										2/3
06	5	U	6	3	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram/figure, selection of equipment's.	10
2	Performance	20
3	Calculation, Result, Drawing Graphs (if any)	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	-	-	-	-	-	-	-	-	2	-	-
2	3	-	-	-	-	-	-	-	-	2	-	-
3	3	-	-	-	-	-	-	-	-	2	-	-
4	3	-	2	2	-	-	-	2	-	2	-	-
5	3	-	2	2	-	-	-	2	-	2	-	-
6	3	-	2	2	-	-	-	2	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Modern Physics	B.L. Thereja, S.Chand & Company Ltd 5 th Edition, 2014	13:978-8-12-190163-5
2.	Engineering Physics	V.Rajendran, The McGraw Hill Education Pvt. Ltd, 1 st Edition, 2010	13: 978-0-07-107014-0
3.	Conceptual Physics	P.G.Hewitt, San Francisco Addison Wesley- 10 th Edition, 2006	13: 9780321909107
4.	Engineering Physics	R.K.Gaur And S.L.Gupta, Dhanpatrai Publication New Delhi, 1987	97-8-18-992822-3

❖ **E-REFERENCES:**

<https://www.youtube.com/watch?v=7vT-988yH3M> , assessed on 5th march 2016
https://www.youtube.com/watch?v=XMWcQ4Fn_3I , assessed on 4th march 2016
<https://www.youtube.com/watch?v=6L3Y6UnWe6M> , assessed of 5th march 2016
https://www.youtube.com/watch?v=KjUIKF6_4LI , assessed on 2nd march 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Vernier Caliper (Least count= 0.01 cm and range= 0 to 12 cm)
2. Screw gauge (Least count= 0.001 cm and range= 0 to 2.5 cm)
3. Young' Modulus- Searle's pattern with micrometer reading 0.001 cm.
4. Travelling microscope vertical and horizontal scales with range 0- 15 cm with least count 0.001 cm
5. resonance apparatus with glass tube and metal reservoir (L= 0- 100 cm)
6. sonometer teak wood with length 1m.
7. Tuning fork -256, 320, 384, 428, 480, 512 Hz.
8. Boyle's apparatus iron base double steel rod, 25 ml fitted with leveling screw on base
9. Stoke's apparatus with glass tube 50 cm.
10. Stop watch GEM 1/10 sec.
11. Ammeter (DC, 0-5 Amp)
12. Millimeter (DC, 0-1 Amp. G.E. type D 50)
13. Voltmeter (DC, 0-3V)
14. Rheostat single tube of 6.5 cm dia., 30 cm length, 5 Amp, 18 ohm, provided with Bakelite slider with phosphor, bronze contacts.
15. Joule's calorimeter with mass 198 cal/gms.
16. Laser

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	M. K. Malke	I/C Physics Department	Government Polytechnic, Nagpur.
2.	Dr. K. S. Moon	Associate Professor	Dharampeth M P Deo Memorial Science College, Nagpur
3.	Mrs. Farheen Baig	Assistant Professor	Priyadarshini College of Engineering, Nagpur
4.	Mrs. M.B. Mahaley	HOD, Physics Department	SDMP, Nagpur
5.	Dr. S. B. Raut	Lecturer	Government Polytechnic, Nagpur.
6	Mrs. S.B. Adulkar	Lecturer	Government Polytechnic, Nagpur.

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN EE/EC/IT/CM
LEVEL NAME	: BASIC SCIENCE COURSES
COURSE CODE	: CH202E
COURSE TITLE	: APPLIED CHEMISTRY
PREREQUISITE	: NIL
TEACHING SCHEME	: TH:04; TU:00;PR:02(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 2 PR CREDIT = 1 CLOCK HR.)
TH. TEE EXAM.	: 03 HRs
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: 01 HR

❖ RATIONALE:

Chemistry is the basic science which is essential to all engineering courses. For an engineer, the usage of equipments and instruments would require knowledge of chemical substances, their composition and properties. Chemistry subject knowledge also aims to bridge the theoretical concepts and their practical engineering applications, thus highlighting the role of chemistry in the field of engineering.

Study of different polymers, insulators or dielectrics, adhesives and their chemical behavior will be useful in their applications in electrical appliances and electronics industries. This will be gateway for development of reasoning capacity of students and understanding new technology as well and capabilities in solving challenging problems at various level of working in the electronic and computer industry.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Use principles and basic laws of chemistry in engineering field.
2. Select and apply knowledge of metal and nonmetallic materials in field of engineering and Technology.
3. Select proper cells and batteries on the basis of properties and construction.
4. Record readings of experiments.
5. Conclude result of practical on the basis of ultimate stakeholders or society.
6. Safely handle chemicals and equipments which are correlate with safety of others and environmental protection

❖ COURSE DETAILS:

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Chemical Bonding	1. Define terms related to Atomic structure. 2. State postulates of Bohr's Theory. 3. Draw schematic diagram of atom. 4. Write all steps of formation of molecules. 5. Review the filling up orbital by Aufbau principle and Hund's rule.	Atomic Structure: 1.1 Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location. 1.2 Postulates of Bohr's Theory 1.3. Definition, Shape of the orbitals & distinction between Orbits & Orbitals. 1.4 Hund's Rule, Filling Up of the Orbitals by Aufbau's Principle (till Atomic no. 30). Valency: 1.5 Definition & types of valency (Electrovalency & Covalency). 1.6 Octet Rule, Duplet Rule. 1.7 Formation of Electrovalent e.g. NaCl, CaCl ₂ , MgO, AlCl ₃ . 1.8 Formation of Covalent Compounds CO ₂ , H ₂ O, NH ₃ , C ₂ H ₂ . 1.9 Distinction between electrovalent & covalent compounds.	
2. Metallurgy and Alloys	1. Describe the process of extraction of copper and aluminum from its ore. 2. State different properties of copper and aluminum metal. 3. Select proper alloy as per their composition, properties and uses. 4. Write Engineering applications of Al and Cu.	Metallurgy 2.1 Metallurgy of Copper Definitions of metallurgy. 2.2 Extraction process: Ores of copper, extraction of copper from copper pyrite by physical concentration by Froth floatation process and chemical concentration by roasting. 2.3 smelting, bessemerisation, electrolytic refining. 2.4 Engineering Applications of copper. Metallurgy of Aluminum 2.5 Extraction process : ores of Aluminum, extraction of aluminum, purification of bauxite by Hall's process, electrolytic reduction of alumina, 2.6 electrolytic refining of aluminum. 2.7 Engineering applications of aluminum Alloy 2.8 Brass ,Bronze, duralumin, Alnico composition ,properties and applications 2.9 Solders -Composition, properties and applications of ,rose metal and wood's metal	
3. Non-Metallic Engineering	1. Distinguish between thermo softening and thermosetting plastics.	Polymers (Plastics, Rubber) 3.1 Definition of Plastic, Formation of Plastic by Addition & Condensation	

Materials	- List the properties of Rubber. - State the applications of thermal insulators, and Adhesive. - Describe applications of Phenol formaldehyde resin, urea formaldehyde resin and epoxy resin.	- Polymerization, types of polymerization, thermosetting and thermosetting plastic. - Definitions, examples and applications of conducting polymers, photoconductive polymers, electrically insulating polymers, liquid crystal polymer(LCP) Rubber: Types of Rubber. Natural Rubber: Its Processing, Drawbacks of Natural Rubber, Vulcanisation of Rubber with Chemical Reaction. - Synthetic Rubber: Definition, difference between natural and synthetic rubber, - Properties of synthetic rubber such as elasticity, tack, abrasion resistant, their definition and related applications. Insulating material and Adhesives Definition & Characteristics of Thermal insulators. Preparation, Properties & Applications of Thermocole & glasswool. - Definition, characteristics, advantages of adhesive, Properties and application of Phenol formaldehyde resin, urea formaldehyde resin and epoxy resin.	
4. Electro chemistry	- Describe the mechanism of electrolysis. - Identify the role of electrodes in application of electrolysis. - Define terms involved in electrochemistry. - Calculate the problems based on Faradays I, Faradays II law and PH. - Apply the knowledge of electrolysis in Electroplating and Electro refining.	Basic concepts of electrolysis: - Electrolyte, type of electrolyte- strong and weak electrolyte, their difference. - Ionization and electrolytic dissociation, Arrhenius theory of electrolytic dissociation, degree of ionization, factors affecting degree of ionization. - Definitions of electrolytic cell, electrodes- cathode, anode, electrode potential- oxidation potential and Reduction potential. Electrolysis - Mechanism of electrolysis- Electrolysis, electrochemical series for cations and anions. - Mechanism of electrolysis of CuSO_4 solution by using Platinum electrode and Copper electrode. - Applications of electrolysis- Electroplating of Silver, Electro refining of Blister copper. - Faraday's laws of electrolysis: Faraday's First and Second law, relation between electrochemical equivalent and chemical equivalent, numerical. P^{H} and P^{OH}: - Definition of P^{H}, P^{OH}, P^{H} scale, numerical.	

5. Cells and batteries	1. Define basis terms involved in electrochemical cell and battery. 2. Write construction and working of different types of cells. 3. Differentiate Primary and Secondary cells. 4. describe the engineering applications of Lead-acid 5. Storage cell, Ni-Cd Cell, Hydrogen- oxygen fuel cell.	Electrochemical cells/ batteries: 5.1 Basic concepts: Definition of electrolyte, conductivity of electrolytes, cell, battery, electrolytic cell, electrochemical cell, charging, discharging. 5.2 Classification of electrochemical cells: Primary and secondary cells. 5.3 Primary cells: construction, working and applications of - Dry Cell, Daniel cell, 5.4 Secondary cells: construction, working and applications of - Lead-acid storage cell, Ni-Cd Cell 5.5 Fuel cell : Definition, construction, working, advantages, limitations and 5.6 applications of Hydrogen- oxygen fuel cell.	
6. Corrosion	1. Write mechanism of atmospheric corrosion and immersed corrosion. 2. Describe different methods of protection of metal from corrosion. 3. Select proper protection method for different types of material from corrosion.	6.1 Definition, Types, Atmospheric or Chemical Corrosion, Mechanism, Factors Affecting Atmospheric Corrosion] 6.2 Definition, Types, Atmospheric or Chemical Corrosion, Mechanism, Factors Affecting Atmospheric Corrosion 6.3 Immersed Corrosion or Electrochemical Corrosion, mechanism of electrochemical corrosion absorption of oxygen gas, Evolution of Hydrogen gas. 6.4 Factors Affecting Electrochemical Corrosion, 6.5 Application of Protective Coatings like metal coating by -Galvanizing, Tinning, Sherardizing Metal Spraying, Metal Cladding, Cementation or Diffusion Method. 6.6 Application of non metallic coatings: paint-definition, characteristics, constituents of paint and their functions.	
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Pract-icals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Explore the chemistry laboratory.	Chemical Bonding	2
2	Determine the percentage of copper in the given brass alloy or copper ore.	Metallurgy and Alloys	2
3	Find the relation between loss in weight of aluminium strip in acidic and alkaline medium and rate of corrosion.	Corrosion	2
4	Determine the strength of given hydrochloric acid solution by titrating it against Sodium hydroxide solution.	Corrosion	2
5	Determine thinner content in oil paint.	Corrosion	2
6	Prepare urea formaldehyde resin used in manufacturing of sun mica Plastic.	Electrochemistry	2
7	Determination of P^H value of given solution by using P^H paper, universal indicator and P^H meter.	Electrochemistry	2
8	Find the Electrochemical equivalent (ECE) of copper.	Cells and Battery	2
9	Perform electro refining process of copper metal.	Electrochemistry	2
10	Prepare Phenol formaldehyde resin used in manufacturing of Bakelite Plastic.	Non-Metallic Engg. Materials	2
11	Analyse basic and Acidic Radicals of known salt solution-1 (Confirmatory Test) using qualitative analysis method.	Chemical Bonding	2
12	Analyse basic and Acidic Radicals of known salt solution-2 (Confirmatory Test) using qualitative analysis method.	Chemical Bonding	2
13	Analyse basic and Acidic Radicals of known salt solution-3 (Confirmatory Test) using qualitative analysis method.	Chemical Bonding	2
14	Analyse basic and Acidic Radicals of known salt solution-4 (Confirmatory Test) using qualitative analysis method.	Chemical Bonding	2
Skill Assessment			4
Total Hrs.			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Chemical Bonding:	06(04)	04(04)	00(00)	10(08)
2	Metallurgy and Alloys	02(00)	04(06)	06(00)	12(06)
3	Non-Metallic Engineering Materials	06(00)	04(04)	00(00)	10(04)
4	Electrochemistry	02(04)	10(02)	06(04)	18(10)
5	Cells and Battery	02(00)	08(00)	00(06)	10(06)
6	Corrosion	00(02)	04(04)	06(00)	10(06)
	Total	18(10)	34(20)	18(10)	70(40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	4	U	2	5/7
	6	R	2																
02	1	R	4	1	U	4	2	U	4	1	R	4	1	U	4				3/5
03	3	R	4	3	U	4	4	U	4	3	U	4	4	R	4				3/5
04	5	U	4	5	U	4	6	U	4	4	A	4	6	U	4				3/5
05	2	A	6	4	A	6	2	U	6										2/3
06	4	U	6	6	A	6	5	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing chemical reactions, handling the equipment, writing procedure etc.	10
2	Performance	20
3	Calculation, result, drawing graphs(if any)	10
4	Viva Voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	-	-	-	-	-	-	-	-	-	-	-
2	3	2	-	-	-	-	-	-	-	-	-	-
3	3	2	-	-	-	-	-	-	-	-	-	-
4	3	-	3	-	-	-	-	3	-	3	-	-
5	3	-	2	-	-	-	-	2	-	2	-	-
6	3	-	1	-	-	2	-	1	-	1	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1	Engineering Chemistry	Jain and Jain , Dhanpat Rai publishing company(P) ltd.15 edition	10092
2	Engineering Chemistry	S. S. Dara , S. Chand Publication,15 edition	
3	Engineering Chemistry	R. Sivakumar N. Sivakumar and Tata McGraw-Hill, edition10.	9780745-328896
4	Polytechnic Chemistry	Vedprakash Mehta ,Jain brothers,edition6	13-9788183600134
5	Industrial chemistry	Goel Publication,edition-8	81877224002

❖ **E-REFERENCES:**

http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_polymers-,
assessed on 2 Feb. 2016

http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_fluids-,
assessed on 2 Feb. 2016

<http://www.asetute.com.au/corrosion.html>, assessed on 4 Feb. 2016

http://www.sherardizing.com/resources/files/9_Sherardizing_Corrosion.pdf, assessed on
4 Feb. 2016

<http://www.galvanizeit.org/aga/animation>, assessed on 6 Feb. 2016

http://www.ehow.com/list_6725219_different-types-metal-cladding.html, assessed on 8
Feb 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Electronic balance (measure up to 0.001 mg)
2. Battery 12 volt
3. Digital multi-meter
4. Rheostat assorted sizes
5. Voltmeter MI 0-150-300 V
6. Ammeter MI 0-5-10 A
7. Electrolytic cell set up
8. Digital PH meter

❖ **LIST OF EXPERS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

Sr. No	Name	Designation	Institute/Industry
1.	Dr. P.J. Sondawale	I/C chemistry Department	Government Polytechnic, Nagpur
2.	Dr. Mudrika I. Ahmed	Lecturer in chemistry	Government Polytechnic, Nagpur
3.	Dr. M. S. Rathod	Lecturer in chemistry	Government Polytechnic, Nagpur
4.	Dr. S. A. Petkar	Lecturer in chemistry	Government Polytechnic, Nagpur
5.	Mr. S.R. Gaidhar	Lecturer in chemistry	Government Polytechnic, Gadchiroli
6.	Dr. S. Z. Jadhav	Professor in chemistry	Institute of Science, Nagpur
7.	Dr. K. A. Nandekar	Lecturer in chemistry	G.H.Raisoni Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/AU/PK/MT/EE/EC/IT/CM/TX
LEVEL NAME	: BASIC SCIENCE COURSES
COURSE CODE	: MH201E
COURSE TITLE	: ENGINEERING MATHEMATICS
PREREQUISITE	: NIL
TEACHING SCHEME	: TH:04; TU: 01; PR:00 (CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: NIL
PT.	: 01 HR

❖ RATIONALE:

The subject is classified under basic sciences and intends to teach students basic facts, concepts and principles of Mathematics as a tool to analyze Engineering problems. Mathematics lay- down the foundation for understanding core Technology subjects.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Develop logical thinking which is useful in comprehending the principles of all other subjects.
2. Use concept of allied angle, compound angle, multiple, and sub multiple angle to solve engineering problems.
3. Use measures of central tendency and measures of dispersion in decision making.
4. Apply matrix method to solve simultaneous equations in two and three variables.
5. Develop intellectual skill by using mathematical concept.
6. Apply laws of logarithm to solve engineering problems.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
1. Logarithm	1. Identify natural and common logarithm 2. Apply laws of logarithm in solving examples	1.1 Definition of logarithm 1.2 Definition of natural & common logarithm 1.3 Laws of logarithm & change of base formula	04
2. Partial fractions	1. Define rational function, proper and improper fraction. 2. Factorize quadratic and cubic polynomial 3. Resolve proper and improper fraction into partial fraction.	2.1 Definition of rational function , proper ,improper fraction and partial fraction 2.2 Resolving proper fraction into partial fraction. 2.2.1 Denominator containing non repeated linear factors 2.2.2 Denominator containing repeated linear factors 2.2.3 Denominator containing irreducible non repeated quadratic factors 2.3 Resolving improper fraction into partial fraction.	06
3. Determinant and Matrix	1. Memorize expansion formula of determinant of order 2 and 3. 2. Find the value of determinant of order 2 and 3. 3. Define various types of matrices. 4. Perform all algebraic operations on matrices. 5. Solve simultaneous equations in two and three variables	3.1 Definition of determinant , order of determinant 3.1.1 Expansion of determinant of order 2 and 3 3.2 Definition of matrix 3.2.1 Types of matrices 3.2.2 Algebra of matrices 3.2.3 Transpose of matrix , ad-joint of matrix and inverse of matrix 3.2.4 Solution of system of linear equations two and three variables by inverse matrix method	14
4. Trigonometry	1. Define allied angle and compound angle. 2. State the formula of multiple angle (2θ and 3θ) sub-multiple angle ($\frac{\theta}{2}$). 3. Verify trigonometric identities. 4. Solve examples using allied angle, compound angle, multiple	4.1 Trigonometric ratios of any angle 4.2 Fundamental identities 4.3 Trigonometric ratios of allied angles 4.4 Trigonometric ratios of compound angles 4.5 Trigonometric ratios of multiple and sub-multiple angles 4.6 Factorization and de-factorization formulae	22

	and sub-multiple angle formula. 5. Solve examples using factorization and de-factorization formula.		
5. Inverse trigonometric functions	1. Define inverse trigonometric functions. 2. Find principle values of inverse trigonometric functions 3. Solve examples of inverse trigonometric functions.	5.1 Definition of inverse trigonometric functions 5.2 Principle values of inverse trigonometric functions 5.3 Relation between inverse trigonometric functions	06
6. Statistics	1. Define mean of data. 2. Memorize formula of mean, combined mean, mean deviation and standard deviation. 3. Find mean and combined mean. 4. Find the range, mean deviation, standard deviation and variance. 5. Find coefficient of variation and compare the consistency	6.1 Measures of central tendency (mean only) 6.2 Combined mean 6.3 Measures of dispersion 6.4 Range, mean deviation, standard deviation 6.5 Variance and coefficient of variation 6.6 Comparison of two sets of observations	12
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Solve examples using laws of logarithm	Logarithm	01
2	Find partial fraction of proper fraction.	Partial fraction	01
3	Find partial fraction of improper fraction.		01
4	Expand determinant of order 2 and 3.	Determinant and Matrix	01
5	Perform all algebraic operations on matrices		01
6	Find transpose , ad-joint and inverse of matrix		01
7	Solve simultaneous equations in two and three variables		01
8	Verify trigonometric identities.	Trigonometry	01
9	Use allied angle and compound formulae		01
10	Use multiple and sub-multiple angle formulae		01
11	Apply factorization formula to solve examples.		01
12	Apply de-factorization formula to solve examples.		01
13	Find principle values of inverse trigonometric functions and verify formulae	Inverse trigonometric functions	01
14	Find mean of any data and combined mean oftwo sets ofdata.	Statistics	01
15	Find the range, mean deviation, standard deviation and variance.		01
16	Find coefficient of variation and compare the consistency		01
Total Hrs.			16

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Logarithm	00(02)	04(00)	00(00)	04(02)
02	Partial fraction	00(00)	08(06)	00(00)	08(06)
03	Determinant and Matrix	02(00)	08(04)	06(04)	16(08)
04	Trigonometry	06(00)	14(08)	04(04)	24(12)
05	Inverse trigonometric functions	02(00)	04(04)	00(00)	06(04)
06	Statistics	00(02)	12(00)	00(06)	12(08)
	Total	10(04)	50(22)	10(14)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	3	R	2	4	R	2	4	R	2	4	R	2	5	R	2	1	R	2	5/7
	6	R	2																
02	1	U	4	2	U	4	2	U	4	3	U	4	3	A	4				3/5
03	3	U	4	3	U	4	4	U	4	4	U	4	4	A	4				3/5
04	4	U	4	5	U	4	4	A	4	5	U	4	4	U	4				3/5
05	6	U	6	4	U	6	2	U	6										2/3
06	6	U	6	3	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3, 4,5,6
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	--	--
		Journal Writing		Continuous	--	--	--	--
				TOTAL	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
	NIL	

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	3	2	-	-	-	2	3	-	3	-	-
2	3	3	2	3	-	-	2	3	-	3	-	-
3	3	3	2	3	-	-	2	3	-	3	-	-
4	3	3	2	3	-	-	2	3	-	3	-	-
5	3	3	2	-	-	-	2	3	-	3	-	-
6	3	3	2	3	-	-	2	3	-	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Higher Algebra	Hall & Knight, Publisher: Arihant, 5 th Edition 2015	9352030605
2	Plane Trigonometry	S L Loney, Publisher: Arihant, 5 th Edition 2015	9352030540
3.	Basic Statistics	B L Agarwal, Publisher: Anshan	1848290675
4.	Engineering Mathematics	S.S .Shastry, Prentice Hall Of India, 4 th Edition 2008	978-81-203-3616-2
5.	Fundamental of Statistics	S C Gupta, Himalaya Publishing House, 7 th Edition 2015	9789350517697

❖ **E-REFERENCES:**

<https://www.khanacademy.org/math/algebra>, assessed on March 3, 2016

<https://www.khanacademy.org/math/trigonometry>, assessed on March 3, 2016

<https://www.youtube.com/watch?v=BiLIcCtXmm0>, assessed on March 3, 2016

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S.M. Sayyed	I/C Mathematics Dept.	Govt. Polytechnic Nagpur
2.	Mr. P.T. Khobragade	Lecturer	Govt. Polytechnic Nagpur
3.	Mr. G.R. Dewalkar	Lecturer	Govt. Polytechnic Nagpur
4.	Dr. K. C. Deshmukh	Professor	R. T. M. Nagpur University
5.	Dr. P. B. Bahatkar	Professor	Y. C. C. E. Nagpur
6	Mr. Nasir Khan	Lecturer	Anjuman Polytechnic Nagpur

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN EE/EC/IT/CM
LEVEL NAME	: BASIC SCIENCE COURSES
COURSE CODE	: MH203E
COURSE TITLE	: APPLIED MATHEMATICS
PREREQUISITE	: MH201E
TEACHING SCHEME	: TH:04; TU: 01;PR: 00(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR, 1PR CREDIT = 2 CLOCK HRs)
TH. TEE EXAM.	: 03 HRs
PR. TEE EXAM	: NIL
PT. EXAM	: 01 HR

❖ **RATIONALE:**

Mathematics is the backbone of Technical courses, Understanding of engineering concepts require logical approach and thinking. The course is extension of Engineering Mathematics of first semester and stepping into the prerequisites to learn Calculus and Numerical method. Applied Mathematics lay down the foundation to understand and express principles and laws involved in other Technological subjects.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Apply mathematical term, concept, principles and different methods for studying engineering subjects.
2. Apply mathematical methods to solve technical problems.
3. Execute management plans with precision.
4. Use mathematical techniques necessary for daily practical problems.
5. Apply concept of extrema in finding maximum profit of production and minimum cost or material needed for production of an article.
6. Apply various numerical method to solve algebraic and simultaneous equations.

❖ COURSE DETAILS:

A.THEORY:

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
1. Functions and Limits	1. Identify various types of functions. 2. Define odd and even function. 3. Find value of any given function. 4. Find limits for all different functions.	1.1 Definition of function, value of a function. 1.2 Types of functions. 1.3 Concept of limit. 1.4 Algebra of limits. 1.5 Limits of algebraic functions. 1.6 Limits of trigonometric functions. 1.7 Limits of exponential & logarithmic functions.	10
2. Derivatives and Applications of derivative	1. State limit definition of derivative. 2. Perform all algebraic operations on derivatives. 3. Find slope, Equation of tangent and normal line of the given curve. 4. Solve examples of maxima and minima.	2.1 Definition of derivative, Notations. 2.2 Derivative of standard functions. 2.3 Rules for differentiation (without proof) 2.4 Derivative of composite functions. 2.5 Derivative of inverse trigonometric functions. 2.6 Derivative of implicit functions. 2.7 Logarithmic differentiation. 2.8 Derivative of parametric functions. 2.9 Second order differentiation. 2.10 Applications: Equation of tangent and normal; Maxima and minima.	16
3. Integration, Definite integration and Applications	1. State Integration by parts theorem. 2. Integrate function using different method. 3. Solve examples of definite integral using properties. 4. Determine Mean and R.M.S. values.	3.1 Definition of integration as anti-derivative. 3.2 Integration of standard functions. 3.3 Rules for integration. 3.4 Integration by substitution. 3.5 Integration of rational functions. 3.6 Integration by trigonometric transformation. 3.7 Integration by parts. 3.8 Integration by partial fraction. 3.9 Definition of definite integral. 3.10 Properties of definite integral. 3.11 Applications: Mean and R.M.S. values.	16
4. Differential equations	1. State order and degree of D.E. 2. Solve differential equations of first order and first degree. 3. Solve different engineering problems	4.1 Definition of differential equation. 4.2 Order and degree of differential equation. 4.3 Methods of solving differential equations of first order and first degree. 4.4 Variable separable method, reducible to variable separable. 4.5 Homogenous differential equation,	08

	using differential equations.	exact differential equation. 4.6 Linear and Bernoulli equations.	
5. Numerical methods	1. Identify the interval of root of algebraic equation. 2. Find the approximate root of algebraic equation. 3. Solve the system of simultaneous equations containing 3 unknowns.	5.1 Solution of algebraic equation. 5.1.1 Bisection method. 5.1.2 Regula-Falsi method. 5.1.3 Newton-Raphson method. 5.2 Solution of Simultaneous equations containing 3 unknowns. 5.2.1 Gauss elimination method. 5.2.2 Iterative methods: Gauss-Seidal & Jacobi's method.	14
Total Hrs.			64

BLIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Find value of any given function.	Functions and Limits	01
2	Find limits algebraic functions.		01
3	Find limits trigonometric, exponential functions.		01
4	Solve examples on derivative using algebraic operations.	Derivatives and Applications of derivative	01
5	Find dy/dx of implicit functions.		01
6	Find dy/dx of parametric functions and inverse trigonometric functions.		01
7	Find equation of tangent and normal and solve maxima and minima problems.		01
8	Solve examples using rules of integration and substitution method	Integration, Definite integration and Applications	01
9	Solve examples using integration by parts and partial method		01
10	Solve examples using integration by parts and partial fraction method.		01
11	Evaluate definite integral using properties.		01
12	Find area using integration		01
13	Solve D.E. using variable separable method and reducible to variable separable.	Differential equations	01
14	Solve homogenous,linear and Bernoulli D.E.		01
15	Find the approximate root of algebraic equation.	Numerical methods	01
16	Solve the system of simultaneous equations		01
Total Hrs.			16

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Functions and Limits	04(00)	08(08)	00(00)	12(08)
02	Derivatives and Applications of derivative	04(00)	08(04)	06(06)	18(10)
03	Integration, Definite integration and Applications	02(00)	08(08)	06(00)	16(08)
04	Differential equations	00(04)	08(00)	00(00)	08(04)
05	Numerical methods	04(00)	12(04)	00(06)	16(10)
	Total	14(04)	44(24)	12 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	2	R	2	2	R	2	3	R	2	4	R	2	5/7
	4	R	2																
02	1	U	4	1	U	4	2	U	4	1	U	4	1	U	4				3/5
03	2	U	4	3	U	4	3	U	4	2	U	4	3	U	4				3/5
04	4	U	4	4	U	4	5	R	4	3	U	4	5	U	4				3/5
05	2	A	6	3	A	6	2	A	6										2/3
06	5	U	6	5	U	6	5	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3, 4,5,6
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	--	--
		Journal Writing		Continuous	--	--	--	--
				TOTAL	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
	NIL	

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	3	2	-	-	-	2	3	-	3	-	-
2	3	3	2	3	-	-	2	3	-	3	-	-
3	3	3	2	3	-	-	2	3	-	3	-	-
4	3	3	2	3	-	-	2	3	-	3	-	-
5	3	3	2	-	-	-	2	3	-	3	-	-
6	3	3	2	3	-	-	2	3	-	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Engineering Mathematics-1	P N Wartikar, Pune VidyarthiGrihaPrakashan	4567155742
2.	Calculus of one variable	IA Maron, Publisher: Arihant, 5 th edition 2015	9352030559
3.	Engineering Mathematics	S.S .Shastri, Prentice Hall Of India, 4 th edition 2008	9788120336162
4.	Engineering Mathematics	D.T.Gaikawad, S Chand Publication, 1 st edition 2010	8121933560
5.	Higher Engineering Mathematics	B S Grewal, Publisher: S Chand, 43 rd edition 2014	9788174091955

❖ **E-REFERENCES:**

- http://www-math.mit.edu/~djk/calculus_beginners/, assessed on 3rd March, 2016
- <https://en.wikibooks.org/wiki/Calculus>, assessed on 3rd March, 2016

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. M. Sayyed	I/C HOD, MathsDeptt.	Govt. Polytechnic Nagpur
2.	Mr. T. Khobragade	Lecturer	Govt. Polytechnic Nagpur
3.	Mr. R. Dewalkar	Lecturer	Govt. Polytechnic Nagpur
4.	Dr. K. C. Deshmukh	Professor	R. T. M. Nagpur University
5.	Dr. P. B. Bahatkar	Professor	Y. C. C. E. Nagpur
6.	Mr. Nasir Khan	Lecturer	Anjuman Polytechnic Nagpur

(Member Secretary PBOS)

(Chairman PBOS)



LEVEL - III

GOVERNMENT POLYTECHNIC, NAGPUR
(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN EE/EC/CM/IT/MT/TX
LEVEL NAME	: ENGINEERING SCIENCES AND TECHNICAL ARTS COURSES
COURSE CODE	: ME302E
COURSE TITLE	: ENGINEERING GRAPHICS
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 02; TU: 00; PR: 04 (CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT. EXAM	: NIL

❖ **RATIONALE:**

Engineering graphics is the language of engineers. It describes the fundamentals, facts, concepts, principles and techniques of Engineering Graphics. The course illustrates techniques of drawing in an engineering field. The concepts of graphical language are used in expressing the ideas, conveying the instructions, which are used in carrying out the jobs on the sites, shop floor etc. It helps to develop the idea of visualizing the actual object or part on the basis of drawings and blue prints. This course is useful in developing drafting and sketching skills of the student. This preliminary course aims at building a foundation for the further course in drawing and other allied courses.

COURSE OUTCOMES:

After completing this course students will be able to–

1. Draw geometrical figures, curves, sketches etc.
2. Construct the views of an object by using principles of orthographic projection.
3. Visualize three dimensional objects and draw isometric projections.
4. Apply various drawing codes, conventions and symbols as per IS SP-46
5. Interpret various engineering curves
6. Draw free hand sketches of mechanical elements

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Principles of drawing	1. Use of instruments for drawing, scales, lines and their applications. 2. Use of IS SP-46. 3. Loci of points from given data.	1.1 Use of different drawing instruments and equipment 1.2 Types of letters and numbers (single stroke vertical and numbers only) 1.3 Conventions of lines, 1.4 Dimensioning technique as per IS: SP -46 1.5 Scales (reduced, enlarged and full size)- Plain scale, diagonal scale. 1.6 Redrawing 1.7 Loci of points	05
2. Engineering curves.	1. Draw conic sections. 2. Draw involute, cycloid and state their applications 3. Draw helix, spiral from given data.	2.1 To draw an ellipse by- i) Arcs of circles method ii) Concentric circles method 2.2 To draw parabola- I) Rectangle method 2.3 To draw hyperbola by- I) Passing through a given point with reference to given asymptotes 2.4 To draw involutes of circle and polygon of maximum six sides 2.5 To draw cycloid, epi-cycloid and hypo-cycloid	08
3. Orthographic projections.	1. Visualize, interpret and draw orthographic views from given pictorial views. 2. Use of IS SP-46 for dimensioning technique.	3.1 Introduction to orthographic projections 3.2 First angle and Third angle method of projections 3.3 Conversion of simple pictorial views into orthographic views and dimensioning techniques as per IS SP-46	07
4. Isometric projections	1. Visualize, interpret and draw Isometric views from given orthographic views	4.1 Isometric scales 4.2 Isometric views of simple object (plane surfaces, slanting surfaces, and Rectangular, V, Trapezoidal slots)	07

5. Free hand sketches	1. Prepare proportionate freehand sketches of given machine elements 2. Describe functions and use of machine element.	5.1 Types of threads profile – Vee and square, acme, buttress, seller, BA threads, knuckle threads. Types of screws 5.2 Bolts – square and hexagonal bolts, eye bolt 5.3 Types of nuts : square, hexagonal, wing 5.4 Foundation bolts: Eye foundation bolt, Rag foundation bolt, Lewis foundation bolt 5.5 Single and double Riveted Lap and Butt joints	05
Total Hrs.			32

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Draw types of lines, lettering, numbers are to be drawn on sketch book only and one problem from each subtopics 1.5 ,1.6 and 1.7 of chapter 1 (01 Sheet)	1.Principles of drawing	12
2	Draw Engineering Curves, one problem from each subtopic of chapter 2. (01 Sheet)	2. Engineering Curves	12
3	Draw two problem using first angle method of projection (01 Sheet)	3 Orthographic Projections	14
4	Draw one problem with plane surfaces & other with slot, slanting surfaces (using natural scale and isometric scale) (01 Sheet)	4. Isometric Projections	14
5	Draw Free Hand Sketches – any ten sketches covering all the topics under chapter 6 (01 Sheet)	5. Free Hand Sketches	12
Total Hrs.			64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Nil

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Nil

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics, Assessment Sheets &b Drawing Sheets	4,5,6
		Drawing Portfolio		Continuous	05	--	Drawing Portfolio	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Drawing Answer Sheets	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing of scale, redrawing, and loci of point, line work, neatness ,cleanliness and accuracy	10
2	Drawing two Engineering Curves, line work, neatness ,cleanliness and accuracy	10
3	Drawing of orthographic projections , line work neatness ,cleanliness and accuracy	10
4	Drawing of isometric projections, line work neatness ,cleanliness and accuracy	10
5	Drawing of Free Hand Sketches , line work neatness ,cleanliness and accuracy	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	–	–	–	–	–	3	3	–	3	–	–
2	3	–	3	3	–	–	3	3	3	3	–	–
3	3	–	3	3	–	–	3	3	3	3	–	–
4	3	–	3	3	–	–	–	3	–	3	–	–
5	3	–	3	3	–	–	–	3	3	3	–	–
6	3	–	3	3	–	–	–	3	3	3	–	–

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Engineering Drawing Practice for Schools and Colleges IS: SP-46	Bureau of Indian Standards, Third Reprint, October 1998	81-7061-091-2
2.	Engineering Drawing	N.D. Bhatt Charotar Publishing house 2010	978-93-80358-17-8
3.	Machine Drawing	N.D. Bhatt &V. M Panchal, Charotar Publishing house, 2010	978-93-80358-11-6
4	Engineering Drawing	D.A. Jolhe Tata McGrawHill Edu.2010	978-0-07-064837-1

5.	Engineering Drawing	R. K. Dhawan , S..Chand & co. 2001	81-219-1431-0
6	Engineering Drawing	P. J Shah. S.Chand&co.2008	81-219-2964-4

❖ **E-REFERENCES:**

- <https://www.youtube.com/watch?v=TJ4jGyD-WCw>, assessed on 25th March 2016
- https://www.youtube.com/watch?v=dmt6_n7Sgcg, assessed on 25th March 2016
- https://www.youtube.com/watch?v=_MQScnLXL0M, assessed on 26th March 2016
- <https://www.youtube.com/watch?v=3WXPanCq9LI>, assessed on 26th March 2016
- <https://www.youtube.com/watch?v=fvjk7PlxAuo>, assessed on 27th March 2016
- <http://www.me.umn.edu/courses/me2011/handouts/engg%20graphics.pdf> , assessed on 27th March 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

- 1) Drawing Board with drawing instruments
- 2) Mini-drafter

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. O. V. Sarode	I/C, Head of Mechanical Engineering	Government Polytechnic, Nagpur.
2.	Mr. M.G. Thote	Lecturer in Mechanical Engineering	Government Polytechnic, Nagpur.
3.	Mr. G.H. Dahole	Lecturer in Mechanical Engineering	Government Polytechnic, Nagpur.
4	Er. Ritesh Jain	Deputy Manager	Mahindra and Mahindra Ltd. Nagpur
5	Er. A.M.Onkar	Chief Executive Officer	Onkar Furnitures, MIDC, Nagpur
6	Mr. G.F.Potbhare	Principal	NIT, Polytechnic, Nagpur
7	Dr. S.S.Baraskar	Lecturer in Mechanical Engineering	Govt. Polytechnic, Arvi

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT.
LEVEL NAME	: ENGINEERING SCIENCES AND TECHNICAL ART COURSES
COURSE CODE	: CM301E
COURSE TITLE	: COMPUTER WORKSHOP
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU:00;PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02(TH/TU CREDIT = 00 CLOCK HR., 0 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: NIL
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: NIL

❖ RATIONALE:

This course is essential for creating awareness of computers for the students. It gives hands-on experience of computer operation to the students. It introduces basic components of computer and method and means to connect them to the system. It introduces basic knowledge of internet: Web browsing, chatting, exchanging of information. Since the dirt can affect reliability and performance of various components, cleaning of components become one of the essential activity of basic maintenance. This subject demonstrates steps in cleaning and handling various components, handling problems with component connections.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify basic components of computers.
2. Connect and handle different peripheral devices.
3. Identify different ports on Motherboard.
4. Identify and connect different cards on Motherboard.
5. Maintain different peripheral devices like keyboard, mouse, printers and motherboard.
6. Identify front panel and back panel connections.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Identify all the peripheral devices.	Introduction to personal Computer.	2
2.	Identify the front and rear panel controls and ports on a PC		4
3.	Identify all components mounted on Motherboard.		2
4.	Assemble PC on desktop.		4
5.	Assemble PC inside of cabinet.		4
6.	Perform system configuration using CMOS setup.		4
7.	Identify different ports such as serial, parallel, PS/2, RJ 45, USB ports.		4
8.	Copy data on CD, DVD	Introduction to external peripheral devices.	2
9.	Perform different printer settings on different types of printers. Write down the function of each switch.		4
10.	Perform printer's self test		2
11.	Connect of speakers and microphones.	Introduction to different cables.	2
12.	Identify and distinguish different types of cables in your lab.		4
13.	Make patch cable (UTP) with RJ-45 connector with help of crimping tool.		4
14.	Follow cleaning procedures of Mouse, Keyboard and Motherboard.	Physical connection of different peripheral devices.	2
15.	Connect scanner, scan documents and pictures on the scanner available in your lab. Sample printout be attached		4
16.	Make jumper settings on hard disk.		4
17.	Identify different types of cards such as graphics card, LAN card, multimedia cards etc.		4
18.	Fix different cards into matching slots on the motherboard.		4
Skill Assessment			4
TOTAL			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

NIL

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

NIL

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Selection, writing steps, installation etc.	10
2	Connection and configuration.	10
3	Performance	20
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES****1. Computer Engineering:-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	3	3	-	-	-	-	-	-	3	3	-
2	3	3	3	-	-	-	-	-	-	3	3	-
3	3	3	3	-	-	-	-	-	-	3	3	-
4	3	3	3	3	-	-	-	3	3	3	3	-
5	3	3	3	3	-	-	-	3	3	3	3	-
6	3	3	3	3	-	-	-	3	3	3	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	3	3	-	-	-	-	-	-	3	-	-
2	3	3	3	-	-	-	-	-	-	3	-	-
3	3	3	3	-	-	-	-	-	-	3	-	3
4	3	3	3	3	-	-	-	3		3	-	3
5	3	3	3	3	-	-	-	3	-	3	-	3
6	3	3	3	3	-	-	-	3	-	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Troubleshooting Your PC	Mr. David Stone & Alfred Poor, Prentice Hall India, 2000	13: 978-073-561490-1
2.	A+ Complete	David Groth, BPB Publication, 2006	13: 978-0782128024
3.	Computer Installation and Servicing	Balasubramaniam, Tata McGraw Hill Education Pvt. Ltd, Reprint, 2011	13: 9781259082467
4.	Reference Manuals of PC troubleshooting and maintenance	Manuals	-

❖ **E-REFERENCES:**

- <http://www.pcworld.com/article/116583/article.html> , assessed on 29th March 2016
- <http://www.computerstepbystep.com/computer-maintenance.html> , assessed on 29th March 2016
- <https://www.youtube.com/watch?v=a0rEXzyX0-8>, assessed on 29th March 2016

❖ **LIST OF MAJOR COMPONENTS/DEVICES WITH THEIR SPECIFICATION.**

1. Operating System(Windows 98/2000/XP/7/8/8.1/10)
2. CPU Intel core i3/i5/i7
3. Fiber optics cable(LSFH Polymer)
4. Unshielded Twisted pairs cable(CAT 1 to CAT5)
5. Connectors(RJ45/BNC/AUI/FIBER)
6. Printers(INK JET/LASER)
7. Scanner(FLAT BED)
8. Crimps, Strips and cut tools(HT-200R, HT-2008R)

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
2	Dr. Mrs. A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
3	Ms. Shifa S. Sayyed	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4	Mrs. V A Raje	System Analyst(Lecturer in Computer Engineering)	Government Polytechnic, Nagpur.
5	Ms. I. G. Lokhande	Lecturer in Information Technology	Government Polytechnic, Nagpur.

6	Mr. Atul Upadhyay	COE	Vista computers, Ramnagar, Nagpur
7	Prof N. V Chaudhari	Asst. Professor (CSE)	DBACEO ,Wanadongri, Nagpur
8	Prof. Manoj Jethawa	HOD, Computer Science	ShriDattaMeghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/CM/IT/AE/PK/MT
LEVEL NAME	: ENGINEERING SCIENCES AND TECHNICAL ARTS COURSES
COURSE CODE	: AM301E
COURSE TITLE	: ENGINEERING MECHANICS
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03; TU: 01; PR: 02
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (Internal)
PT.	: 01 HR

RATIONALE:

Study of this course develops understanding of effect of force on a body. It helps in analytical and graphical solutions to problem related to forces acting on body. It also helps in understanding concept and application of Equilibrium, friction, centroid and center of gravity. Study of simple machines gives idea about input, output, efficiency and friction of machine. Study of this course is very useful at higher level like strength of materials, Mechanics of structure etc. It helps in forming base for understanding all the courses, which are related to engineering mechanics.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Apply concept of engineering mechanics in engineering field.
2. Analyze effect of force, friction, centroid and centre of gravity.
3. Solve problems related to force, equilibrium of forces, friction, centre of gravity and simple lifting machines.
4. Prove simple laws of equilibrium of forces.
5. Compute efficiency of different machines.
6. Draw the graphs between load and efforts, load and efficiency.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1.Introduction of Engineering Mechanics	1.Define terms related to Engineering Mechanics 2. State the units of different scalar and vector quantity.	1.1Definition of engineering mechanics, necessity and Classification of engineering mechanics. 1.2 Definitions: Space, time, particle, body, rigid body, mass, weight, scalar and vector quantity. 1.3Units of measurement (SI units): Fundamental units and derived units.	02
2.Simple lifting Machine	1. Define terms related to simple lifting Machine 2.Describe different types of simple lifting machine 3.State velocity ratio of machines 4. Solve problem related to simple lifting machine	2.1Concept of simple lifting machine, uses of machine, definition of load, effort, mechanical advantage, velocity ratio, efficiency of Machines, reversible and non-reversible machines.. 2.2Ideal machine, friction in machine, law of machine, maximum Mechanical advantage and efficiency. 2.3Velocity ratios of simple axle and wheel, differential axle wheel, Single purchase & double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block, two sheaves and three sheaves pulley block, worm and worm wheel	08
3.Forces	1.Define Terms Related to Force 2. Define terms related to moments 3. Define terms related to graphic statics 4. State Principal of Transmissibility of Force 5. State Law of parallelogram of forces 6. Describe Resolution & Composition of forces 7. Solve problems on forces.	3.1 Concept of force, definition of force, unit of force, effects of force, Characteristics of force. 3.2System of forces. Principle of transmissibility of force. 3.3 Composition of forces & Resolution of forces (Two dimensional), Orthogonal and Non Orthogonal components of a force. Resultant force. Resultant of concurrent, non- concurrent and parallel forces, Law of parallelogram of forces: limitations and its applications 3.4 Definition of moment, sign convention of moments, types of moments. Law of moment, definition of couple, types of couple, properties of couple, Varignon's theorem of moments and its applications 3.5 Introduction to graphic statics, graphical representation of force, Bow's notation, Space diagram, force diagram, polar diagram & funicular polygon.	12

4. Equilibrium	1. Define terms related to Equilibrium 2. State analytical conditions of equilibrium. 2. State Lami's theorem 3. Define terms related to Beam 4. Solve Problems related to Lami's theorem and beam reaction.	4.1 Definition of equilibrium, analytical conditions of equilibrium, free body diagram 4.2 Lami's Theorem: limitations and its applications. (Simple problems, no problems on spheres put in container). 4.3 Equilibrium of concurrent, non-concurrent and parallel forces. Definition of Beam, span, types of beams, types of supports, types of loading: point load and UDL. Analytical method to calculate reactions at support for point load and UDL on simply supported and overhanging beams	10
5. Centroid & Centre of gravity	1. Define centroid and center of gravity 2. State centroids of plain regular figures. 3. Locate centroid of two different geometric areas 4. Solve problems related to compound figures. 5. State the centre of gravity solid bodies 6. Locate c.g of two different solid bodies 7. Solve problems related to compound figures	5.1 Definition of centroid and centre of gravity, difference between centroid and centre of gravity. Locating centroids of regular figures such as triangle, rectangle, circle, semi circle, quarter circle. (No Derivations). 5.2 Locating centroid of compound figures, having combination of two different geometric areas only. 5.3 Centre of gravity of solid bodies like cylinder, cone, sphere and hemisphere. 5.4 Locating centre of gravity of compound bodies having combination of only two different geometric shapes	08
6. Friction	1. Define terms related to friction 2. State laws of friction 3. Apply concept of friction 4. Solve problems related to friction	6.1 Concept of friction and its importance in engineering, types of friction, laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction. 6.2 Equilibrium of bodies on level surface subjected to force parallel and inclined to plane & inclined plane subjected to force parallel to the plane. (No ladder friction).	08
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Find the M.A., V.R., Efficiency of and law of machine for simple /Differential Axle and Wheel	Simple lifting Machine	2
2	Find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack		2
3	Find the M.A., V.R., Efficiency and law of machine for Two Sheave Or three sheave Pulley Block		2
4	Find the M.A., V.R., Efficiency and law of machine for Single purchase Crab Or Double purchase Crab		2
5	Find the M.A., V.R., Efficiency and law of machine for Worm and Worm Wheel		2
6	Find unknown force using law of polygon of forces.	Forces	2
7	Find forces in the members of jib crane by using triangle law of forces.		2
8	Determine resultant of co-planer concurrent forces by graphical method. (Any two problems)		4
9	Determine resultant of co-planer non Concurrent Forces by graphical method. (Any two problems)		4
10	Find angle between three concurrent forces using Lami's Theorem.	Equilibrium	2
11	Find equilibrium of parallel forces using beam reaction apparatus.		2
12	Determine beam reaction for Vertical Point Load and UDL. (Any two problems)		2
13	Compare co-efficient of Friction between different surfaces such as Wood and wood, Wood and glass, Wood and metal.	Friction	2
Skill Assessment			2
Total Hrs.			32
Tutorials			
1	Forces, Equilibrium, simple lifting machine		08
2	Friction, Centroid and centre of gravity		08
Total Hrs.			16

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction	04(02)	00(00)	00(00)	04(02)
02	Simple Lifting Machine	02(00)	08(04)	00(04)	10(08)
03	Forces	02(00)	12(04)	06(06)	18(10)
04	Equilibrium	02(00)	08(00)	00(06)	10(06)
05	Centroid And Centre Of Gravity	00(00)	04(04)	06(00)	10(06)
06	Friction	00(02)	04(08)	12(00)	16(06)
	Total	10(04)	36(20)	24 (16)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	2	R	2	3	R	2	4	R	2	1	R	2	5/7
	6	R	2																
02	2	U	4	2	U	4	4	U	4	2	U	4	2	A	4				3/5
03	3	U	4	3	U	4	3	U	4	3	U	4	5	U	4				3/5
04	4	U	4	5	U	4	6	U	4	6	U	4	6	U	4				3/5
05	3	A	6	5	A	6	3	A	6										2/3
06	6	A	6	6	A	6	4	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing figure of simple lifting machine and force diagram, selection of equipment's. writing procedure etc.	10
2	Performance	20
3	Calculation, Result, Drawing Graphs(if any)	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	PSO 1	PSO 2
1	3	-	-	-	-	-	-	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-	-	-
3	3	-	-	-	-	-	-	-	-	-	-	-
4	3	-	3	3	-	-	3	3	-	-	-	-
5	3	-	3	3	-	-	3	3	-	-	-	-
6	3	-	3	3	-	-	3	3	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Applied Mechanics	R.S. Khurmi, S.Chand & Co. New Delhi, 2014	10:8121916437 13:9788121916431
2.	Engineering Mechanics	Sunil Deo, Label Book Publishers New Delhi, 2014	10:9381595550 13:978-9381595558
3.	Engineering Mechanics	Basu, Tata Mcgraw Hills, 2013	10:125906266X 13:978-1259062667
4.	Engineering Mechanics	S Ramamrutham, S Chand & Co. New Delhi, 2008	8187433515 9788187433514
5.	Static and Straight of Materials	U.C. Zindal Asian Book Pvt. Ltd New Delhi, 2008	10:8184120737 13:9788184120730

❖ **E-REFERENCES:**

- <https://www.youtube.com/watch?v=-JG9IEqRzQ4>, assessed on 28th March 2016
- <https://www.youtube.com/watch?v=4Vlhh6sGkrI>, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=EcPGKLUe04I>, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=ndT35aqDfAQ>, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=W9UDs-kSR0g>, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=kuAfu0fZOLw>, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=PO5EL9TB-v4>, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=Bx-mMA6k8u4>, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=9XtGJXVnQxk>, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=k37FJHbSQA8>, assessed on 30th March 2016
- https://www.youtube.com/watch?v=6_D6jjQcAFU, assessed on 30th March 2016
- <https://www.youtube.com/watch?v=AOkeQMMsSrc>, assessed on 30th March 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

- | | |
|---|----|
| 1. simple /Differential Axle and Wheel | 01 |
| 2. Simple Screw Jack | 01 |
| 3. Two Sheave Or three sheave Pulley Block | 01 |
| 4. Single purchase Crab Or Double purchase Crab | 01 |
| 5. Worm and Worm Wheel | 01 |
| 6. Force table apparatus for law of polygon of forces. | 01 |
| 7. Jib crane by using triangle law of forces. | 01 |
| 8. Lami's Theorem. Force table apparatus | 01 |
| 9. Co-efficient of Friction between different surfaces ,
such as Wood and wood, Wood and glass,
Wood and metal. | 01 |

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Y. K. Chandarana	HOD, Applied Mechanics	Govt. Polytechnic, Nagpur
2.	H. S. Chepey	HOD, Civil Engineering	A.S. T. S., Wardha
3.	A. P. Waghmare	Lecturer in Applied Mechanics	Govt. Polytechnic, Nagpur
4.	R. D. Mendhe	Lecturer in Applied Mechanics	Govt. Polytechnic, Amravati
5.	R. N. Nibudey	Lecturer in Applied Mechanics	Govt. Polytechnic, Gondia
6.	M. R. Shelote	Consultant	M.R. Associates, Nagpur
7.	Dr. R. N. Khapre	Associate Professor	RCOEN, Nagpur
8.	A. J. Fulzele	Assistant Secretary (Tech)	MSBTE, RO, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN EC, CM, IT
LEVEL NAME	: ENGINEERING SCIENCES AND TECHNICAL ARTS COURSES
COURSE CODE	: EE303E
COURSE TITLE	: ELECTRICAL ENGINEERING
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 04; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: 03 HRs
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: 01 HR

❖ RATIONALE:

Knowledge of electrical engineering is essential for the students of Electronics/ Computer/ Information technology. Students should know the facts, concepts, principles and procedures in electrical engineering. This course describes the basic facts, concepts & principles for the understanding of basic elementary knowledge related to electrical area. It is very useful course for Solving & understanding the different electronic circuits.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Follow the electrical safety precautions.
2. Solve the electrical circuits by using principle and basic laws.
3. Select transformers and motors for particular applications.
4. Connect electrical measuring instruments in the circuit
5. Use different machines for different application.
6. Operate electrical machines/equipment.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Electrical Safety	1. Recall electrical safety rules. 2. Remove the electrocuted person from live conductor 3. Interpret electrical safety signs and symbols 4. Carry out different methods of artificial respiration on electrocuted person 5. Use fire-fighting equipment on different types of fires. 6. Classify various types of earthing. 7. State the need of earthing.	1.1 Electrical Safety, Causes of accidents, General safety rules, Concept of electrical shock, Effect of electric shock, Method of removing electrocuted person, Safety signs and symbols. 1.2 Artificial respiration- Schaefer's method, Silvestre's method, mouth to mouth respiration. 1.3 First Aid 1.4 Fire, Causes of Fire, Basic ways of extinguishing the fire Classification of fire, Class A, B, C, D, Fire fighting equipments, fire extinguishers, and their types . 1.5 Earthing- Necessity of earthing, methods of reducing earth resistance.	7
2. Fundamentals of electricity	1. Define the various electrical Parameters, work , power and energy 2. State different effects of electric Current 3. State various law and its applications. 4. Calculate the temperature coefficient of resistance 5. Identify and draw different electrical engineering symbols 6. Describe line diagram of power system 7. Solve series, parallel and series- parallel resistive circuits	2.1 Concept of electric charge, current, voltage drop, EMF, potential difference, Direction of current and their SI units. 2.2 Types of material-conductor, insulator and semiconductor, properties and application. 2.3 Resistance, unit of resistance, Law of resistance (Factors affecting resistance), Effect of temperature on resistance, Ohms law (simple numerical on 2.3). 2.4 Resistance in series, properties of series circuit, voltage distribution in series circuit, equivalent resistance of series circuit, Applications of series circuits, 2.5 Resistance in parallel, properties of parallel circuit, current distribution in parallel circuit, equivalent resistance of parallel circuit, Applications of	9

		parallel circuits, (Numerical problems based on 2.4,2.5) 2.6 Kirchhoff's current and voltage law(no numerical) 2.7 Work, power, energy and their SI units, Relation between H.P and watts, Kwh and Kcal. 2.8 Connection of ammeter, voltmeter and wattmeter in single phase AC circuit. and its measurement. 2.9 Comparison between AC and DC	
3. AC Fundamentals	1. Define terms related to AC fundamentals 2. Compare terms time period and frequency, angular velocity and frequency, frequency and speed. 3. Solve problems related to pure resistive, inductive and capacitive circuit 4. Understand the concept of reactance, Impedance and power factor. 5. State and compare types of electrical loads	3.1 Generation of alternating voltage- single phase and three-phase. 3.2 Equation of sinusoidal alternating voltage and current, important terminology such as- waveform, instantaneous value, cycle, time period, frequency, amplitude, Relation between time period and frequency, angular velocity and frequency, frequency and speed. 3.3 Maximum, average and R.M.S. value of sinusoidal waveform, form factor and peak factor.(No derivation) 3.4 A.C. Voltage applied to pure resistor, pure inductor, and pure capacitor. Concept of reactance, Impedance and power factor, power in single-phase circuits. ((Simple Numerical problem based on 5.4 topic). 3.5 Types of loads.	12
4 Electrostatics& Electromagnetism	1. State Coulombs law of Electrostatics 2. Define terms related to electrostatics 3. Solve series, parallel capacitive circuits 4. Apply laws of electromagnetism	4.1 Coulombs law of Electrostatics, Absolute and relative permittivity, Concept of electric field, electric flux, electric intensity, electric flux density, and electric potential, potential gradient, dielectric strength. 4.2 Capacitance, dielectric constant, capacitance of parallel plate capacitor, capacitance in series and parallel and source of capacitance in electrical systems. Charging &	12

		discharging of capacitor, Dielectric loss. (Numerical problems based on 3.2) 4.3 Types of capacitor and their application 4.4 Faraday's Laws of electromagnetic induction. Direction of induced EMF and current, Lenz's Law, Fleming's right hand rule, Induced EMF, Dynamically induced EMF, statically induced EMF, self-Inductance (L), Mutual Inductance. 4.5 Energy stored in inductor, rise and decay of current through inductor	
5 Transformer	1. State meaning of transformer. 2. Describe the concept of transformation ratio, KVA rating of transformer, voltage regulation and efficiency 3. Classify the different types of transformer	5.1 Definition, principle of operation, types of transformer, 5.2 EMF equation (No derivation), transformation ratio, KVA rating of transformer, voltage regulation and efficiency. (Simple Numerical problem based on 4.2 topic). 5.3 Current Transformer and Potential Transformer- Special features and its applications. 5.4 Auto-transformer –Special features, Schematic diagram and its applications	12
6. Drives	1. Classify different types of AC & DC motors. 2. Select the particular motor for particular application. 3. Describe construction and working of DC machines and AC machines. 4. Understand the need of starter. 5. Control the speed of motor. 6. Describe construction and working of Stepper motor.	6.1 Broad classification of A.C & D.C Drives. 6.2 DC Drives- General working principle of D. C. motor. Types-shunt, series and compound motor. Application and selection for different applications need of starter, 3 point starters, reversal of rotation. 6.3 AC Drives-Single-phase induction motors, their types, application and selection for different applications, reversal of rotation. 6.4 Principle of operation of Stepper Motor and its application. (No Numerical on topic 6)	12
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical's	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Identify electrical measuring instruments, sources, ICDP/ITDP, switches, loads, wires and execute safety precautions in laboratory.	Electrical Safety	2
2	Connect voltmeter, ammeter and wattmeter in electrical circuit.	Fundamentals of Electricity	2
3	Measure the current, voltage and resistance with the help of multi-meter or tong tester.		2
4	Calculate the unknown resistance in an electric circuit using ohms law.		2
5	Calculate the temperature coefficient of resistance of conductors		2
6	Measure the total resistance of series circuit & parallel circuit		2
7	Find the branch current and mesh voltage using Kirchhoff's laws. (KCL & KVL)		2
8	Use test lamps for testing single-phase and three – phase supply. Use of tester on single-phase supply.		2
9	Test capacitor. Plot charging and discharging curve of capacitor.	Electrostatics& Electromagnetism	2
10	Measure the inductance of a given coil.		2
11	Connect voltage & current ratio of single- phase transformer.	Transformer	2
12	Operate CRO and Observe the current & voltage wave form for purely R,L& C ac circuit &interpret the phasor relationship.	AC Fundamentals	2
13	Reverse the directions of rotation of DC shunt motor.	Drives	2
14	Reverse the directions of rotation of single-phase capacitor start motor		2
15	Identify different parts of Stepper motor at fixed angular step.		2
Skill Assessment			2
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Electrical Safety	02(00)	04(04)	00(00)	06(04)
02	Fundamentals of electricity	02(00)	04(06)	06(00)	12(06)
03	AC Fundamentals	06(04)	10(00)	00(06)	16(10)
04	Electrostatics& Electromagnetism	00(02)	04(04)	06(00)	10(06)
05	Transformer	02(02)	04(04)	06(00)	12(06)
06	Drives	06(04)	08(04)	00(00)	14(04)
	Total	18(12)	34(22)	18 (06)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	2	R	2	2	R	2	3	R	2	5	R	2	6	R	2	4	R	2	
	5	R	2																
02	3	R	4	1	U	4	2	U	4	1	U	4	4	U	4				
03	3	U	4	4	U	4	5	U	4	3	R	4	5	U	4				
04	6	R	4	6	U	4	6	U	4	6	R	4	6	R	4				
05	3	U	6	2	A	6	3	A	6										
06	4	A	6	5	A	6	2	U	6										

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, selection of equipment's. writing procedure etc.	10
2	Performance	20
3	Calculation, Result, Drawing Graphs (if any)	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	-	-	-	2	-	1	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-	-	-
3	3	-	-	-	-	-	-	-	-	-	-	-
4	3	-	2	2	-	-	-	2	-	2	-	-
5	3	-	2	2	-	-	-	2	-	2	-	-
6	3	-	2	2	-	-	-	2	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Principle of Electrical Engineering and Electronics	V. K. Mehta, S. Chand & Company Ltd., Reprint, 1996	81-219-1053-6
2.	A Text Book Of Electrical Technology Vol-I	B. L. Theraja, A. K. Theraja, S.Chand& Co Ltd., Reprint,2006	81-219-2440-5
3.	Basic Electrical Engineering	V. N. Mittle, Arvind Mittal, The McGraw Hill Education Pvt. Ltd, Reprint, 2011	13: 978-0-07-059357-2
4.	Experiments in Basic Electrical Engineering	S. K. Bhattacharya and K. M. Rastogi., New Age International Publisher, Reprint, 2009.	978-81-224-1042-6
5.	A Text Book on laboratory courses in Electrical Engineering	S. G.Tarrekar and P. K. Kharbanda, S. Chand& Company Ltd., Third, 1990	13: 978-8121901048

❖ **E-REFERENCES:**

- <http://nptel.ac.in/courses/108108076/1> , assessed on 18th January 2016
- <http://www.electrical4u.com> , assessed on 18th January 2016
- <https://www.youtube.com/watch?v=A9KSGAnjo2U> , assessed on 18th January 2016
- www.learnerstv.com/Free-engineering-Video-lectures-ltv059-Page1.htm assessed on 28th Feb 2016
- www.studyaaar.com/index.../11-basic-electrical-a-electronics-engineerin assessed on 28th Feb 2016
- www.faadooengineers.com/.../448-BASIC-ELECTRICAL-ENGINEERIN assessed on 28th Feb 2016.
- <https://www.scribd.com/.../Lecture-Notes-Basic-Electrical-and-Electronic> assessed on 28th Feb 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Meters: Ammeter MI 0-5-10 A, Voltmeter MI 0-150-300, Wattmeter 0-3000 W, Digital Multi-meter, Tong tester, Megger 500V/1000V Hand driven.
2. Rheostat assorted sizes, Variable Inductor, Capacitor
3. Single phase induction motor, 230 V, 50 Hz, 1 kw
4. Single phase transformer, 230/115 V, 50 Hz., 1 KVA
5. CRO, dual trace
6. DC Shunt Motor, 220 V, 3 HP

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr.C.S.Thorat	Principal	Government Polytechnic, Nagpur.
2.	Mrs. K. M. Gaidhane	I/C, Head of Electrical Engineering	Government Polytechnic, Nagpur.
3.	Mr. R. I. Kamble	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
4.	Mrs. S. P. Thote	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
5.	Dr. R. S. Surjuse	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
6.	Mr. G. V. Gotmare	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
7.	Mr. H. N. Kharkar	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
8.	Mr. N. H. Adkine	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
9.	Mrs. A.P. Gandhi	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
10.	Mr. R. Y. Ghormade	HOD, Electrical Engineering	Dharampeth Polytechnic, Nagpur
11.	Mr. B. P. Bale	Dy. Engineer.	MSDCL, Nagpur
12.	Dr. S. S. Bharatkar	Lecturer in Electrical Engineering	Government Polytechnic, Amravati

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM, IT
LEVEL NAME	: ENGINEERING SCIENCE AND TECHNICAL ART COURSES
COURSE CODE	: EC308E
COURSE TITLE	: PRINCIPLE OF ELECTRONICS
PREREQUISITE	: NIL
TEACHING SCHEME:	TH: 04; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (Internal)
PT.	: 01 HR

❖ **RATIONALE:**

The subject deals with fundamental devices used in all electronic circuits. This course prepares students understanding the construction, characteristics, operating principle and applications of electronic devices and circuit applications used in electronic circuits. Information Technology also deals with basic of materials used in electronic circuits and computer systems. The course also covers passive and active components used in electronics circuits, IC fabrication and computer systems.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Describe the construction and characteristics of semiconductor devices.
2. Identify different semiconductor devices in electronic circuits.
3. Utilize the concept of electronics in various fields.
4. Assemble small electronic circuits.
5. Measure different parameters using test and measuring equipments.
6. Analyze electronic circuits.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Materials, Components And Circuit Elements	1. Compare different types of materials. 2. Use the concept of soldering. 3. Describe the need of insulating material. 4. Classify materials. 5. Identify different resistor. 6. Estimate the value of resistor using colour coding. 7. List various applications of passive components. 8. Describe the concept of cables, switches, connectors.	1.1 Types Of Materials: - conductors, Insulators, Semiconductor and magnetic. 1.2 Concept of solder, types of solder:- hard solder and soft solder. Soldering Alloys, soldering fluxes, need of flux, types of fluxes:- corrosive, intermediate and noncorrosive fluxes. 1.3 Types of passive components :- resistors, Classification, functions, specifications, color coding, symbols and units of resistors, Capacitor Classification, functions, specifications, symbol and unit of capacitor, inductors Classification, functions, specifications. 1.4 Types of resistor:- fixed resistor, wire wound resistor and LDR 1.5 Applications of resistor, capacitors and inductors. 1.6 Concept of Relays, specifications, functions and application of relays 1.7 Concept of Switches, specifications functions and applications of switches, 1.8 Concept of connectors, specifications functions and applications of connector. 1.9 Concept of cables, specifications functions and applications of cables.	12
2. P-N Junction	1. Draw energy level diagram and energy band diagram. 2. State Types of semiconductor. 3. Define semiconductor. 4. Describe formation of p-n junction semiconductor. 5. Compare different types of diodes. 6. State applications of p-n diode.	Semiconductor theory: 2.1 Energy level diagram, energy band diagram, Comparison of insulators, semiconductors and conductors on the basis of energy bands. 2.2 Definition of semiconductor, types of semiconductor, examples of semiconductor. 2.3 Effect of temperature on its conductivity on intrinsic semiconductor. 2.4 Types of extrinsic semiconductors. Trivalent and pentavalent impurity elements, majority and minority carriers, crystalline structure and working of P&N.	13

		Semiconductor Diodes. 2.5 Formation of P-N junction, and its working with forward and Reverse biasing. 2.6 Zener and avalanche mechanism 2.7 Types of P-N junction diode, Circuit diagram, working Principle of Zener diode, LED, LASER and Photodiode. 2.8 Rectification property of a P-N junction diode.	
3. Bipolar Junction Transistor (BJT)	1. Define transistor. 2. Identify PNP & NPN transistor. 3. Sketch input and output characteristics of different transistor configuration. 4. Describe the need of transistor biasing. 5. Describe different biasing methods of biasing. 6. Distinguish different biasing methods. 7. Apply the concept of transistor to use it as switch	3.1 Types of BJT, constructions, symbols, applications, ratings, Specifications of BJT. 3.2 BJT configurations (CE, CB, CC) and their input and output characteristic. Comparison of CE, CB, CC configurations. 3.3 Operating Regions of BJT. 3.4 Definitions:- current gains (alpha and beta) and their relationship. 3.5 Condition for faithful amplification. Concepts of D.C. load line. Operating points and its stability factors. 3.6 Application of transistor:- transistor as an switch and transistor as an amplifier 3.6 Need of transistor biasing. 3.7 Biasing methods of BJT:- Circuit diagram, working principle of Fixed bias method, Voltage divider bias method and base bias with collector feedback method.	12
4. Rectifiers And Filters	1. Define rectifier and filters. 2. Describe half wave rectifier and full wave rectifier circuits. 3. Distinguish between HWR and FWR. 4. Memorize the need if filter. 5. Recall the operation of Filter. 6. Describe the different types of filters. 7. Distinguish different types of filters.	Rectifiers 4.1 Rectifiers Specifications and types of rectifiers. 4.2 Circuit diagram, working, waveform advantages, disadvantages, specifications of half wave rectifiers(HWR) 4.3 Circuit diagram, working, waveform advantages, disadvantages, specifications of full wave rectifiers(FWR) 4.4 comparisons of HWR and FWR. 4.5 Definitions of the terms :- peak inverse voltage, ripple factor, Fitters 4.6 Necessity and types of filters. 4.7 circuit diagram, working, waveforms, advantages, disadvantages of shunt capacitor filter, series inductor, LC- types and	10

		II types filter 4.8 Function of bleeder resistor, comparisons of all filters.	
5.Voltage Regulators	1. Define Voltage Regulation. 2. Illustrate the need of regulation. 3. Demonstrate Zener diode as a voltage regulator. 4. Describe working of series and shunt regulators using BJT. 5. Compare different voltage regulators. 6. Describe Zener diode as a voltage regulator.	5.1 definition of voltage regulation, Block diagram, working and demerits of unregulated power supply(URPS) 5.2 Necessity and types of voltage regulation, Zener diode as voltage Regulator and its merits and demerits, concept of switched mode power supply (SMPS). 5.3 Circuit diagram ,working, merits, demerits, of series and shunt regulators using BJT 5.4 Definition of load and line regulation. 5.5 Comparison of all voltage regulators.	06
6.Oscillators	1. Define Feedback. 2. Discuss positive and negative feedback 3. Define oscillators. 4. Categorize oscillators. 5. Describe working of different oscillators 6. Memorize advantages and disadvantages of oscillator.. 7. Identify the given circuit of oscillator and describe.	Feedback circuits: 6.1 Definition, types, and comparison of feedbacks. 6.2 Effects and advantages of negative feedback in amplifier 6.3 Block diagram of negative feedback 6.4. Block diagram of positive feedback Oscillators 6.5 LC tank circuit, meaning of damped and undamped oscillation. 6.6 Classification Of oscillators. Barkhausen criteria for sustained oscillation. 6.7 Circuit diagram, working, advantages, disadvantages and applications of Hartley oscillator, colpitt's oscillators and RC phase shift oscillator and crystal oscillator.	11
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Measure Values of resistors using colour codes and multimeter	Materials, components and circuit elements	2
2	Identify various controls of test and measuring equipment(Digital Multimeter, CRO, Function Generator)		4
3	Plot V-I characteristics of P-N Junction Diode.		2
4	Plot V-I characteristics of Zener Diode and identify breakdown voltage in reverse bias condition.		2
5	Plot the input and output characteristics of BJT in CE mode and find input resistance, output resistance and current gain.	Bipolar junction transistor	2
6	Plot the input and output characteristics of BJT in CB mode and find input resistance, output resistance and Current gain		2
7	Assemble fixed bias circuits and voltage divider Transistor biasing circuits on bread board and measure different parameters.		2
8	Analyze the effect of different values of filters on the output HWR and Plot I/O waveform of HWR.	Rectifiers and Filters	4
9	Plot I/O waveforms of FWR and Show the effect of Different Filter on the output of FWR.		4
10	Assemble Zener diode as a voltage regulator and Draw V-I characteristic of Zener diode in reverse bias mode.	Voltage regulators	4
11	Connect input to smps and measure output		2
12	Construct Hatley oscillator and find output frequency	Oscillators	2
13	Construct R.C Phase shift oscillator and find output frequency		2
Skill Assessment			2
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Materials, components and circuit elements	02(02)	08(06)	00(00)	10(08)
02	P-N Junction	06(00)	10(08)	00(00)	16(08)
03	Bipolar Junction Transistor	06(00)	08(00)	00(06)	14(06)
04	Rectifiers and Filters	04(02)	06(04)	00(00)	10(06)
05	Voltage Regulators	02(04)	00(00)	06(00)	08(04)
06	Oscillators	02(04)	04(04)	06(00)	12(08)
	Total	22(12)	36(22)	12 (06)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	5	R	2	6	R	2	1	R	2	5/7
	4	R	2																
02	2	R	4	1	U	4	1	U	4	2	U	4	2	U	4				3/5
03	3	R	4	2	U	4	3	U	4	4	U	4	5	R	4				3/5
04	4	R	4	3	U	4	6	U	4	6	R	4	6	U	4				3/5
05	2	U	6	4	U	6	3	A	6										2/3
06	5	A	6	6	A	6	1	U	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics &Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		Questionnaires	1, 2, 3, 4,5,6
	End Of Course			End Of The Course				

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, writing observation table ,draw waveforms and writing procedure etc.	10
2	Performance of the practical	20
3	Taking observations ,Calculation, Result, Drawing Graphs(if any)	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSO	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	-	-	-	-	-	-	-	-	3	-	-
2	3	-	-	-	-	-	-	-	-	3	-	-
3	3	-	-	-	-	-	-	-	-	3	-	-
4	3	-	2	2	-	-	2	2	-	3	-	-
5	3	-	2	2	-	-	2	2	-	3	-	-
6	3	-	2	2	-	-	2	2	-	3	-	-

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Principles of Electronics	V.K.Mehta, S.Chand & Company Ltd., Reprint, 1996	8121910536
2.	Applied Electronics	R S. Sedha, S. Chand & Company Ltd.2005	8121927838
3.	Basic Electronics	Grob, Tata Mc Graw Hill	9780070634329
4.	Electronics Devices and circuits	S.Salivahanan, Tata Mc Graw Hill	9780070660496
5.	Electronic Principles	Albert Malvino & David J Bates, Tata Mc Graw Hill	9780070634244

❖ **E-REFERENCES:**

- <http://nptel.ac.in/courses/117103063>
- <http://www.electronicsforu.com>
- <https://www.youtube.com/watch?v=w8Dq8bITmSA>

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Ammeter MI 0-5-10 A
2. Voltmeter MI 0-150-300 V
3. Regulated Power Supply
4. Digital Multi-meter
5. Cathode Ray Oscilloscope (0-50 MHZ)
6. Function Generator

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S. S. Tadas	HOD, Electronics and Telecommunications	Government Polytechnic, Nagpur.
2.	Mr. D. A. Brahamankar	Lecturer, Government Polytechnic, Nagpur.	Government Polytechnic, Nagpur.
3.	Mrs. U. P. Potdar	Lecturer, Government Polytechnic, Nagpur.	Government Polytechnic, Nagpur.
4.	Mr. Sandip V Darwhankar	Director	Beta computronicspvt ltd , Nagpur
5.	Mrs. Gajala Ali	Head Electronics	Anjuman Polytechnic , Nagpur
6.	Mr. S M Kale	Lecturer Electronics	Government Polytechnic, Gadchiroli.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN EC, CM, IT
LEVEL NAME	: ENGINEERING SCIENCES AND TECHNICAL ARTS COURSES
COURSE CODE	: EE303E
COURSE TITLE	: ELECTRICAL ENGINEERING
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 04; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: 03 HRs
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: 01 HR

❖ RATIONALE:

Knowledge of electrical engineering is essential for the students of Electronics/ Computer/ Information technology. Students should know the facts, concepts, principles and procedures in electrical engineering. This course describes the basic facts, concepts & principles for the understanding of basic elementary knowledge related to electrical area. It is very useful course for Solving & understanding the different electronic circuits.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Follow the electrical safety precautions.
2. Solve the electrical circuits by using principle and basic laws.
3. Select transformers and motors for particular applications.
4. Connect electrical measuring instruments in the circuit
5. Use different machines for different application.
6. Operate electrical machines/equipment.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Electrical Safety	1. Recall electrical safety rules. 2. Remove the electrocuted person from live conductor 3. Interpret electrical safety signs and symbols 4. Carry out different methods of artificial respiration on electrocuted person 5. Use fire-fighting equipment on different types of fires. 6. Classify various types of earthing. 7. State the need of earthing.	1.1 Electrical Safety, Causes of accidents, General safety rules, Concept of electrical shock, Effect of electric shock, Method of removing electrocuted person, Safety signs and symbols. 1.2 Artificial respiration- Schaefer's method, Silvestre's method, mouth to mouth respiration. 1.3 First Aid 1.4 Fire, Causes of Fire, Basic ways of extinguishing the fire Classification of fire, Class A, B, C, D, Fire fighting equipments, fire extinguishers, and their types . 1.5 Earthing- Necessity of earthing, methods of reducing earth resistance.	7
2. Fundamentals of electricity	1. Define the various electrical Parameters, work , power and energy 2. State different effects of electric Current 3. State various law and its applications. 4. Calculate the temperature coefficient of resistance 5. Identify and draw different electrical engineering symbols 6. Describe line diagram of power system 7. Solve series, parallel and series- parallel resistive circuits	2.1 Concept of electric charge, current, voltage drop, EMF, potential difference, Direction of current and their SI units. 2.2 Types of material-conductor, insulator and semiconductor, properties and application. 2.3 Resistance, unit of resistance, Law of resistance (Factors affecting resistance), Effect of temperature on resistance, Ohms law (simple numerical on 2.3). 2.4 Resistance in series, properties of series circuit, voltage distribution in series circuit, equivalent resistance of series circuit, Applications of series circuits, 2.5 Resistance in parallel, properties of parallel circuit, current distribution in parallel circuit, equivalent resistance of parallel circuit, Applications of	9

		parallel circuits, (Numerical problems based on 2.4,2.5) 2.6 Kirchhoff's current and voltage law(no numerical) 2.7 Work, power, energy and their SI units, Relation between H.P and watts, Kwh and Kcal. 2.8 Connection of ammeter, voltmeter and wattmeter in single phase AC circuit. and its measurement. 2.9 Comparison between AC and DC	
3. AC Fundamentals	1. Define terms related to AC fundamentals 2. Compare terms time period and frequency, angular velocity and frequency, frequency and speed. 3. Solve problems related to pure resistive, inductive and capacitive circuit 4. Understand the concept of reactance, Impedance and power factor. 5. State and compare types of electrical loads	3.1 Generation of alternating voltage- single phase and three-phase. 3.2 Equation of sinusoidal alternating voltage and current, important terminology such as- waveform, instantaneous value, cycle, time period, frequency, amplitude, Relation between time period and frequency, angular velocity and frequency, frequency and speed. 3.3 Maximum, average and R.M.S. value of sinusoidal waveform, form factor and peak factor.(No derivation) 3.4 A.C. Voltage applied to pure resistor, pure inductor, and pure capacitor. Concept of reactance, Impedance and power factor, power in single-phase circuits. ((Simple Numerical problem based on 5.4 topic). 3.5 Types of loads.	12
4 Electrostatics& Electromagnetism	1. State Coulombs law of Electrostatics 2. Define terms related to electrostatics 3. Solve series, parallel capacitive circuits 4. Apply laws of electromagnetism	4.1 Coulombs law of Electrostatics, Absolute and relative permittivity, Concept of electric field, electric flux, electric intensity, electric flux density, and electric potential, potential gradient, dielectric strength. 4.2 Capacitance, dielectric constant, capacitance of parallel plate capacitor, capacitance in series and parallel and source of capacitance in electrical systems. Charging &	12

		discharging of capacitor, Dielectric loss. (Numerical problems based on 3.2) 4.3 Types of capacitor and their application 4.4 Faraday's Laws of electromagnetic induction. Direction of induced EMF and current, Lenz's Law, Fleming's right hand rule, Induced EMF, Dynamically induced EMF, statically induced EMF, self-Inductance (L), Mutual Inductance. 4.5 Energy stored in inductor, rise and decay of current through inductor	
5 Transformer	1. State meaning of transformer. 2. Describe the concept of transformation ratio, KVA rating of transformer, voltage regulation and efficiency 3. Classify the different types of transformer	5.1 Definition, principle of operation, types of transformer, 5.2 EMF equation (No derivation), transformation ratio, KVA rating of transformer, voltage regulation and efficiency. (Simple Numerical problem based on 4.2 topic). 5.3 Current Transformer and Potential Transformer- Special features and its applications. 5.4 Auto-transformer –Special features, Schematic diagram and its applications	12
6. Drives	1. Classify different types of AC & DC motors. 2. Select the particular motor for particular application. 3. Describe construction and working of DC machines and AC machines. 4. Understand the need of starter. 5. Control the speed of motor. 6. Describe construction and working of Stepper motor.	6.1 Broad classification of A.C & D.C Drives. 6.2 DC Drives- General working principle of D. C. motor. Types-shunt, series and compound motor. Application and selection for different applications need of starter, 3 point starters, reversal of rotation. 6.3 AC Drives-Single-phase induction motors, their types, application and selection for different applications, reversal of rotation. 6.4 Principle of operation of Stepper Motor and its application. (No Numerical on topic 6)	12
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical's	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Identify electrical measuring instruments, sources, ICDP/ITDP, switches, loads, wires and execute safety precautions in laboratory.	Electrical Safety	2
2	Connect voltmeter, ammeter and wattmeter in electrical circuit.	Fundamentals of Electricity	2
3	Measure the current, voltage and resistance with the help of multi-meter or tong tester.		2
4	Calculate the unknown resistance in an electric circuit using ohms law.		2
5	Calculate the temperature coefficient of resistance of conductors		2
6	Measure the total resistance of series circuit & parallel circuit		2
7	Find the branch current and mesh voltage using Kirchhoff's laws. (KCL & KVL)		2
8	Use test lamps for testing single-phase and three – phase supply. Use of tester on single-phase supply.		2
9	Test capacitor. Plot charging and discharging curve of capacitor.		Electrostatics & Electromagnetism
10	Measure the inductance of a given coil.	2	
11	Connect voltage & current ratio of single- phase transformer.	Transformer	2
12	Operate CRO and Observe the current & voltage wave form for purely R,L& C ac circuit &interpret the phasor relationship.	AC Fundamentals	2
13	Reverse the directions of rotation of DC shunt motor.	Drives	2
14	Reverse the directions of rotation of single-phase capacitor start motor		2
15	Identify different parts of Stepper motor at fixed angular step.		2
Skill Assessment			2
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Electrical Safety	02(00)	04(04)	00(00)	06(04)
02	Fundamentals of electricity	02(00)	04(06)	06(00)	12(06)
03	AC Fundamentals	06(04)	10(00)	00(06)	16(10)
04	Electrostatics& Electromagnetism	00(02)	04(04)	06(00)	10(06)
05	Transformer	02(02)	04(04)	06(00)	12(06)
06	Drives	06(04)	08(04)	00(00)	14(04)
	Total	18(12)	34(22)	18 (06)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	2	R	2	2	R	2	3	R	2	5	R	2	6	R	2	4	R	2	
	5	R	2																
02	3	R	4	1	U	4	2	U	4	1	U	4	4	U	4				
03	3	U	4	4	U	4	5	U	4	3	R	4	5	U	4				
04	6	R	4	6	U	4	6	U	4	6	R	4	6	R	4				
05	3	U	6	2	A	6	3	A	6										
06	4	A	6	5	A	6	2	U	6										

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, selection of equipment's. writing procedure etc.	10
2	Performance	20
3	Calculation, Result, Drawing Graphs (if any)	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	3	-	-	-	2	-	1	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-	-	-
3	3	-	-	-	-	-	-	-	-	-	-	-
4	3	-	2	2	-	-	-	2	-	2	-	-
5	3	-	2	2	-	-	-	2	-	2	-	-
6	3	-	2	2	-	-	-	2	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Principle of Electrical Engineering and Electronics	V. K. Mehta, S. Chand & Company Ltd., Reprint, 1996	81-219-1053-6
2.	A Text Book Of Electrical Technology Vol-I	B. L. Theraja, A. K. Theraja, S.Chand& Co Ltd., Reprint,2006	81-219-2440-5
3.	Basic Electrical Engineering	V. N. Mittle, Arvind Mittal, The McGraw Hill Education Pvt. Ltd, Reprint, 2011	13: 978-0-07-059357-2
4.	Experiments in Basic Electrical Engineering	S. K. Bhattacharya and K. M. Rastogi., New Age International Publisher, Reprint, 2009.	978-81-224-1042-6
5.	A Text Book on laboratory courses in Electrical Engineering	S. G.Tarrekar and P. K. Kharbanda, S. Chand& Company Ltd., Third, 1990	13: 978-8121901048

❖ **E-REFERENCES:**

- <http://nptel.ac.in/courses/108108076/1> , assessed on 18th January 2016
- <http://www.electrical4u.com> , assessed on 18th January 2016
- <https://www.youtube.com/watch?v=A9KSGAnjo2U>, assessed on 18th January 2016
- www.learnerstv.com/Free-engineering-Video-lectures-ltv059-Page1.htm assessed on 28th Feb 2016
- www.studyaaar.com/index.../11-basic-electrical-a-electronics-engineerin assessed on 28th Feb 2016
- www.faadooengineers.com/.../448-BASIC-ELECTRICAL-ENGINEERIN assessed on 28th Feb 2016.
- <https://www.scribd.com/.../Lecture-Notes-Basic-Electrical-and-Electronic> assessed on 28th Feb 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Meters: Ammeter MI 0-5-10 A, Voltmeter MI 0-150-300, Wattmeter 0-3000 W, Digital Multi-meter, Tong tester, Megger 500V/1000V Hand driven.
2. Rheostat assorted sizes, Variable Inductor, Capacitor
3. Single phase induction motor, 230 V, 50 Hz, 1 kw
4. Single phase transformer, 230/115 V, 50 Hz., 1 KVA
5. CRO, dual trace
6. DC Shunt Motor, 220 V, 3 HP

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr.C.S.Thorat	Principal	Government Polytechnic, Nagpur.
2.	Mrs. K. M. Gaidhane	I/C, Head of Electrical Engineering	Government Polytechnic, Nagpur.
3.	Mr. R. I. Kamble	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
4.	Mrs. S. P. Thote	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
5.	Dr. R. S. Surjuse	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
6.	Mr. G. V. Gotmare	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
7.	Mr. H, N. Kharkar	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
8.	Mr. N. H. Adkine	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
9.	Mrs. A.P. Gandhi	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
10.	Mr. R. Y. Ghormade	HOD, Electrical Engineering	Dharampeth Polytechnic, Nagpur
11.	Mr. B. P. Bale	Dy. Engineer.	MSDCL, Nagpur
12.	Dr. S. S. Bharatkar	Lecturer in Electrical Engineering	Government Polytechnic, Amravati

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.
(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: ENGINEERING SCIENCE AND TECHNICAL ARTS COURSES
COURSE CODE	: CM302E
COURSE TITLE	: COMPUTER NETWORK
PREREQUISITE	: NIL
TEACHING SCHEME:	TH: 04; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 01 CLOCK HR., 01 PR CREDIT = 02 CLOCK HR.)
TH. TEE EXAM	: 03 HRs
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: 01 HR

❖ **RATIONALE:**

The day-to-day business transaction in banks, railways reservation, industrial sale, purchase, industrial automation / process and educational environments are all dependent on computers that are connected on networks. This subject will enable to learn the basic concepts of computer network and its applications, topologies, communication media, protocols used and OSI reference model.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Illustrate various protocols, models in networks.
2. Recognize network architecture and physical media used to connect computers in network.
3. Identify the layers, principles of operations and operating characteristics of the ISO OSI model.
4. Develop a simple computer network.
5. Share files, directories and printers on local area network.
6. Install networking devices and wireless networks.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Basics of Computer Network	1. Define the term network and identify several networks 2. List the applications of Computer Network 3. Identify the roles of the client and server in client-server architecture 4. Categories computer network based on scope and connection 5. Identify the use of various types of server.	1.1 Introduction to Computer Network: Computer network, sharing information, sharing resources, file sharing 1.2 Categories of network: Based on scope - LAN, MAN, WAN Based on Connection - Peer to Peer network, Client- Server Network, Centralized network, Distributed network. 1.3 Network Architecture:- Features and Applications 1.4 Applications and features of different types of servers: File server, Mail Server, Web Server, Proxy Server.	08
2. Network Topologies and Networking Standard	1. Draw stated logical network topology. 2. Design a computer network considering particular topology 3. Identify the use of different networking standards	2.1 Types of topology: Bus topology, Ring topology, Star topology, Mesh topology, Tree topology, Hybrid topology 2.2 IEEE Networking Standards: 802.2, 802.3, 802.5, 802.11 Standard	08
3. The Reference Model	1. List 7 layers of the OSI Model and compare them to the layering used in the Internet model 2. Describe the basis and structure of an abstract layered protocol model. 3. Describe, analyse and compare a number of datalink, network, and transport layer protocols	3.1 OSI Reference Model: Physical Layer, Data link layer, Network layer, Transport Layer, Session Layer, Application Layer. 3.2 TCP/IP Reference Model: Link, Internet, Transport, Application layer 3.3 Comparisons of OSI and TCP/IP reference model	12

	- Differentiate between connection oriented and connectionless approach - Analyse the services and features of the various layers of data networks		
4. Transmission Media	- Identify a variety of cables and ports used on PCs - List guided and unguided transmission media - Select appropriate transmission media for a given network - Describe the characteristics of each cable - Describe the characteristics of each connectors	4.1 Types of Transmission media 4.2 Guided Media: Twisted pair wire, Coaxial cable, Fibre optic cable 4.3 Connectors: BNC Connectors, RJ45 Connectors, AUI Connectors, Fibre Connectors 4.4 Unguided Media: Electromagnetic spectrum, Radio transmission, Microwave Transmission, Infrared Transmission, Satellite Communication 4.5 IEEE 802.3 standard : 10Base2, 10base5, 10BaseT, Fast Ethernet, Gigabit Ethernet	12
5. Network Devices	- Describe the differences between a hub, switch (bridge), and a router. - Recognize the different internetworking devices and their functions. - Differentiate Layer2 and Layer3 Switches - State the use of Network Management Software	5.1 Hubs 5.2 Repeaters 5.3 Switches 5.4 Routers 5.5 Bridges 5.6 Gateways 5.7 Access Points 5.8 Modems 5.9 Difference between Layer 2 and layer 3 Switches 5.10 Introduction of Network management software	12
6 IP Protocol and Network Applications	- Describe networking protocols and their hierarchical relationship hardware and software - Analyse the features and operations of various application layer protocols such as HTTP, DNS, subnet masking	6.1 IP Protocol – IP v4, IP v6 6.2 Addressing Schemes 6.3 Subnet and Masking 6.4 DNS 6.5 Email 6.6 FTP 6.7 HTTP 6.8 Framing, Flow and Error Control in Data Link Layer 6.9 Concept of Routing	12

	3. Select appropriate class for given network size. 4. Illustrate subnet and usage of subnet masking.		
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Install and configure network interface card	Basics of Computer Network	2
2	Develop a small network	Basics of Computer Network & The Reference Model	4
3	Troubleshoot the network devices.		2
4	Install and configure File server, Print server, Mail Server	Basics of Computer Network	4
5	Install proxy server		4
6	Share a printer on a network & print a document on it from a different computer on a network		2
7	Share files and directories from one computer to second computer on the network		2
8	Prepare and test straight and cross UTP cables	Transmission Media	2
9	Crimp Network cables using tools available		2
10	Install and test router, repeater and bridge	Network Devices	2
11	Install a small wireless network using access points		2
12	Configure networking commands like ping, ipconfig, netstat, nslookup, traceroute	IP Protocol and Network Applications	2
Skill Assessment			2
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Basics of Computer Network	06(00)	04(04)	00(00)	10(04)
02	Network Topologies and Networking Standard	00(00)	04(00)	06(06)	10(06)
03	The Reference Model	02(00)	08(04)	00(00)	10(04)
04	Transmission Media	00(04)	08(04)	06(00)	14(08)
05	Network Devices	02(04)	04(04)	06(00)	12(08)
06	IP Protocol and Network Applications	00(00)	08(04)	06(06)	14(10)
	Total	10(08)	36(20)	24(12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	1	R	2	3	R	2	5	R	2	4	R	2	5/7
	4	R	2																
02	1	U	4	2	U	4	3	U	4	1	U	4	3	U	4				3/5
03	3	U	4	4	U	4	4	U	4	4	U	4	5	R	4				3/5
04	5	U	4	6	U	4	6	U	4	5	U	4	6	U	4				3/5
05	2	A	6	4	A	6	2	A	6										2/3
06	5	A	6	6	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Install and configure network interface card, File server, print server, mail server, share files, directories and printer	10
2	Performance	20
3	Identify variety of tables and codes used on PC, crimp network cables using tools	10
5	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	PSO1	PSO2
1	3	3	-	-	-	-	-	-	-	-	-	3
2	3	3	-	-	3	-	-	-	-	-	-	3
3	3	3	-	-	3	-	-	-	-	-	-	3
4	3	3	2	2	-	-	-	2	2	2	-	3
5	3	3	2	2	-	-	-	2	2	2	-	3
6	3	3	2	2	-	-	-	2	2	2	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	PSO1	PSO2
1	3	3	-	-	-	-	-	-	-	-	3	-
2	3	3	-	-	3	-	-	-	-	-	3	-
3	3	3	-	-	3	-	-	-	-	-	3	-
4	3	3	2	2	-	-	-	2	2	2	3	-
5	3	3	2	2	-	-	-	2	2	2	3	-
6	3	3	2	2	-	-	-	2	2	2	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Computer Networks	Andrew S Tannenbaum, Pearson Education, 5 th Edition, 2013	13:9789332518742
2.	Computer Networking: A Top-Down Approach	Behrouz Forouzan, Tata McGraw Hill, Special Indian Edition ,2011	13:9781259001567
3.	Data & Computer Communication,	Williams Stallings , Prentice Hall of India 7 th Edition,2011	13: 978-0131006812
4.	Computer Networking: A Top-Down Approach	James F. Kurose , Pearson Education, 5 th Edition, 2012	13:9788131790540
5.	Computer Networks: Networking Equipment, Cabling, Setup, Sharing, TCP/IP, Layers	N. S. Reddy, NEO Publishing House, Kindle Edition 2016	--

❖ **E-REFERENCES:**

- <http://www.nptelvideos.in/2012/11/computer-networks.html?m=1>, assessed on 05th April 2016
- <https://www.slideshare.net/mobile/makyong1/basic-concepts-of-computer-networks>, assessed on 05th Sept 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

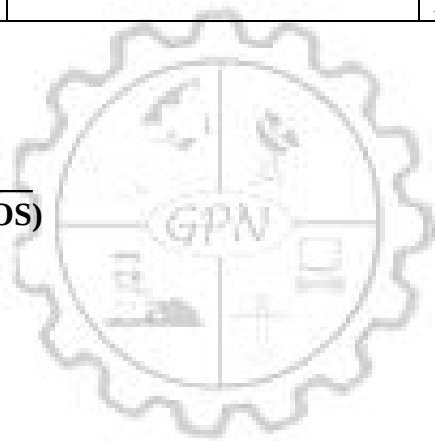
1. Computer systems
2. Network Cable Cat 5/Cat 6.
3. Crimping Tool
4. UTP Cable Tester
5. Layer 2 Switch
6. Wireless Access point and wireless router
7. Impacting Tool
8. Network cable connectors
9. Network Trainer Kit

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S. P. Lambhade	HOD, Dept. of Computer Engineering	Government Polytechnic, Nagpur.
2.	Ms. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
3.	Ms. D. M. Shirkey	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4.	Mr. L. D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
5.	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur
6	Prof. N.V.Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongari, Nagpur
7	Mr. Atul Upadhyay	CEO	Vista Computers, Ram Nagar, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: ENGINEERING SCIENCES AND TECHNICAL ARTS COURSES
COURSE CODE	: EC310E
COURSE TITLE	: DIGITAL TECHNIQUES
PREREQUISITE	: NIL
TEACHING SCHEME:	TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (Internal)
PT. EXAM	: 01 HR

❖ RATIONALE:

This course forms the foundation of digital electronics to the students of Information Technology. It deals with learning the concepts of number Systems logic gates, combinational and sequential logic circuits. Now a day, many electronic systems are digitized. Hence, it is necessary to know the concept of design of a digital system. This course emphasizes on the combinational and sequential logic design.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Analyze digital logic circuits.
2. Perform conversion of different number system
3. Describe operation of various digital circuits like combinational circuits and sequential circuits.
4. Identify various pins of logic gate ICs.
5. Assemble various digital circuits like combinational circuits, Sequential circuits on breadboard.
6. Interpret the output of various combinational and sequential circuits.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1.Digital system and Number system	1. Define the terms analog and digital system. 2. Describe various logic levels. 3. Solve numerical on conversion of number system 4. Perform binary addition and subtraction.	1.1 Digital and Analog System, 1.2 Comparison of analog and digital system 1.3 Logic levels. 1.4 Binary, decimal, octal and hexadecimal number systems and their conversions. 1.5 Binary addition and subtraction. 1.6 Binary subtraction by using 1's & 2's complement	08
2.Logic gates & Boolean Algebra	1. Define logic gates. 2. Describe various logic gates. 3. Draw various logic gates using universal gates. 4. Solve various Boolean expressions. 5. State and prove De-Morgans theorem.	2.1 Definition and types of logic gates 2.2 Operating principle, truth table, 2.3 Boolean equation and symbol of NOT, OR, AND, NAND, NOR, EX-OR and EX-NOR gates. 2.3 Universal logic gates. Design of other logic gates using universal gates. 2.4 Basic laws of Boolean algebra.2.5De-Morgan's theorem.	08
3.Combinational circuits	1. Define min term and max term. 2. Describe K-map method of simplification 3. Design adder and subtractor using logic gates. 4. Design BCD to 7 segments decoder. 5. Design binary to gray and gray to binary converter.	3.1 Min-term and Max-term representation of logical function. 3.2 K-map minimization up to 4 variables. Don't care condition. 3.3 Binary half & full adder and binary half and full subtractor. 3.4 BCD to 7 Segment decoder. 3.5 Binary to gray and gray to binary conversion.	10
4.Multiplexers and Demultiplexers	1. State the need of multiplexers and de multiplexers. 2. Design of various multiplexers and de multiplexers using logic	4.1 Types, advantages, design steps and applications of multiplexers 2:1, 4:1, 8:1 and 16:1 multiplexers up to 16:1. 4.2 Multiplexers tree	08

	gates. 3. Design higher order multiplexers and demultiplexers using lower order. 4. Compare multiplexers and demultiplexers.	4.3 Types advantages and application of demultiplexers 1:2, 1:4 and 1:8 demultiplexers. 4.4 Demultiplexers tree upto 1 to 16 demultiplexers. 4.5 Comparison between multiplexers and demultiplexers	
5.Sequential Circuits	1. Compare combinational and sequential systems. 2. Compare latch and flip flop. 3. Design of various flip flops. 4. Describe Race around condition. 5. List various applications of flip flops.	5.1 Combinational and sequential logic systems. 5.2 Triggering Methods. 5.3 RS latch using NOR gates and NAND gates. 5.4 Clocked RS flip flop, J-K flipflop, D and T Flip Flop. 5.5 Propagation delay time and race-around condition. 5.6 MS J-K flip flop . 5.7 Applications of flip flops	08
6.Counters & Shift Registers	1. Define Counters. 2. Compare Asynchronous and Synchronous Counters. 3. Define MOD N Counter. 4. Define various shift registers. 5. Design Bi-directional and circulating shift register. 6. List various applications of shift registers.	1.1 Counters– Asynchronous (ripple) and synchronous counters. (Definition) 1.2 Design of asynchronous counter (UP and DOWN) using JK or T flip flop (up to 4 bit) 1.3 MOD – N Counter 1.4 Ring Counter, Johnson Counter. 1.5 Decade counter IC 7490. 1.6 Definition and types of shift registers (SISO, SIPO, PISO, PIPO) 1.7 Bi-directional shift register. 1.8 Universal Shift Register. 1.9 Application of shift register	06
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical's	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Identify different pins of logic gate IC, apply input, measure output and relate it with the truth table. .	Logic gates & Boolean algebra	02
2	Assemble various basic gates using universal gates and relate it with the truth table.		02
3	Assemble the logic circuit using AND/OR/NOT logic gatesand NAND gates for verification of Boolean expression.		02
4	Assemble the logic circuit using AND/OR/NOT logic gatesand NAND gates for verification of De Morgan's Theorem		02
5	Identify different pins of 8:1 multiplexer IC, apply input, measure output and relate it with the truth table.	Multiplexers and Demultiplexers	02
6	Identify different pins of 1: 8 de multiplexer IC, apply input, measure output and relate it with the truth table.		02
7	Assemble the logic circuit for half adder and full adder using logic gates and verify its truth table.	Combinational Circuits	02
8	Identify different pins of S R flip flop IC, apply input, measure output and relate it with the truth table.	Sequential Circuits	02
9	Identify different pins of S R flip flop IC, apply input, measure output and relate it with the truth table.		02
10	Identify different pins of D flip flop IC, apply input, measure output and relate it with the truth table.		02
11	Identify different pins of T flip flop IC, apply input, measure output and relate it with the truth table.		02
12	Assemble 4 bit synchronous counter using Flip Flop, show its output on LED and relate it with the truth table.	Counters & shift registers	02
13	Assemble decade counter using IC 7490, show its output on LED and relate it with the truth table. .		02
14	Assemble 4 bit SISO register using flip flop, show its output on LED and relate it with the truth table. .		02
15	Assemble 4 bit PIPO register using flip flop, show its output on LED and relate it with the truth table.		02
Skill Assessment			02
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Digital System and Number System.	02(00)	04(04)	04(00)	10(04)
02	Logic Gates& Boolean Algebra	04(04)	04(04)	04(00)	12(08)
03	Combinational Circuits	06(02)	04(06)	04(00)	14(08)
04	Multiplexerand De multiplexers	02(00)	04(06)	04(00)	10(06)
05	Sequential Circuits	06(04)	06(00)	00(04)	12(08)
06	Counters&Shift registers	06(00)	06(00)	00(06)	12(06)
	Total	26(10)	28(20)	16(10)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	4	R	2	2	R	2	3	R	2	5/7
	3	U	2																
02	1	A	4	2	A	4	3	R	4	1	U	4	2	U	4				3/5
03	1	U	4	2	U	4	3	U	4	2	R	4	5	R	4				3/5
04	3	A	4	4	U	4	4	A	4	3	U	4	5	A	4				3/5
05	5	R	6	5	U	6	4	U	6										2/3
06	6	R	6	6	U	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics &Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, truth table, writing procedure etc.	10
2	Identifying various pins of IC	10
3	Performance on bread board	20
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	-
2	-	3	-	-	-	-	-	-	-	3	-	-
3	-	3	-	-	-	-	-	-	-	3	-	-
4	-	3	2	2	-	-	2	2	-	3	-	-
5	-	3	2	2	-	-	2	2	-	3	-	-
6	-	3	2	2	-	-	2	2	-	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Digital Integrated Electronics	H. Taub and D.Schilling. McGraw-Hill, 2008, Second Edition	ISBN 10: 0070857881 ISBN 13: 9780070857889
2.	Digital Principles and Applications	Malvino Leach. McGraw-Hill, Seventh Edition, 2011	ISBN 10: 0070398836 ISBN 13: 9780070398832
3.	Digital electronics- R.P.Jain.	R.P.Jain. McGraw-Hill, Third Edition, 2003	SBN 10: 0070669112 ISBN 13: 9780070669116
4.	CMOS/TTL: A user's guide with projects	Carr, Joseph J. Tab Books; 1st edition (1984)	SBN 10: 0830616500 ISBN 13: 9780830616503

❖ **E-REFERENCES:**

- www.electrical4u.com/digital-electronics , assessed on 20th January 2016
- <http://nptel.ac.in/courses/108108076/1> , assessed on 20th January 2016
- <http://www.electrical4u.com> , assessed on 20th January 2016
- <https://www.youtube.com/watch?v=A9KSGAnjo2U>, assessed on 20th January 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Digital Multi-Meter.
2. Logic Gates ICs (7400,7402,7404,7408,7432,7486)
3. Multiplexer and De multiplexer IC(74150,74151,74138,74139)
4. Flip Flops ICs (7472,7474,74H71,74L71)
5. Breadboard and LEDs.
6. Power Supply

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Prof. A A Ali	HOD in Electronics and Telecommunication Engg. (II Shift)	Government Polytechnic, Nagpur
2.	Prof. V M Sakode	Lecturer in Electronics and Telecommunication Engg.	Government Polytechnic, Nagpur
3	Mr. Sandip V Darwhekar	Director	Beta computronics Pvt Ltd, Nagpur
4	Mrs Gajala Ali	Head of Electronics Engg	Anjuman Polytechnic , Nagpur
5	Mr. S. M. Kale	Lecturer, Electronics Engg.	Government Polytechnic, Gadchiroli.

 (Member Secretary PBOS)

 (Chairman PBOS)

LEVEL - IV

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: IT401E**
COURSE TITLE	: DATA COMMUNICATION
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03; TU: 00; PR: 00(CLOCK HRs.)
TOTAL CREDITS	: 03 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH.TEE	: 1 HR (Objective type online examination)
PR.TEE	: NIL
PT.TEE	: 15 MINUTES (Objective type Offline examination)

❖ RATIONALE:

Computer communication through networking becomes essential part of our life. We can manage many application like Air Line Reservation, Railway Reservation, E-banking, E Governance, On-Line shopping, E-learning etc. by clicking mouse button from our own place. Because of this, world become the global village. By considering importance of communication in networking, we here introduce problems related to channel allocation, flow control, error control and congestion control over networks.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Differentiate network topologies, hardware and protocols.
2. Learn network architecture and physical media used to connect computers in network.
3. Identify the layers, principles of operations and operating characteristics of the ISO OSI model.
4. Design simple computer network.
5. Identify different problems related to channel allocation.
6. Identify different problem related to flow control and error control.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Introduction to data Communication and Multiplexing	1. Define the term networking protocols, standard organization, and bandwidth and data transmission rate. 2. Define the term analog signal, digital signal, baud rate and Bits per second. 3. List different modes of data transmission. 4. State the need of multiplexing and its application. 5. State the need of Modulation. 6. State the working of simplex, half duplex and full duplex. 7. State the need of Demultiplexing. 8. Differentiate between FDM and TDM. 9. Describe the procedure of Pulse code Modulation and delta Modulation.	1.1.Introduction: Data Communication, protocols, Standards, Standard organizations, Bandwidth and Data Transmission Rate. 1.2.Analog Signal, Analog Transmission, Digital Signal, Digital Transmission, Baud Rate and Bits per second 1.3. Modes of Data Transmission, Parallel and Serial Communication, Asynchronous, Synchronous and Isochronous Communication, Simplex, Half-Duplex, Full Duplex, 1.4.Process of modulation, Multiplexing and Demultiplexing, Types of Multiplexing: TDM,FDM , TDM Vs FDM Digital Modulation Types:- Pulse Code Modulation(PCM)Delta Modulation(DM)	06
2. Error Correction And detection	1. Describe the function of Data Communication Model. 2. State Line Configuration. 3. Define the term Error. 4. State the types of Errors. 5. Perform Hamming code. 6. Perform Vertical redundancy check. 7. Perform Longitudinal redundancy check. 8. Define the term redundancy and Checksum.	2.1 Functions of Data Communication Model, Line Configuration 2.2 Types of Errors, Error Detection 2.3 Redundancy, Vertical Redundancy Check (VRC) 2.4 Longitudinal Redundancy Check(LRC), Cyclic Redundancy Check(CRC) 2.5 CHECKSUM, 2.6 Hamming Code	10
3. Flow Control and	1. Define the term Line Discipline.	3.1.Line Discipline:- ENQ/ACK, Poll/Select,	08

Error control	2. State the types of ENQ/ACK, Poll/Select. 3. State the problem related to Flow control. 4. Describe different protocols of Flow control. 5. State the problem related to Error control. 6. Describe Stop N Wait error control protocol and Sliding Window error control protocol. 7. Draw and describe Go-Back-N ARQ and Selective reject ARQ.	3.2.Flow Control: Stop-and –Wait, Sliding Window flow control. 3.3.Error Control :- Automatic Repeat Request(ARQ) 3.4.Stop-and Wait ARQ, Sliding Window ARQ 3.5.Go-Back-n-ARQ, Selective-Reject ARQ	
4. Multiple Access protocol	1. State the problem related to channel allocation. 2. Describe static and dynamic channel allocation. 3. Describe Pure Aloha and slotted Aloha protocols. 4. Compare FDMA and TDMA. 5. State the problem related to Carrier sense multiple access. 6. Describe CSMA/CD and CSMA/CA. 7. Describe token passing mechanism.	4.1.Random Access, Multiple Access, Channel Allocation problem, static and dynamic channel allocation. 4.2.Pure ALOHA, Slotted ALOHA, FDMA, TDMA Comparison of FDMA and TDMA 4.3.Carrier Sense Multiple Access(CSMA): CSMA/CD,CSMA/CA, Controlled Access 4.4.Token passing mechanism.	10
5. Congestion Control	1. State the problem related to congestion control. 2. State the principles of Congestion control. 3. Describe the policies for Congestion prevention. 4. Define the term choke packets. 5. Describe hop-by-hop choke packets. 6. Describe the terms BECN and FECN. 7. Describe Leaky Bucket Algorithm.	5.1.Introduction: Congestion control, General Principles of Congestion Control, Congestion Prevention Policies 5.2.Choke Packets 5.3.Hop-by-Hop Choke Packets 5.4.BECN,FECN 5.5.Leaky Bucket Algorithm	08

6. WAN Communication.	1. State the need of Frame Relay. 2. Describe the Frame Relay format. 3. Describe Asynchronous transfer mode. 4. Define the terms related to Packet size, ATM cells and switching. 5. Describe different layers of ATM.	6.1 Introduction: Frame Relay, The need for Frame Relay, How Frame Relay works, frame format 6.2 Asynchronous Transfer Mode (ATM) ,Overview of ATM, Packet Size, ATM Cells, Switching, ATM layers	06
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
NIL			

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction to data Communication and Multiplexing	02(00)	06(00)	00(00)	08(00)
02	Error Correction And detection	06(00)	04(00)	00(00)	10(00)
03	Flow Control and Error control	02(00)	10(00)	00(00)	12(00)
04	Multiple Access protocol	00(00)	08(00)	06(00)	14(00)
05	Congestion Control	02(00)	04(00)	06(00)	12(00)
06	WAN Communication.	06(00)	04(00)	04(00)	14(00)
	Total	18(00)	36(00)	16(00)	70 (00)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Bit 7		
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M
01 To 35	1	R	2	2	R	2	2	R	2	2	R	2	3	R	2	5	R	2	6	R	2
	6	R	2	6	R	2	1	U	2	1	U	2	1	U	2	2	U	2	2	U	2
	3	U	2	3	U	2	3	U	2	3	R	2	3	U	2	4	U	2	4	U	2
	4	U	2	4	U	2	5	U	2	5	U	2	6	U	2	6	U	2	4	A	2
	4	A	2	4	A	2	5	A	2	5	A	2	5	A	2	6	A	2	6	A	2

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3, 4,5,6
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Online Exam	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	Rubrics & Assessment Sheets	--
		Journal Writing		Continuous	--	--	Journal	--
				TOTAL	--	--		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	Rubrics & Practical Answer Sheets	--
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ SCHEME OF PRACTICAL EVALUATION:

S.N.	Description	Max. Marks
NIL		

❖ MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	3	3
2	-	3	-	-	-	-	-	-	-	3	3	3
3	-	3	-	-	-	-	-	-	-	3	3	3
4	-	3	-	-	-	-	-	3		3	3	3
5	-	3	-	-	-	-	-	3	-	3	3	3
6	-	3	-	-	-	-	-	3	-	3	3	3

1-Slight (Low)

2-Moderate (Medium)

3- Substantial (High)

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Computer Networks	Andrew S Tannenbaum, Tata McGraw-Hill Edition, 2012	0-385-19195-2
2.	Data Communication & Networking	BehrouzForouzan, Special Indian Edition Tata McGraw Hill,2012	100072967757
3.	Data & Computer Communication,	Williams Stallings , Prentice Hall of India	0131392050
4.	Complete Reference Networking	Craig Zacker, Tata McGraw-Hill Edition	9780070474161
5.	Networking + Certification (Second Edition)	Microsoft Press	100070474168

❖ E-REFERENCES:

http://www.tutorialspoint.com/data_communication_computer_network/ ,assessed on 25th April 2016

<http://www.freetchbooks.com/data-communication-and-networks-f31.html> , assessed on 25th April 2016

<https://www.youtube.com/watch?v=sG6WGvzmVaw>, assessed on 25th April 2016

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION:

NIL

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1.	Shifa A. Mohammad	Lecturer in Information Technology	Government Polytechnic, Nagpur
2.	V. A Raje	System Analyst(Lecturer in Computer Engineering)	Government Polytechnic, Nagpur
3.	I.G Lokhande	Lecturer in Information Technology	Government Polytechnic, Nagpur
4.	Prof. ManojJethawa	HOD, Computer Science	ShriDattaMeghe Polytechnic, Nagpur
5.	Prof. N. V. Choudhari	Asst. Professor(CSE),	DBACOE, Wanadongari, Nagpur
6.	Mr. Atul Upadhyay	COE	Vista Computers, Ramnagar, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN IT/CM
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: IT402E ^{\$}
COURSE TITLE	: JAVA PROGRAMMING
PREREQUISITE	: NIL
TEACHING SCHEME	: TH:03; TU:00; PR:04 (CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (External)
PT.	: 01 HR

❖ RATIONALE:

Java language enhances and refines the object oriented paradigm. With the enormous growth-taking place in Internet and World Wide Web, Java is rapidly becoming the dominant application development language and system programming language. Java is most appropriate language for integrating Internet into the information system. The course introduces students to the design of Java language, syntax of Java, programming applets and applications that can perform multiple actions in parallels.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Comprehend Java SDK environment to create, debug and run simple Java programs
2. Comprehend building blocks of Object Oriented Programming language.
3. Summarize different Object Oriented features of Java.
4. Develop program in java using Classes, Inheritance, Interfaces and Packages.
5. Develop, debug and execute java programs on Exception handling, Multithreaded programming and Files.
6. Design and implement Applet, GUIs and event handling mechanisms with java programs

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Java Basics	1. Describe the history, features and advantages of Java 2. Describe the data types and its scope. 3. List types of operator 4. Describe the Precedence and associativity of operator. 5. State the steps to implement small programs using Decision making, Branching & Looping 6. State the steps to implement programs for Arrays, String Handling and Command line argument 7. Develop programs based on Java basics	1.1 Java Evolution: History, Features, Java and the Internet, Advantages of Java, JVM, Byte code 1.2 Data types, Unicode, variables, Scope of variables, Type casting, constant, literal, 1.3 Types of Operators, Operator Precedence & Associativity and Arrays 1.4 Decision making & Branching: If..else statement, switch statement, ? : operator 1.5 Decision making & Looping : for, while, do while, Jumps in Loop, labeled Loops 1.6 Use of : String class, StringBuffer class, Command line argument, Wrapper Classes, Vector Class	08
2. Classes, Objects And Methods In Java	1. Describe the General form of a class 2. State effects of Access Control 3. Describe the use of reference variable 4. Describe constructor and its types. 5. Apply static, this and final keywords 6. Describe Garbage collection in java. 7. State the steps to implement programs for nested and inner classes 8. Develop programs based on Classes, Objects And Methods.	2.1 Class Fundamentals: General form of a class , A simple class 2.2 Access Control: public, private, protected, default 2.3 Declaring objects, new keyword, reference variable 2.4 Introducing Methods: Adding a method, returning a value, parameterized method, overloading methods, object as parameter 2.5 Constructors : Types of constructor, overloading constructors, returning object 2.6 keywords : static, this, final 2.7 Garbage collection 2.8 Nested and inner classes	06
3. Inheritance, Interfaces and Packages	1. Describe inheritance and method overriding 2. List types of inheritance 3. Describe abstract classes and methods 4. State the steps to define	3.1 Inheritance: Introduction, Types of Inheritance, Member access and inheritance, Super class variable can	08

	and implement interfaces 5. Define packages, importing packages and access protection. 6. Develop programs based on Inheritance, Interfaces and Packages	reference the subclass object, uses of super keyword, method overriding, Using final keyword with inheritance, Abstract classes and Methods 3.2 Interfaces : Introduction to interfaces Defining an interface Implementing interfaces Accessing Interface Variables Extending interfaces 3.3 Packages : Introduction to packages Defining package finding packages and CLASSPATH Access protection Importing packages Java API Packages	
4. Exception Handling, Multithreaded Programming	1. Differentiate between Error and Exception 2. Describe Exception handling concept 3. List types of Exception. 4. Describe and apply try, catch, finally, throw and throws clauses 5. State the steps to Create own exception 6. Describe the life cycle of Thread 7. State the steps to create Thread 8. List the advantages of multiple Threads 9. Describe and apply inter-Thread communication 10. Develop programs based on Exception Handling, Multithreading.	4.1 Exception Handling : Fundamentals types of exceptions, Uncaught Exceptions Using try and catch, Multiple catch clauses, Nested try statements throw, throws, finally Java's built-in Exceptions Creating own exceptions 4.2 Multithreaded Programming : Java thread model, Life cycle of thread Thread priorities, Thread Synchronization, Creating a Thread - implementing Runnable, extending Thread Main thread, Creating multiple threads, Using isAlive() and join() Inter-thread Communication	10
5. Applet Programming	1. Describe difference between Applet and application 2. Describe Applet life cycle 3. State the steps to Create simple Applet 4. Apply various methods of Graphics Class 5. State the steps to	5.1 Applet fundamentals 5.2 How Applets differ from Applications 5.3 Writing and Building Applet Code 5.4 Applet Life Cycle 5.5 Creating simple applets 5.6 Applet and AWT package 5.7 Moving banner applet using	10

	implement AWT Event Handler 6. List advantages of Swing package 7. Develop programs based on Applet Programming.	thread 5.8 Parameterized applet 5.9 Graphics class and use of various shapes and colors 5.10 Mouse clicks, movements, keyboard events 5.11 The AWT event handler 5.12 Introduction to Swing package	
6. Input And Output Stream Classes	1. Describe the concept of Streams 2. Compare Byte Stream and Character Stream Classes 3. Describe the input/output Exception 4. Apply primitive data type with files 5. State the steps to implement input and output Stream classes 6. Describe object serialization. 7. Develop programs based on Input And Output Stream Classes.	6.1 Introduction: Concept of Stream 6.2 Stream classes 6.3 Byte stream classes 6.4 character stream classes 6.5 Use of File class: reading/writing characters/bytes in a file 6.6 Input/ Output Exceptions 6.7 reading and writing primitive data type 6.8 concatenating and buffering files 6.9 Other Stream Classes 6.10 Object serialization	06
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS: -

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Create, debug and run java programs based on constants, variables and operators	Java Basics	2
2.	Create, debug and run java programs based on decision making and branching		2
3.	Create, debug and run java programs based on decision making and Looping		2
4.	Create, debug and run java programs based on String, StringBuffer		2
5.	Create, debug and run java programs based on Wrapper class and Vectors		2
6.	Create, debug and run java programs based on classes with objects	Classes, Objects And Methods In Java	2
7.	Create, debug and run java programs based on method overloading		2
8.	Create, debug and run java programs based on constructor overloading		2
9.	Create, debug and run java programs based on Nested and inner classes		2
10.	Create, debug and run java programs based on inheritance	Inheritance, Interfaces and Packages	2
11.	Create, debug and run java programs based on Interfaces		2
12.	Create, debug and run java programs based on Package		2
13.	Create, debug and run java programs based on exception handling.	Exception Handling, Multithreaded Programming	2
14.	Create, debug and run java programs based on user defined Exception		4
15.	Create, debug and run java programs based on Threads by implementing Runnable interface		4
16.	Create, debug and run java programs based on Threads by extending Thread class		4
17.	Create, debug and run java programs based on Applets.	Applet Programming	2
18.	Create, debug and run java programs based on graphics to draw, fill, different shapes		4
19.	Create, debug and run java programs based on mouse events and keyboard events		4
20.	Create, debug and run java programs based on read & write characters from a file using input/output stream	Input And Output Stream Classes	2
21.	Create, debug and run java programs based on object Serialization		2
22.	Mini Project		10
Skill Assessment			2
Total Hrs			64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Java Basics	02(02)	04(04)	04(00)	10(06)
02	Classes, Objects And Methods In Java	02(02)	04(04)	06(00)	12(06)
03	Inheritance, Interfaces and Packages	02(00)	04(06)	06(00)	12(06)
04	Exception Handling, Multithreaded Programming 2	02(00)	06(02)	06(04)	14(06)
05	Applet Programming	02(00)	04(04)	06(04)	12(08)
06	Input And Output Stream Classes	02(02)	08(00)	00(06)	10(08)
	Total	12(06)	30(20)	28 (14)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	1	R	2	5/7
	2	R	2																
02	6	R	4	1	U	4	2	U	4	5	A	4	2	U	4				3/5
03	6	U	4	5	U	4	3	U	4	4	A	4	1	U	4				3/5
04	4	U	4	6	U	4	1	A	4	5	U	4	4	U	4				3/5
05	4	A	6	2	A	6	3	U	6										2/3
06	3	A	6	5	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing program, Logic of the program	10
2	Debug the program	10
3	Execution of program, Program Output, Complexity of program	20
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Information Technology:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	-	3
2	-	3	-	-	-	-	-	-	-	-	-	3
3	-	3	-	-	-	-	-	-	-	-	-	3
4	-	3	3	3	-	-	-	3	3	3	-	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Computer Engineering:

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	3	3
2	-	3	-	-	-	-	-	-	-	-	3	3
3	-	3	-	-	-	-	-	-	-	-	3	3
4	-	3	3	3	-	-	-	3	3	3	3	3
5	-	3	3	3	-	-	-	3	3	3	3	3
6	-	3	3	3	-	-	-	3	3	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Java 2: The Complete reference	Patrick Naughton, McGraw Hill Edu, Fifth Edition, reprint 2015	13:9780072119763
2.	Programming with Java A Primer	E Balagurusamy, Tata McGraw Hill Edu, Forth Edition, reprint 2011	13:9780070141698
3	Core Java: An Integrated Approach, New:Includes All Versions upto Java 8	Dr. Nageshwara Rao, Imprint Wiley Publication, Dreamtech Press, 2016	13:9789351199250

❖ **E-REFERENCES:**

- <http://www.oracle.com/technetwork/java/javase/downloads/index.html> , assessed on 16th September 2016
- <http://docs.oracle.com/javase/specs/jls/se8/html/index.html>, assessed on 16th September 2016
- <http://docs.oracle.com/javase/tutorial/java/index.html> , assessed on 16th September 2016
- <http://www.tutorialspoint.com/java/> , assessed on 16th September 2016
- <http://www.tutorialspoint.com/javaexamples>, assessed on 16th September 2016
- <http://www.learnjavaonline.org/> , assessed on 16th September 2016
- <http://www.c4learn.com/javaprogramming/> , assessed on 16th September 2016
- <https://www.webucator.com/tutorial/learn-java/index.cfm> , assessed on 16th September 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer System with latest configuration
2. Java Development Kit 1.8 and above
3. Editors : Notepad, NetBeans (Freeware)

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
3.	Mr. R. L. Meshram	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mr. L. D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
5.	Mrs. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.

6	Mrs. S. Choudhari	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
7	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
8	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
9	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: IT403E ^s
COURSE TITLE	: LINUX PROGRAMMING
PREREQUISITE	: CM404E
TEACHING SCHEME	: TH: 03; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 Hrs.
PR. TEE	: 02 HRs (External)
PT.	: 01 Hr.

❖ RATIONALE:

Operating System is most essential component of Computer System. Linux became the platform to run desktops, servers, and embedded systems across the globe, it was one of the most reliable, secure, and efficient operating systems available. The course aim is to provide in depth knowledge of this platform.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Access and manipulate the operating system parameters.
2. Apply services of Linux Operating system for implementing various types of applications.
3. Analyze Linux file system by accessing file and directory attributes.
4. Install and Operate Linux Operating System.
5. Develop programs using shell programming.
6. Execute various commands of Linux Operating System.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1.Introduction	1. Install Linux O.S. 2. Log in/out via terminals and network 3. Differentiate between Linux O.S. and Unix O.S. 4. State the features of Linux O.S. 5. State the steps to Create users and perform log-in and log-out via terminal and network.	1.1 History of Linux, Advantages of using Linux, Linux distribution, Linux kernel 1.2 The tools & Application, GNU/GPL license, Free software foundation, MULTICS 1.3 Unix kernel, The shell, The init process, special configuration in /etc/inittab file 1.4 Logging in and out: Logins via terminals, logins via network.	10
2. Linux Commands and Linux file system	1. Define SYSV init process 2. Describe Linux boot loaders: GRUB & LILO. 3. State the syntax and example of Various Linux commands. 4. Draw Ext 2 and Ext 3 linux file system structure. 5. Describe the other file system –ufs, JFS file system. 6. Describe Init run levels. 7. Apply Linux commands to manipulate file and directory attributes.	2.1 Internal & external commands in Linux: Internal commands in Linux echo, type, etc., External commands in Linux, ls, mv, rm, cat, useradd etc 2.2 Command line commands – who, log name, banner, cal, date, bc, man, info etc. 2.3 Files & directory commands – cat, less, more, ls, comm, diff, tar, Directory related commands – pwd, cd, mkdir, rmdir, Manipulating file commands - cp, mv, rm 2.4 File link commands chmod, umask, file, type, wc, split, cmp, diff. 2.5 Linux file system structure- ext 2, ext 3 file system 2.6 other file system – ufs, reiserfs, IBM, JFS file system 2.7 Linux boot loader – GRUB & LILO, 2.8 SYSV init process, Init Run Levels.	10
3. Introduction to Shell programming	1. Define Shell. 2. Develop programs using Vi editor. 3. Write Shell programs in vi editor. 4. List the steps to execute shell programs in vi editor.	3.1 Shell programming – Shell scripts, executing shell scripts, creating shell scripts. 3.2 Vi Editor: Appending files into current file, Changing Text commands, Cursor Positioning Commands, Cutting and Pasting Text, Exiting from vi, Text Deletion Commands, Text	06

		Insertion Commands, Undo Commands.	
4.Managing User accounts and Disk space	1. Apply different attributes of SUDO command to perform various administrative tasks. 2. Apply UPG tool to create user groups and assign privileges. 3. Describe RAID Technology 4. Define Shadow password file. 5. Compare KDE and GNOME desktop environment	4.1 The Root Account, Feature of Sudo, User Private Group (UPG), The shadow password file. 4.2 Metadevices, Logical volume manager, RAID technology supported under Linux 4.3 Job scheduling system-cron and at 4.4 The X Window System, Graphical User Interfaces: KDE and GNOME Desktop Environment.	08
5. Linux system security	1. Define Boot Security 2. Describe Security Principles. 3. Define PAM. 4. Describe SSL transaction. 5. Compare Host based security and network based security. 6. Apply PAM tool to access and grant different types of permissions to the files	5.1 Types of Permissions, Security Principles- host based security & Network based security 5.2 Boot security, Firewall concept 5.3 PAM(Pluggable Authentication Modules), Advantages of PAM 5.4 Symmetric certificate in an SSL (Secure Socket Layer) transaction	06
6. Servers and services	1. Compare Apache server, NFS Server, NIS Server. 2. Describe working of DHCP Protocol. 3. Compare POP3 and SMTP. 4. Describe Intra-net services in Linux like telnet, rsh, ssh etc. 5. Apply DHCP protocol to allocate IP addresses to the host of the network in linux. 6. Define TCP-Wrapper. 7. Define FTP.	6.1 DNS (Domain Name System), MailTransfer Agent & Local Directory Agent, understanding pop3 & SMTP 6.2 Apache server (HTTP), feature of Apache, Working of web server Samba server, Advantage of Samba server, NFS server & its usage NIS server 6.3 Working of DHCP & benefits of DHCP deployment 6.4 ssh, Telnet, FTP, rsh xinetd, tcp-wrappers.	08
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Install Linux OS on standalone machine.	Introduction	04
2.	Perform Logging/logout via terminals and network.		04
3.	Perform general purpose utility commands in Linux.	Linux Commands and Linux file system	06
4.	Use GRUB.CONF file to access and change system parameters while OS loading.		04
5.	Use VI Editor.	Introduction to Shell programming	02
6.	Write any two Shell script program in VI Editor.		04
7.	Write any two C program in VI Editor.		04
8.	Create User.	Managing User accounts and Disk space	02
9.	Recover Root Password.		04
10.	Run SUDO command to access system privileges.		04
11.	Configure firewall for computer security.	Linux system security	04
12.	Setup LAN: LAN topology and networking (TCP/IP statically using setup command or through wizard).		04
13.	Configure DHCP server.		04
14.	Perform rpm command to install any two packages.	Servers and services	04
15.	Access Net configuration of machine using netconfig command.		02
16.	Configure NFS server.		04
		Skill Assessment	04
		Total	64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction	04(04)	04(04)	06(00)	14(08)
02	Linux Commands and Linux file system	04(00)	04(08)	06(00)	14(08)
03	Introduction to Shell programming	00(02)	04(04)	06(00)	10(06)
04	Managing User accounts and Disk space	00(02)	06(04)	06(00)	12(06)
05	Linux system security	04(00)	04(00)	00(06)	08(06)
06	Servers and services	02(00)	10(00)	00(06)	12(06)
	Total	14(08)	32(20)	24 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	4	U	2	6	U	2	6	R	2	3	R	2	5/7
	4	R	2																
02	2	R	4	1	U	4	2	U	4	2	U	4	2	U	4				3/5
03	3	U	4	4	U	4	5	R	4	1	R	4	1	U	4				3/5
04	5	U	4	6	U	4	6	U	4	3	U	4	4	R	4				3/5
05	1	A	6	2	A	6	5	A	6										2/3
06	3	A	6	4	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Activities: Writing syntax of commands ,Writing procedure step by step ,Writing programs	10
2	Performance	20
3	Output of program , Result after executing commands	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3	3	-	-	-	-	-	-	-	-
2	-	3	3	3	-	-	-	-	-	-	3	-
3	-	3	3	3	-	-	-	-	-	-	-	-
4	-	3	3	3	1	-	-	3	3	3	3	-
5	-	3	3	3	-	-	-	3	3	3	-	2
6	-	3	3	3	-	-	-	3	3	3	3	2

1. Slight (Low) 2.Moderate (Medium) 3.Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Linux Command Line and Shell Scripting Bible	Richard Blum,Christine Bresnahan,3 rd Edition,John Wiley & Sons ,Inc.,Jan 2015.	13: 9781118983843
2.	The Linux Command Line: A Complete Introduction	William E. Shotts Jr., 1 st Edition,2012.	13: 9781118983843
3.	Linux: The Beginners Choice For the Linux System	Simon Bedford, CreateSpace Independent Publishing, April 13, 2015.	13:9781514895658

❖ **E-REFERENCES:**

- <http://www.slideshare.net/vignesh0009/linux-practicals> , assessed on 02/09/2016.
- <https://www.linux.com/tutorials> , assessed on 02/09/2016.

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer (Dual Core or above)
2. Network printer.
3. Red Hat Enterprise Linux 6

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr.A.R.Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Department in Computer Engineering	Govt. Polytechnic, Nagpur
2.	Mrs.D.P.Chanmanwar	Lect. In IT	Government Polytechnic, Nagpur.
3.	Mr.R.L.Meshram	Lect. In IT	Government Polytechnic, Nagpur.
4.	Ms.I.G.Lokhande	Lect. In IT	Government Polytechnic, Nagpur.
5.	Mr. Atul Upadhya	CEO	Vista Computers , Ram Nagar, Nagpur
6.	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
7.	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

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GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: IT404E
COURSE TITLE	: MANAGEMENT INFORMATION SYSTEM
PREREQUISITE	: NIL
TEACHING SCHEME:	TH: 03; TU: 00; PR: 00 (CLOCK HRs.)
TOTAL CREDITS	: 03 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: NIL
PT.	: 01 HR

❖ RATIONALE:

MIS is a concept continuous to evolve; emerging trend consistent with the evolution of the MIS concept endures computing. It is the power of computers which makes MIS feasible. From this point of view, the course is introduced.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify the role of MIS in various functional areas of management.
2. Illustrate the supporting role of MIS in decision making.
3. Design information system necessary.
4. Analyse the determination of requirement.
5. Analyse software process.
6. Design software and gains knowledge on effective applications of information systems in business.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1.Managemet Information System: A Framework	1. Define MIS. 2. List the applications of MIS. 3. Describe Information System of MIS. 4. Describe Information Technology and Disnature and scope of MIS 5. List MIS characteristics.	1.1 Importance of MIS, Management Information System :A concept 1.2 Management, Information System MIS: A Definition 1.3 Information Technology and Disnature and scope of MIS 1.4 MIS characteristics, IS Functions.	6
2.Structure And Classification Of MIS	1. Design the structure of MIS based on Physical Components. 2. Describe levels of management activities. 3. Describe Organizational Function of MIS. 4. List classification of IS. 5. Describe transaction processing System. 6. Define the term: MIS, DSS, ESS,OASs . 7. Differentiate between Financial Information System, Marketing Information System and Production/Manufacturing.	2.1 Structure of MIS,MIS structure based on Physical Components 2.2 Information System processing Functions, Decision Support, Levels of Management Activities 2.3 Organizational Function, IS Classification, transaction processing System 2.4 Management Information System(MIS),Decision Support System(DSS) 2.5 Executive Support System, Office Automation system(OASs) 2.6 Business Expert System(BESs),Functional Information, System 2.7 Financial Information System, Marketing Information System, 2.8 Production/Manufacturing Information System	10
3.Decision – Making And MIS	1. Describe Simon’s Model Of Decision –Making. 2. List Components of DSS. 3. Describe Phases of decisions making process and types of DSS. 4. Differentiate between Decision Theory And Decision Analysis 5. Analyse Level Of Programmability and Purpose of Decision Making.	3.1 Decision –Making Simon’s Model Of Decision –Making 3.2 Components of DSS , Phases of decisions making process, Types Of DSS 3.3 Purpose of Decision Making, Level Of Programmability 3.4 Knowledge Of Outcomes, methods for Choosing Among alternatives, 3.5 Decision Theory And Decision Analysis, Utility	8

	6. Describe Tree, Optimization Techniques	3.6 Decision Tree, Optimization Techniques	
4.Information And System Concepts	1. Define Information. 2. List types of information 3. Describe the characteristics of each Dimension. 4. Describe Kinds Of Definition 5. Analyse the different types of information	4.1 Information :A Definition, Types Of Information, strategic Information 4.2 Tactical Information, Operational Information, information Quality 4.3 Dimensions of Information Economic Dimensions, Business Dimensions 4.4 Technical Dimensions, 4.5 System :A Definition , Kinds Of Definition	6
5.Database Management Systems (DBMS)	1. Define Database Hierarchy. 2. Describe Data Duplication, Data Inconsistency, Lack Of Data Integration, Data Dependence 3. Differentiate Types Of Database Structure 4. State the Advantage Of database System 5. State the Disadvantage Of database System 6. Illustrate Objective Of Database 7. Design the software for Database	5.1 Introduction, Database Hierarchy, files-the Traditional approach 5.2 Data Duplication, Data Inconsistency, Lack Of Data Integration, Data Dependence 5.3 Program Dependence, Objective Of Database, Advantage Of database System 5.4 Disadvantage Of a Database, Database Structure ,Database Management System 5.5 Types Of Database Structure	8
6.Implementation And Evaluation Of MIS	1. Illustrate Implementation Process and also Describe planning for Implementation 2. Write step for Creation of forms And Database. 3. Select appropriate Hardware and Software for implementation. 4. Describe IS organization And Procedure Development. 5. Implement requirement analysis of MIS 6. Analyse software process.	6.1 Implementation Process, Planning the Implementation 6.2 Acquisition Of facilities And Space Planning 6.3 IS organization And Procedure Development 6.4 User Training, Acquisition Of Hardware And Software 6.5 Creation Of Forms And Database, Testing 6.6 changeover, Hardware and Software Selection 6.7 Requirement Analysis	10
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
NIL			

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Management Information System: A Framework	02(02)	04(00)	00(00)	06(02)
02	Structure And Classification Of MIS	04(02)	08(08)	06(00)	18(10)
03	Decision –Making And MIS	02(04)	04(04)	06(00)	12(08)
04	Information And System Concepts	02(00)	08(06)	00(00)	10(06)
05	Database Management Systems (DBMS)	02,04(00)	04(00)	00(06)	10(06)
06	Implementation And Evaluation Of MIS	02,06 (04)	06(04)	00(00)	14(08)
	Total	24(12)	34(22)	12(06)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	3	R	2	4	R	2	5	R	2	6	R	2	1	R	2	5/7
	2	R	2																
02	1	U	4	2	U	4	2	U	4	2	U	4	2	U	4				3/5
03	2	R	4	5	R	4	3	U	4	3	R	4	3	U	4				3/5
04	4	U	4	4	U	4	5	U	4	6	R	4	6	U	4				3/5
05	6	R	6	6	U	6	4	U	6										2/3
06	2	A	6	3	A	6	5	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3, 4,5,6
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	Rubrics & Assessment Sheets	--
		Journal Writing		Continuous	--	--	Journal	--
				TOTAL	--	--		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	Rubrics & Practical Answer Sheets	--
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
NIL		

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	3	3	3	-	3
4	-	3	-	-	-	-	-	3	3	3	-	3
5	-	3	-	-	-	-	-	-	-	3	-	3
6	-	3	-	-	-	-	-	3	3	3	-	3

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Management information System	Gordon B. Davis and Margeth, First Edition ,1976	13:9780070158283
2.	Management information System	Jawadekar W.S. , Tata McGraw-Hill Publishing Company Limited, 2 nd Edition, 2002	13:9780070445758
3	Management Information System	Robert Schultheis, Mary Summer, Management Information Systems –The ManagersView, Tata McGraw Hill,4 th Edition 2008.	13:97801323476173

❖ **E-REFERENCES:**

- <https://www.sapnaonline.com/.../management-information-systems-text-cases-331651>, accessed on 05 April 2016
- <https://www.youtube.com/watch?v=ht8I-CL12j4>, accessed on 01 April 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

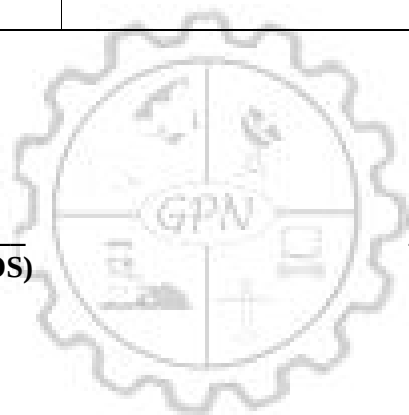
NIL

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr.A.R.Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S.P.Lambade	Head of Computer Engg.	Government Polytechnic, Nagpur
3.	Ms. Isha G. Lokhande	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mr. R.L.Meshram	Lecturer in Information Technology	Government Polytechnic, Nagpur.
5.	Mr. S. Khatri	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
6	Prof. Manoj Jethawa	HOD, Computer Science	Shri Datta Meghe Polytechnic, Nagpur
7	Prof. N. V. Choudhari	Asst. Professor(CSE),	DBACOE, Wanadongari, Nagpur
8	Mr. Atul Upadhyay	CEO	Vista Computers, Ramnagar, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.
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COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: IT405E
COURSE TITLE	: NETWORK ADMINISTRATION AND SECURITY
PREREQUISITE	: Nil
TEACHING SCHEME	: TH: 03; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (Internal)
PT	: 01 HR

❖ **RATIONALE:**

Engineering students must be able to use basics of computer and its security in real time environment. This course increases student's ability towards troubleshooting the problems occurred regarding security of computer and its network. It also describes basics of attacks occurred over the computer in the network. This subject is network application based subject. It gives the practical knowledge of designing computer network while using any type of topologies. This subject covers the installation and configuration of any network operating system. With the proper configuration of operating system on the server, the students will manage and administer the network resources or devices such as printers, scanner, driver and also software like files, folders, directories, applications, programs etc.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Justify the solutions for real world problems regarding security of computer.
2. Design the computer network.
3. Configure the networking resources and software from the server.
4. Troubleshoot network devices in the case of breakdown.
5. Use the different types of network technologies for internet connection.
6. Identify and repair the network faults

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Introduction to security	1. Describe need of computer security 2. State the importance of security 3. State security goals 4. State Hackers classification	1.1 Define 'Secure' , Protecting Valuables, Characteristics of Computer Intrusion 1.2 Attacks – Vulnerabilities, Threats , 1.3 Attacks and Control Methods, Motive, Opportunity, Malware: Viruses, Logic bombs 1.4 The Meaning of Computer Security – Security Goals , Computer criminals: Amateurs, Crackers or Malicious Hackers, Career Criminals, Terrorists 1.5 Method's of Defense Hacking as Defense mechanism, The Methodology of Hacking , Classification of hackers & controls	6
2. Security Alerts	1. Define different terms related to physical security 2. Describe the various types of security Techniques 3. State security Policies	2.1 Role of people in security : Password selection, Piggybacking, Shoulder surfing, Dumpster diving, Installing unauthorized software/ Hardware. Security awareness, Individual user responsibilities, Security policies, standards, procedures and guidelines 2.2 Physical security : Access controls 2.3 Biometrics : finger prints , hand prints , Retina detect patterns, voice patterns, signature and writing patterns, keystrokes, 2.4 Weak / Strong Passwords and Password Cracking , Insecure Network connections 2.5 Malicious Code 2.6 Programming Bugs 2.7 Cyber crime and Cyber terrorism	8

3. Security in Network	1. State various private Network 2. State reasons behind Network Vulnerability. 3. Describe types of firewall. 4. State the various types of Network security 5. Differentiate between Different firewalls. 6. Determine the type of network from the given diagram. 7. Determine the type of firewall from the given features of firewall.	3.1 Network Concepts - The Network , Media , Protocols 3.2 Types of Networks Threats in Network Reasons behind Network Vulnerability. Categories of Attack 3.3 Firewalls : Define Firewall, Design of Firewall, Types of Firewalls , Personal Firewalls, Comparison of Firewalls 3.4 Intrusion Detection System - Types of IDs, Goals for Intrusion Detection System , IDs strengths and Limitations 3.5 IP security - Overview , Architecture, IPSec configurations, IPSec security	8
4. Introduction to Directory Services and Remote Network Access	1. Define various terms related to Networking 2. Describe overview of Directory Services 3. List the features of Windows NT domain 4. Classify PSTN, DSL and VPN. 5. Describe various duties of Network Administrator. 6. Describe various duties of Network Engineer. 7. Describe various roles played by Network Architecture.	4.1 Network Related Jobs – Network Administrator, Network Engineer 4.2 Network Architecture / Designer 4.3 Directory Services - Define Directory Services, Definition of Novell Directory 4.4 Windows NT domains, Microsoft's Active Directory 4.5 Active Directory Architecture – Object Types, Object Naming 4.6 Globally unique identifiers User Principle Names 4.7 Public Switched Telephone Network, Integrated Services Digital Network 4.8 Digital Subscriber Line 4.9 Virtual Private Network – VPN Protocols, Types of VPNs, VPN Clients, SSL VPNs	8
5. Designing Network	1. Describe various terms related to Network services 2. Write the steps for installation and configuration of server – client based network 3. Write the steps for configuring the settings for creating the Domain controller 4. Design the Network referring to given	5.1 Designing Network – Accessing Network Needs, Applications, Users 5.2 Network Services, Security and Safety 5.3 Meeting Network Needs – Choosing Network Type, Choosing Network Structure 5.4 Choosing Servers 5.5 Installing and Configuring Windows 2003 Server - Preparing for Installation	9

	requirements. 5. Write the steps for creating the bootable disk.	5.6 Creating windows 2003 server boot disk, Installing windows 2003 server 5.7 Configuring server/ client 5.8 Adding the DHCP and WINS roles, Adding file server and print server 5.9 Adding Web based Administration	
6. Administering Windows 2003 Server (The Basics)	1. List various steps for creating user accounts in windows 2003 server and its related features 2. Describe the Encryption service 3. Illustrate the various security issue 4. State the steps for installing local and network printer 5. Write the steps to take the backup from Windows 2003 server. 6. Troubleshoot the different problems while connecting the printer to computer.	6.1 Working With User Accounts - Adding a User, Modifying User Account 6.2 Deleting or Disabling a User Account 6.3 Working With Windows 2003 Security Groups – Creating Group 6.4 Public Key Encryption Services 6.5 Working with Shares – Understanding Share Security 6.6 Creating Shares, Mapping Drives 6.7 Administering Printer Shares – Setting up Network Printer 6.8 Working with Windows 2003 Backup – Using Windows 2003 Servers, Backup Software 6.9 Understand Network Printing Concepts 6.10 Locally connected print devices : Setting up local print devices 6.11 Shared print devices, Sharing Locally Attached Print Devices 6.12 Windows Network Printing, Add Print Wizard	9
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Install Linux server and analyze networking features of Linux	Security Alerts	04
2.	Install and configure DNS on Linux		04
3.	Perform access control work on Linux	Security in Network	04
4.	Configuration of Firewalls on Linux		04
5.	Install Windows 2003 Server and note its important features	Administering Windows 2003 Server	04
6.	Write the steps for Creating AD Object and perform it on Windows 2003	Designing Network	02
7.	Create New users in Windows 2003 server and assign different privileges to them		02
8.	Create Windows 2003 Server Boot Disk required for the installation	Administering Windows 2003 Server	04
9.	Install Active Directory in windows 2003 server platform		04
10.	Write the steps required for the installation of a Local printer in Windows 2003 server environment, and also test this installation from the another PC		02
11.	Write the steps required for the installation of a Network printer in Windows 2003 server environment, and also test this installation from the another PC		04
12.	Install Hardware Firewall and configure it for its optimum utilization	Security Alerts	04
13.	Install UTM (Unified Threat Management) and configure it for its optimum utilization		04
14.	Identify the performance of cryptography work on Windows for encryption		04
15.	Prepare a report on Latest Networking Technology in use.	-	12
Skill Assessment			02
Total			64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction to Security	02(02)	08(04)	00(00)	10(06)
02	Security Alerts	04(04)	08(04)	00(00)	12(08)
03	Security in Network	00(02)	04(04)	06(00)	10(06)
04	Introduction to Directory Services and Remote Network Access	04(00)	10(06)	00(00)	14(06)
05	Designing Network	02(04)	04(04)	06(00)	12(08)
06	Administering Windows 2003 Server	08(00)	04(00)	00(06)	12(06)
	Total	20(12)	38(22)	12 (06)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	4	R	2	5	R	2	6	R	2	4	R	2	1	R	2	5/7
	3	R	2																
02	1	U	4	2	U	4	3	U	4	5	U	4	2	R	4				3/5
03	1	U	4	2	U	4	4	U	4	5	U	4	3	U	4				3/5
04	2	R	4	5	U	4	6	U	4	1	U	4	2	U	4				3/5
05	3	A	6	4	U	6	6	A	6										2/3
06	5	A	6	6	R	6	4	U	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ SCHEME OF PRACTICAL EVALUATION

Sr. No.	Description	Max. Marks
1	Explain the concept given in problem definition on answer sheet.	10
2	Installation/configuration of given problem definition	20
3	Viva Voce	20
TOTAL		50

❖ MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	3	-	-	-	-	3	3	3
2	-	3	-	-	3	-	-	-	-	3	3	3
3	-	3	-	-	3	-	-	-	-	3	3	3
4	-	3	3	3	3	-	-	3	3	3	3	3
5	-	3	3	3	3	-	-	3	3	3	3	3
6	-	3	3	3	3	-	-	3	3	3	3	3

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Upgrading and Troubleshooting Networks	Craig Zacker, Osborne/McGraw-Hill, 2 nd Edition, 2000	13: 978-0072122565
2.	Networking : A beginner's guide	Bruce Hallberg, Mc Graw Hill Education Inc., 6 th Edition, 2015	13-978-93-5134-472-8
3.	Computer Network	Andrew S. Tanenbaum & David J Wetherall, Pearson Educational Inc., 5 th Edition, 2011	13:978-93-325-1874-2
4.	Cryptography & Network Security	William Stallings, Pearson Educational Inc., 6 th Edition, 2014	13: 9780133354690
5.	Networking Essentials	Mark A Sportack, Sams Publishing; 1 st Edition, 2006	13: 978-0672312106
6.	Local Area Networks	Gerd Keiser, 2nd edition, Tata Mc Graw Hill, 2002	10:0-07-052904-3

❖ **E-References :**

- <http://nptel.ac.in/courses/106105081/37>
accessed on 02nd September 2016
- http://www.juniper.net/techpubs/en_US/junos15.1/information-products/pathway-pages/network-management/network-management.pdf
accessed on 02nd September 2016
- https://www.researchgate.net/publication/221538483_Computer_network_management_Theory_and_practice
accessed on 02nd September 2016
- <http://www.usi.edu/business/aforough/Chapter%2020.pdf>
accessed on 02nd September 2016
- <http://www.theabbgroup.com/docs/Week%206%20Network%20Administration.ppt>
accessed on 02nd September 2016
- <http://staffweb.itsligo.ie/staff/pflynn/Server%20Management%201/Lecture%2012%20-%20Introduction%20to%20Network%20Administration.ppt>
accessed on 02nd September 2016

❖ **LIST OF MAJOR EQUIPMENTS / INSTRUMENTS WITH SPECIFICATION**

1. Network Lab with all PC connected in LAN or WIFI
2. Computers with Core2Duo and above
3. 24 port Switches, Wi-Fi Modems, Router, Firewall, UTM
4. Troubleshooting kit for Network

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1	Mrs. A. R. Mahajan	Head, Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Department in Computer Engineering	Govt. Polytechnic, Nagpur
3.	Lekhraj D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mrs. V. A. Raje	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5.	Miss. I. G. Lokhande	Lecturer in Information Technology	Government Polytechnic, Nagpur.
6.	Shri. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
7.	Shri. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
8.	Shri. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN IT/CM
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: IT406E ^s
COURSE TITLE	: SOFTWARE ENGINEERING
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 04; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH.TEE	: 03 HRs
PR.TEE	: 02 HRs (External)
PT.	: 01 HRs

❖ RATIONALE:

Today, in the world of technology computer software is the most imperative technology. When computer software succeeds ie, when it meets the needs of the people who use it, when it performs flawlessly over a long period of time, when it is easy to modify and even easier to use it can and does change things for the better. But when software fails ie, when its users are dissatisfied, when it is error prone, when it is difficult to change and even harder to use bad things can and do happen. To succeed, we need discipline when software is designed and built. We need an engineering approach.

Many decisions are required throughout the software development process. Software Engineering is the basis for Software development. Software Engineering helps to cover up a path towards easier, swift, and less expensive methods to build and maintain high quality software also build decision making power in students.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify risk in development process.
2. Plan and observe project estimation.
3. Apply requirement modeling strategies.
4. Use basic design principles, guidelines and process model to develop project.
5. Follow ISO 9000 Quality Standards.
6. Prepare/ design Software Requirement Specification (SRS).

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs .
1. Software Engineering, The Software Process	1. State Software Crises & Myths. 2. State the Software Engineering principles. 3. State features of different models. 4. Compare different models. 5. State the advantages and disadvantages of different models. 6. State WSHH principle. 7. Define 4P's terms.	1.1 The Nature of Software, Software Engineering, the Software Process, Software Engineering Practice, Software Crises & Myths. 1.2 Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models: Waterfall, Incremental Model RAD, Prototyping, Spiral Model. 1.3 Agile Development: What Is Agility? Agility and the Cost of Change, Agile Process, Agility Principles, Human Factors. 1.4 Project management concepts: People, Product, Process, and Project. WSHH principle, critical practice.	10
2. Software Projects Management	1. Propose estimation for given project. 2. Identify risk and do refinement. 3. State the role of Repository. 4. State SCM Features. 5. Identify different objects in software configuration process. 6. State the need of risk management. 7. Apply the steps to mitigate the risk.	2.1 Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics within the Software Process, Metrics for Small Organizations 2.2 Observations on Estimation, The Project Planning Process, Software Scope and Feasibility, Resources, Software Project Estimation, Decomposition Techniques 2.3 Software risks: identification, risk Projection, Refinement, Risk Mitigation, Monitoring, and Management (RMMM) 2.4 Software Configuration Management: The SCM Repository, The Role of the Repository , General Features and Content, SCM Features, The SCM Process: Identification of Objects in the Software Configuration, Version Control, Change Control	10

3. Software Requirement and Scheduling	1. State requirements need & Characteristics. 2. State the components of and design SRS document. 3. Apply different project scheduling techniques. 4. Apply Project Scheduling Techniques for given scenario. 5. Draw Gantt chart.	3.1 Requirements Engineering, Need of SRS, Characteristics of SRS, Components of SRS 3.2 The structure of SRS document, SRS validation. 3.3 Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Validating Requirements. 3.4 Project Scheduling: Concepts. Peoples Efforts. Task set, Task network. 3.5 Project Scheduling Techniques-Need, Concept of Gantt chart, Programme Evaluation Review Technique (PERT), and Critical Path Method (CPM) and Earned Value (EV) analysis.	12
4. Requirements Modeling	1. Design Data Flow Model. 2. Use case diagram. 3. Design a Behavioral Model. 4. Draw state and sequence diagram. 5. Apply Requirements Modeling Strategies.	4.1 Requirements Modeling Strategies 4.2 Building the Analysis Model: Data Modeling Concepts. 4.3 Flow- Oriented Modeling: Creating a Data Flow Model: Creating a Control Flow Model, the Control Specification, and the Process Specification. 4.4 Creating a Behavioral Model: Identifying Events with the Use Case, State Representations. 4.5 Patterns for Requirements Modeling: Discovering Analysis Patterns, a Requirements Pattern Example: Actuator-Sensor. 4.6 Scenario- Based Modeling- Use Case Diagram.	10
5. Design Concepts	1. Apply design principles. 2. Apply Software Quality Guidelines and Attributes. 3. State different Design Elements.	5.1 Design within the Context of Software Engineering 5.2 The Design Process, Software Quality Guidelines and Attributes, The Evolution of Software Design 5.3 Design Concepts: Abstraction, Architecture, Patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement , Aspects, Refactoring, Object-Oriented Design Concepts, Design Classes 5.4 The Design Model, Data Design Elements, Architectural Design	12

		Elements Interface Design Elements, Component-Level Design Elements, Deployment- Level Design Elements. 5.5 Designing Class-Based Components: Basic Design Principles, Component-Level Design Guidelines, Cohesion, Coupling	
6. Software Quality Management	1. State different McCall's Quality Factors. 2. Apply project Management Techniques. 3. State different Elements of Software Quality Assurance. 4. State measures of s/w Reliability and Availability 5. State ISO 9000 Quality Standards.	6.1.6.1. Software Quality: Garvin's Quality Dimensions, McCall's Quality Factors, ISO 9126 Quality Factors 6.2. Achieving Software Quality, Software Engineering Methods, Project Management Techniques, Quality Control, Quality Assurance. 6.3. Software Quality Assurance (SQA): Background Issues, Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics. 6.4. Formal Approaches to SQA. 6.5. Statistical Software Quality Assurance: A Generic Example, Six Sigma for Software Engineering. 6.6. Software Reliability: Measures of Reliability and Availability, Software Safety, The ISO 9000 Quality Standards, The SQA Plan. 6.7. Introduction- Reengineering & Reverse Engineering.	10
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practic al	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Apply suitable software development model for the given scenario.	Software Engineering, The Software Process	02
2	Identify the objectives and summaries outcomes for given scenario, for each SDLC phase.	Software Projects Management	02
3	Design Software Requirement Specification (SRS) document for the project. Consider any project to be developed in any technology as a Software Architect or Project Manager.		04
4	Classify above identified requirement into functional and non-functional requirements.	Software Requirement and Scheduling	04
5	Design USE case diagrams for given scenario.		04
6	Create sequence diagram, state diagram for given scenario.	Requirements Modeling	04
7	Draw E-R diagram, DFD and create data dictionary for above system.		02
8	Draw Activity diagram from above system.		02
9	Identify the design principle that is being violated in relation to the given scenario. (Give any scenario)	Design Concepts	02
10	Develop three different levels of procedural abstractions for one or more of the following programs by applying a “stepwise refinement approach” to: (a) Develop a check writer that, given a numeric dollar amount, will print the amount in words normally required on a check. (b) Iteratively solve for the roots of a transcendental equation. (c) Develop a simple task scheduling algorithm for an operating system.		04
Skill Assessment			02
Total HRs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Software Engineering The Software Process	02(00)	04(04)	00(00)	06(04)
02	Software Projects Management	00(00)	04(04)	06(00)	10(04)
03	Software Requirement and Scheduling	02(02)	04(04)	06(00)	12(06)
04	Requirements Modeling	02(00)	08(04)	06(06)	16(10)
05	Design Concepts	02(00)	08(04)	06(06)	16(10)
06	Software Quality Management	02(02)	08(04)	00(00)	10(06)
	Total	10(04)	36(24)	24 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	3	R	2	4	R	2	5	R	2	6	R	2	3	R	2	5/7
	6	R	2																
02	1	U	4	2	U	4	3	U	4	1	U	4	2	U	4				3/5
03	4	U	4	4	U	4	5	U	4	3	U	4	4	U	4				3/5
04	5	U	4	6	U	4	6	U	4	5	U	4	6	U	4				3/5
05	2	A	6	3	A	6	4	A	6										2/3
06	4	A	6	5	A	6	5	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Identify the suitable software development model, Classify the requirement into functional and non-functional requirements.	20
2	Performance	10
3	Identify the various elicitation techniques, identify design principles, Draw sequence, state, E-R diagram, DFD, Sequence and Activity diagram.	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**❖ **Computer Engineering :**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3		-	-	-	-	-	-	3	3	3
2	-	3		-	-	-	-	-	-	3	3	3
3	-	3		-	-	-	-	-	-	3	3	3
4	-	3	2	2	-	-	-	2	2	3	3	3
5	-	3	2	2	1	-	-	2	2	3	3	3
6	-	3	2	2	-	-	-	2	2	3	3	3

❖ **Information Technology :-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	-	-	3	-	3
4	-	3	2	2	-	-	-	2	2	3	-	3
5	-	3	2	2	1	-	-	2	2	3	-	3
6	-	3	2	2	-	-	-	2	2	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Project Management: Engineering, Technology and Implementation	Shtub, A. Bard, J. F. and Globerson, S, Prentice Hall,	0-13-102765-4
2.	Software Engineering – a practitioner’s approach	Roger S. Pressman, Tata McGraw Hill Publication, Seventh, 2010	978-0-07-337597-7
3.	Software Engineering – Principles and Practice	Waman S. Jawadekar, Tata McGraw Hill Publication, 2004	10: 0070583714 13: 9780070583719

❖ E-REFERENCES:

- http://www.tutorialspoint.com/software_engineering/software_engineering_tutorial.pdf, assessed on 04th August 2016
- http://www.resource.mitfiles.com/IT/II%20year/IV%20sem/Software%20Engineering/books/Pressman_Software_Engineering.pdf, assessed on 04th August 2016
- https://www.tutorialspoint.com/software_engineering/software_project_management.htm assessed on 14th October 2016

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION

NIL

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	HOD, Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
3.	Ms. S. N. Chaudhari	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4.	Ms. D. M. Shirkey	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5.	Ms. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
6.	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur
7.	Prof. N.V.Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongari, Nagpur
8.	Mr. Atul Upadhyay	CEO	Vista Computers, Ram Nagar, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.
(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: IT407E
COURSE TITLE	: INTERNETWORKING WITH TCP/IP
PREREQUISITE	: NIL
TEACHING SCHEME:	TH: 03 TU: 00 PR: 00 (1 CREDIT = 1 CLOCK HR.)
TOTAL CREDITS	: 03 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: NIL
PT.	: 01 HR

❖ **RATIONALE:**

In today's Information Technology industry Computer Network has become an essential part of computer system. Hence it is necessary for the students to make use of Computer Networks and understand concept of TCP/IP Protocol Suite. In recent years, the rapid increase of mobile computing devices like personal digital assistants (PDA), personal computers and laptops has driven a revolutionary change in the computing world. Internet services have grown rapidly and millions of people are using these services in their day to day life. The proliferation of mobile computing devices with improved processing capabilities allows mobile users to connect to the global Internet. The impact of this phenomenal growth changes the modality of communicating and increases its challenges. This course will help students to acquire knowledge about TCP/IP, their requirement, protocols, Architecture, Applications and Utilities.

❖ **COURSE OUTCOMES :**

After completing this course students will be able to –

1. Configure different versions of Ethernet and their operations
2. Perform IP addressing and sub-netting
3. Perform the operation of protocols - such as IP, TCP, UDP and application layer protocols
4. Implement TCP/IP protocol Architecture
5. Determine TCP/IP Applications and its Utilities
6. Troubleshoot small office networks

❖ **COURSE DETAILS :****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	HOURS
1. Introduction to Network Protocols	1. Define / explain various terms related to TCP / IP 2. Describe overview of types of protocols 3. Explain comparative features of TCP/IP and OSI model 4. Analyze TCP/IP and OSI model	1.1 What is TCP/IP Protocol Suite:-IP, ARP, RARP, ICMP, IGMP, UDP, TCP, SCTP 1.2 What is IPX/SPX 1.3 Apple Talk 1.4 TCP/IP 1.5 Comparing Features of TCP/IP model and OSI Model 1.6 Sub-netting and Super-netting	08
2. Introduction to TCP/IP Suite	1. Define and Explain the Architecture of TCP/IP 2. Describe the TCP/IP DoD model & protocol suit 3. Enlist TCP/IP protocols 4. Difference between TCP and UDP 5. Describe the Flow control and Multiplexing in TCP/IP 6. Explain the applications of ICMP 7. Describe the BOOTP and DHCP 8. Interpret the ICMP, ARP and RARP	2.1 TCP/IP Architecture 2.2 TCP/IP DoD model 2.3 Block diagram of TCP/IP protocol suite 2.4 Different protocols in TCP/IP 2.5 TCP- connection oriented services 2.6 Flow control 2.7 Multiplexing 2.8 UDP- Connectionless services 2.9 Internet Control Message Protocol (ICMP) 2.10 Bootstrap Protocol – BOOTP 2.11 DHCP 2.12 IP – ICMP, ARP and RARP	10
3. TCP/IP Addresses	1. Define and Explain Unicast IP 2. Describe the Multicast IP and multicast streaming 3. Describe the Broadcast IP 4. Discuss the difference between Multicasting and Multiple unicasting 5. Enlist TCP/IP port numbers 6. Reconstruct the TCP/IP Port numbers	3.1 Unicast IP 3.2 Multicast IP and multicast streaming 3.3 Broadcast IP 3.4 Multicasting verses Multiple unicasting 3.5 TCP/IP Port numbers	04

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	HOURS
4. TCP/IP Applications and Utilities	1. Define and Explain related terms 2. Describe ping, ipconfig and NTP 3. Configure the BOOTP, DHCP, WINS, DNS, NAT and SNMP 4. Install IPv6 and ICMPv6 and comparison thereof. 5. Analyze IPv6 protocol for the IP	4.1 FTP, TFTP, TELNET, SMTP, POP3, IMAP, HTTP, HTTPS 4.2 Ping, ipconfig, NTP 4.3 BOOTP, DHCP, WINS, DNS, NAT, SNMP 4.4 Next Generation IPv6 & ICMPv6 4.5 Comparison between IPv6 and ICMPv6	08
5. IP Addresses	1. Define IP Address 2. Enlist and explain the classes of IP addressing 3. Describe Reserved IP addresses, network and host component 4. Define Subnet mask assignment 5. Define and configure sub-netting, class C sub-netting and classless addressing 6. Explain the structure of IPv6 Addresses 7. Define Address space 8. Analyze Class C sub-netting and Classless addressing	5.1 Introduction to IP Address 5.2 IP Address Classes 5.3 Reserved IP addresses 5.4 Differentiating network and host component 5.5 Subnet mask assignment 5.6 Introduction to sub-netting 5.7 Class C sub-netting 5.8 Classless addressing 5.9 IPv6 Addresses - Structure 5.10 Address space	08
6. Troubleshooting TCP/IP related problems	1. List and execute the commands and utilities used for troubleshooting 2. Describe the application of nslookup and dig 3. Troubleshoot problems based on Remote access 4. Illustrate the problems Based on Troubleshooting TCP/IP	6.1 Commands and Utilities used for troubleshooting 6.2 NSlookup 6.3 DIG (domain information groper) 6.4 Troubleshooting TCP/IP:- 1. Local Host Cannot Access Remote Host 2. Routing not functioning Properly on New Interface 3. Host connection Fail Using Certain Applications	10
Total			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practic als	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
NIL			

❖ SPECIFICATION TABLE FOR THEORY PAPER :

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1.	Introduction To Network Protocols	02(00)	08(00)	00(06)	10(06)
2.	Introduction To TCP/IP Suite	02(02)	08(00)	06(06)	16(08)
3.	TCP/IP Addresses	02(00)	04(04)	00(00)	06(04)
4.	TCP/IP Applications And Utilities	02(04)	04(04)	06(00)	12(08)
5.	IP Addresses	02(00)	04(08)	06(00)	12(08)
6.	Troubleshooting TCP/IP Related Problems	04(02)	04(04)	06(00)	14(06)
Total		14(08)	32(20)	24(12)	70(40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER :

Q. No.	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	2	R	2	5/7
	6	R	2																
02	1	U	4	1	U	4	2	U	4	3	U	4	4	R	4				3/5
03	2	U	4	3	U	4	4	U	4	4	U	4	5	U	4				3/5
04	6	R	4	5	U	4	6	U	4	5	U	4	6	U	4				3/5
05	2	A	6	4	A	6	1	A	6										2/3
06	5	A	6	6	A	6	2	A	6										2/3

T=Unit/Topic Number

L=Level of Question

M=Marks

R=Remember

U=Understand

A=Analyze / Apply

❖ ASSESSMENT AND EVALUATION SCHEME

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3, 4,5,6
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	--	--
		Journal Writing		Continuous	--	--	--	--
				TOTAL	--	--		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
	NIL	

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	1	-	-	-	3	3
2	-	3	-	-	-	-	-	-	2	2	3	3
3	-	3	-	-	-	-	-	-	2	2	3	3
4	-	3	-	-	-	-	-	2	2	2	3	3
5	-	3	-	-	-	-	-	2	2	2	3	3
6	-	3	-	-	-	-	-	2	2	2	3	3

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Inside TCP/IP	Matthew Flint Arnet, Second edition, New Riders Publishing, 1995	13: 978-1562057145
2.	TCP/IP Protocol Suite	Behrouz A. Forouzan, 1 Fourth Edition, TataMcGraw Hill, 2010`	13:978-0-07-070652-1
3.	Computer Network	Andrew S. Tanenbaum & David J Wetherall, Fifth edition, 2013	13:978-81-317-8757-1
4.	Computer N/T- Protocols, Standards & Interfaces	Uyless Black, Second edition, Prentice Hall Inc., 2002	10:81-203-1041-1
5.	Networking A beginners guide	Bruce Hallberg, Sixth edition, Tata McGraw Hill, 2008	13:978-93-5143-472-8
6.	TCP/IP Illustrated Volume 2	Gary R Wright & W Richard Stevens, Fourth edition, Pearson education (Singapore) , 1996	10:0-201-63346-9
7.	TCP/IP Illustrated Volume 3	W. Richard Stevens, Third edition, Pearson education (Singapore), 2001	10:81-7803-340-X

❖ **E-REFERENCE:**

- www.opsschool.org/en/latest/networking_101.htm
accessed on 12th Sept 2016
- <https://www.redbooks.ibm.com/redbooks/pdfs/gg243376.pdf>
accessed on 12th Sept 2016
- <https://www.amazon.co.uk/Internetworking-TCP-IP-v-1/dp/0131876716>
accessed on 12th Sept 2016
- w3schools.sinsixx.com/tcpip/default.asp.htm
accessed on 12th Sept 2016

❖ **LIST OF MAJOR EQUIPMENTS / INSTRUMENTS WITH SPECIFICATION**

1. Network Lab with all PC connected in LAN
2. Computers with Core2Duo and above with pre-installed windows 8.1
3. Network Lab via Cable or WIFI
4. 24 port Switches, Wifi Modems, Router
5. Troubleshooting kit for Netwo

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	Head of Department in Information Technology	Govt. Polytechnic, Nagpur
2.	Mr. S. P. Lambhade	Head of Department in Computer Engineering	Govt. Polytechnic, Nagpur
3.	Mr. M. A. Rahman	Lecturer in Computer Engineering	Govt. Polytechnic, Nagpur
4.	Mr. Manoj Jethwa	Head of Department in Computer Technology	Shri Datta Meghe Polytechnic, Nagpur
5.	Mr. N. V. Chaudhari	Asstt. Prof.- Computer Science and Engineering	DBACER, Wanadongri, Nagpur
6.	Mr. Atul Upadhaya	Chief Executive Officer	Vista Computers, Ramnagar, Nagpur

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: CM401E
COURSE TITLE	: PROGRAMMING IN 'C'
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 05(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (External)
PT.	: 01 HR

❖ RATIONALE:

Engineering students should know the basics of programming in open source environment. This course describes the basics of problem solving and logic development. It also describes basics of programming using C programming language. C is the most commonly used structured programming language. It is very useful course for understanding the higher level knowledge in the field of software engineering and learning advanced object oriented languages.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Analyze the problem, design algorithm and draw flowchart.
2. Apply concept of modular programming.
3. Select and use appropriate branching and looping statements, functions, and data types available in C, as required
4. Develop a program in 'C'..
5. Write and execute programs in C.
6. Debug and execute programs in C.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
1. Fundamentals of programming	1. Define various terms related to programming 2. Enlist C tokens, keywords, various rules, symbols, data types. 3. Identify valid / invalid variable names, syntax errors 4. Compare various terms. 5. Write an algorithm and draw flowchart for simple problems. 6. Describe structure of C program.	1.1 History of C, constants , Definition / description of program, syntax rules, character set, C tokens, keywords, identifiers, rules for identifiers, constants, types of constants, backslash character constants, variables, data types, primary, derived, user defined data types, size and range of data types, declaration and initialization of variables, defining symbolic constants, underflow and overflow of data. 1.2 Definition / description of algorithm, flowchart, High level language, Low level language , compiler, interpreter. 1.3 Flowchart symbols, algorithm and flowchart for simple problems 1.4 Structure of C program, various sections of C program and their purpose. 1.5 Process of creating, compiling and executing program. 1.6 Sample programs.	4
2. Basic I/O functions, Operators and Expressions in C	1. List various Formatted and unformatted I/O functions of C language along with syntax, its use and example. 2. List and describe various operators, their types and uses. 3. Write valid C expressions using various operators. 4. Identify and correct the errors in expressions and statements. 5. Write simple C programs.	2.1 Syntax, use, examples of scanf(), printf(), getchar(), putchar(), gets(), puts() and examples, various format codes (%c, %d, %e, %f, %g, %h, %i, %o, %s, %u, %x), output format flags (-, +, 0, #), Rules for scanf(). 2.2 Definition and example of operands, operators, expression. 2.3 Symbols, uses and examples of various Arithmetic, Relational, logical, boolean , bitwise , assignment, ternary, increment (++) and decrement (--) operators, rules for ++ , -- operators supported by C. 2.4 Writing and evaluation of arithmetic expression. Precedence	6

		of arithmetic operators, rules for evaluation of expression, inbuilt math functions: sin(), cos(), tan(), sqrt(), pow(), log(), log10(), exp(). 2.5 Type casting: Implicit and Explicit, precedence and associativity of operators, their rules. 2.6 Simple C programs using various operators and typecasting.	
3. Decision Making, Branching and Looping	1. List and write Decision making statements, unconditional jump statement, loop statements supported by C. 2. Select and apply appropriate Decision making statements, unconditional jump statement, loop statements supported by C as per requirement. 3. Compare various loop statements, supported by C. 4. List rules for nesting loops. 5. Identify and correct the errors. 6. Write C programs using decision making and loop statements.	3.1 Syntax, working, flowchart and example of if, if-else, nested if-else, else-if ladder, switch statement, rules for switch statement, goto statement (forward jump and backward jump). 3.2 Syntax, working, flowchart, comparison and example of for loop, while loop and do while loop. 3.3 Jumping within loops and jumping out of loop. 3.4 Syntax, working and use of break, continue and exit(); 3.5 Algorithm, flowchart programs using if, if-else, nested if-else, else-if ladder, switch statement, goto, for loop, while loop, do-while loop, nested loops.	10
4. Functions	1. Define function and terms related to function. 2. Enlist and define type of functions, scope rules. 3. Enlist categories of functions and state their examples. 4. State and describe ways of passing values to functions 5. Define and describe recursion. 6. Write programs based on functions.	4.1 Definition / description of modular programming, User Defined Function (UDF), function prototype, local, global parameters and formal, actual arguments, Library and user defined functions. 4.2 Elements of UDF, definition of UDF, return values and their types, function call, function declaration, 4.3 Function categories: function with no argument and no return value, with no argument but return value, with argument and no return value, with no argument and one return value, that returns multiple values. 4.4 Pass by value and by reference,	8

		rules for pass by pointers. 4.5 Algorithm, flowchart and programs based on functions, call by value, call by reference, recursion.	
5. Array and pointers	1. Define Array, string, pointer and their related terms. 2. Declare array and perform various operations on array. 3. Declare string, perform various operations on string and use various string library functions 4. Declare pointer variable, perform operations on pointer variables. 5. Enlist benefits of various data structures. 6. Write programs based on arrays, strings and pointers.	5.1 Definition of subscript, subscripted variable, derived data type, array, character array, string, NULL character, pointer 5.2 Declaration, compile time and run time initialization, accessing and processing elements of one dimensional array, 2D array. 5.3 Declaration, initialization of character array, using getchar(), gets(), scanf(), putchar(), puts(), printf() to input /output strings, Arithmetic operations on characters. 5.4 Syntax, working, use and examples of string handling functions like strlen(), strcpy(), strcmp(), strcat(). 5.5 Symbol and use of indirection operator, address operator. Initialization of pointer variable, legal arithmetic on pointers, comparison of Array and Pointer. 5.6 Benefits / advantages of using arrays, strings and pointers. 5.7 Programs based on arrays, strings, Pointers, Pointers and arrays.	10
6. Structure and Union	1. Define structure, union and their related terms. 2. Design, Define, declare structure, perform operations on individual members of structure and union. 3. Write programs based on Structure and Union	6.1 Description of user defined data type, Structure and union variables, member operator. 6.2 Structure definition, declaration and initialization. Accessing, copying, comparing structure members, size of structure, rules for initialization of structure, comparing structure and union. 6.3 Examples of array of structures, array within structure and structure within structure. 6.4 Benefits / advantages of using structures. 6.5 Comparison of array and structure. 6.6 Programs based on Structure,	10

		Union , array of Structures , array within structure and structure within structure .	
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:**(Note: Perform all practicals in LINUX environment)**

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Write and execute two simple C programs using standard formatted I/O functions. Write and execute four simple C programs using various operators and typecasting	2.Basic I/O , Operators and Expressions in C	04
2	Write and execute two programs each using if - else, if - elseif ladder.	3.Decision Making and Branching and Looping	02
3	Write and execute two programs each using nested if- else and switch statement.		04
4	Write and execute two programs using while loop		02
5	Write and execute two programs using do- while loop		02
6	Write and execute two programs each using for loop and nested for loop.		04
7	Write and execute 2 programs using function based on parameters passing by value.	4.Functions	02
8	Write and execute 2 programs using function based on parameters passing by reference.		04
9	Write and execute a programs using function based on recursion.		02
10	Write and execute two simple programs each using 1D and 2D arrays.	5.Array and pointers	04
11	Write and execute a simple program using character array.		02
12	Write and execute two simple programs each using string library functions.		02
13	Write and execute two simple programs each using pointers.		04
14	Write and execute a simple program using array of pointers.		02
15	Write and execute a simple program each using structure and union.	6.Structure and Union	02
16	Write and execute two simple programs using array of structures and array within structure.		04
17	Write and execute a program using structure within structure.		02
18	Mini project based on above concepts		12
Skill Assessment			04
Total Hrs			64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Fundamentals of programming	06(00)	04(04)	00(00)	10(04)
02	Basic I/O , Operators and Expressions in C	06(02)	04(04)	00(00)	10(06)
03	Decision Making, Branching and Looping	02(00)	08(04)	06(06)	16(10)
04	Functions	02(00)	08(00)	00(06)	10(06)
05	Arrays and Pointers	02(04)	06(04)	06(00)	14(08)
06	Structures and Unions	00(02)	04(04)	06(00)	10(06)
	Total	18(08)	34(20)	18 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	2	R	2	5/7
	6	R	2																
02	1	R	4	1	U	4	2	U	4	1	U	4	2	U	4				3/5
03	2	R	4	3	U	4	4	U	4	3	U	4	5	U	4				3/5
04	3	U	4	4	U	4	6	U	4	5	R	4	6	U	4				3/5
05	3	A	6	5	U	6	4	A	6										2/3
06	5	A	6	6	A	6	3	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing program and Drawing flow chart	20
2	Execution of program	20
3	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	3	2
2	-	3	-	-	-	-	-	-	-	-	3	2
3	-	3	-	-	-	-	-	-	-	-	3	-
4	-	3	2	2	-	-	-	2	2	2	3	-
5	-	3	2	2	-	-	-	2	2	2	3	-
6	-	3	2	2	-	-	-	2	2	2	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	-	3
2	-	3	-	-	-	-	-	-	-	-	-	3
3	-	3	-	-	-	-	-	-	-	-	-	3
4	-	3	2	2	-	-	-	2	2	2	-	3
5	-	3	2	2	-	-	-	2	2	2	-	3
6	-	3	2	2	-	-	-	2	2	2	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Programming in ANSI 'C'	E. Balagurusamy , Publication Mc graw Hill Education , 6th Edition,2012.	13 : 9781259004612
2.	Let us C	Yashwant Kanetkar BPB Publication , 13th Edition,2015.	13: 9788183331630

❖ E-REFERENCES:

- <http://www.computer-pdf.com/programming/c-cpp/284-c-programming-book.html> accessed on 30th March 2016
- <http://www.w3schools.org.in> accessed on 30th March 2016
- <http://www.cquestions.com/> accessed on 21st April 2016

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION

1. Computer (Dual Core or above)
2. Network printer.
3. TC/GCC compiler

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1.	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
2.	Dr. Mrs. A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
3	Mrs.V.A. Raje	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4	Ms. D.M. Shirke	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5	Ms. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
6	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
7	Prof. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
8	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: CM402E^s
COURSE TITLE	: OBJECT ORIENTED PROGRAMMING
PREREQUISITE	: CM401E
TEACHING SCHEME	: TH: 03; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (External)
PT	: 01 HRs

❖ RATIONALE:

Engineering students must be able to use basics of programming in real time environment. This course increases student's ability towards problem solving and logic development for real world problems. It also describes basics of programming using C++ programming language. C++ is the most commonly used object oriented language. It is very important course for understanding and acquires higher level knowledge in the field of software engineering and learning advanced object oriented languages.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Design the solutions for real world problems.
2. Select and apply appropriate statements, functions, and data structures available in C++, as required
3. Apply various concepts available in C++ to various defined problems.
4. Develop object oriented programs in C++.
5. Debug and test programs in C++.
6. Execute the programs in C++.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Fundamentals of programming	1. Define various OOP's basic concepts. 2. Differentiate between OOP and POP 3. Describe structure of C++ program.	1.1 Its need & requirement, Procedure Oriented Programming (POP) verses Object Oriented Programming (OOP), 1.2 Basic concepts of Object Oriented Programming, Object Oriented Languages, Applications of OOP. 1.3 Beginning with C++: What is C++? , keywords, variables, constants, basic data types, 1.4 Operators, scope resolution operator, memory management operators, console input/output, structure of C++ program.	6
2. Basic of Classes & Objects	1. Define classes and objects 2. Declare and define static data members, member functions 3. Write programs on classes and objects 4. Define friend function. 5. Develop programs on friend function.	2.1 Structures in C++. 2.2 Class & Object: Introduction, specifying a class, access specifiers, defining member functions, creating Objects, memory allocation for objects. 2.3 Array of Objects, Object as function arguments. 2.4 Static data members, static member function, friend Function	8
3. Constructor , Destructor, Inheritance	1. Define constructors and destructors. 2. Describe types of constructors. 3. Write programs based on constructors and destructors. 4. Define inheritance and state its types. 5. State visibility modes. 6. Develop program based on inheritance.	3.1 Concepts of Constructors, Types of constructors: Default, Parameterized, Copy. 3.2 Overloaded Constructors: Multiple Constructors in a Class, Constructors with default arguments. 3.3 Destructors. 3.4 Introduction to derived class, visibility modes & effects 3.5 Types of Inheritance : single, multilevel, multiple, hierarchical , hybrid 3.6 Constructors in derived class	12

4. Pointers in C++	1. Define pointer 2. Enlist pointer arithmetic statements 3. State pointer to array, string and objects. 4. Describe this pointer 5. Develop program over pointers.	4.1 Concepts of Pointer: Pointer declaration, Pointer operator, address operator, Pointer arithmetic. 4.2 Pointer to Array: Searching, Insertion, deletion 4.3 Pointer to String: Searching, finding length, comparisons, concatenation, reverse 4.4 Pointer to Object: Pointer to Object, this pointer, Pointer to derived class.	6
5. Polymorphism	1. Define polymorphism. 2. State types of polymorphism. 3. Describe Run time polymorphism. 4. Develop programs over polymorphism.	5.1 Introduction, Types of polymorphism: Compile time, Run time 5.2 Compile time Polymorphism: Function overloading, operator overloading: Overloading unary and binary operators, Rules for Operator overloading. 5.3 Run time polymorphism: Virtual functions, rules for virtual Functions, pure virtual function.	8
6. Working with files	1. Define various file operations 2. Describe various files opening modes 3. State movement of pointer throughout file 4. Develop program over files	6.1 Introduction 6.2 Classes for File Stream Operations 6.3 Opening and closing a file, detecting end of file 6.4 File Modes 6.5 File pointers and their manipulations 6.6 Sequential input and output operation 6.7 Updating a File: Random Access 6.8 Error handling during file operations 6.9 Command Line Arguments	8
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
Note: Perform all practical in Windows/LINUX environment			
1.	Develop & Execute two simple C++ programs based on object and classes.	Fundamental of programming	4
2	Develop & Execute two programs based on default argument concept in function.	Classes and objects,	2
3	Develop & Execute two programs based on function overloading.		2
4	Develop & Execute two programs on static member function.		2
5	Develop & Execute two programs using friend function		2
6	Develop two programs based on constructor, destructor and dynamic constructor.	Constructor and destructor	4
7	Develop & Execute two programs over constructor overloading		2
8	Develop & Execute five programs for all types inheritance	Inheritance	6
9	Develop & Execute a program to pass parameters from derived class constructor to base class constructor		2
10	Develop & Execute two programs to create a pointer for object and array of objects.	Pointer	2
11	Develop & Execute program for virtual function.		2
12	Develop & Execute two simple programs on unary operator overloading.	Polymorphism	4
13	Develop & Execute two simple programs on binary operator overloading.		4
14	Develop & Execute two simple programs to perform various operations over files	Working with files	4
15	Develop & Execute two simple programs to randomly access contents of file		2
16	Develop & Execute a simple program using command line argument		2
17	Develop & Execute Mini project based on above concepts		14
Skill Assessment			4
TOTAL			64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Fundamentals of programming	02(04)	04(00)	00(00)	06(04)
02	Basic of classes and objects	02(02)	04(04)	06(00)	12(06)
03	Constructor , Destructor and Inheritance	02(00)	08(04)	06(06)	16(10)
04	Pointers in C++	02(00)	08(08)	00(00)	10(08)
05	Polymorphism	04(00)	04(00)	06(06)	14(06)
06	Working with files	02(02)	04(04)	06(00)	12(06)
	Total	14(08)	32(20)	24 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	6	R	2	4	R	2	2	R	2	5/7
	6	R	2																
02	1	U	4	4	U	4	6	U	4	2	U	4	3	U	4				3/5
03	2	U	4	3	U	4	4	U	4	1	R	4	4	U	4				3/5
04	5	R	4	3	U	4	5	U	4	4	U	4	6	U	4				3/5
05	3	A	6	6	A	6	3	A	6										2/3
06	5	A	6	2	A	6	5	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing program for defined problem.	10
2	Draw flowchart for defined problem.	10
3	Execution of program	10
4	Viva voce	20
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	3	-
2	-	3	-	-	-	-	-	-	-	3	3	-
3	-	3	-	-	-	-	-	-	-	3	3	-
4	-	3	3	3	-	-	-	3	3	3	3	-
5	-	3	3	3	-	-	-	3	3	3	3	-
6	-	3	3	3	-	-	-	3	3	3	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	-	-	3	-	3
4	-	3	3	3	-	-	-	3	3	3	-	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1	Object oriented programming with c++	E. Balagurusamy , Mc Graw Hill Education , 4 th Edition, 2008	13: 9789383286508
2	Let us C++	Yashwant Kanetkar , BPB , 2 th Edition, 2003	13: 9788183331630
3	Object oriented programming in c++	Robert Lafore, SAMS, 4 th Edition, 2008	13: 9788131722824

❖ **E-REFERENCES:**

- www.cprogramming.com/tutorial/c++-tutorial.html Accessed on 14 sept. 2016
- www.tutorialspoint.com/cplusplus/cpp_tutorial.pdf Accessed on 14 sept. 2016
- www.tutorialspoint.com/cplusplus/cpp_pdf_version.htm Accessed on 14 sept. 2016
- <http://www.w3schools.org.in> Accessed on 14 sept. 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer (Dual Core or above)
2. Network printer.
3. TCP/GCC compiler

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
2	Dr. Mrs. A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
3	Mr.Lekhraj D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4	Ms.S. N. Chaudhary	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5	Ms.G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
6	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
7	Prof. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
8	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: PROFFESIONAL COURSES
COURSE CODE	: CM403E ^{\$}
COURSE TITLE	: DATA STRUCTURES
PREREQUISITE	: CM401E
TEACHING SCHEME:	TH: 03; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT =2 CLOCK HR.)
TH. TEE EXAM	: 03 Hrs
PR. TEE EXAM	: 02 Hrs (External)
PT. EXAM	: 01 Hr

❖ RATIONALE:

In the present era it is very essential to develop programs and organize data in such a way that it solves a complex problem efficiently. Data structure is such a tool, which aims in developing data organizing and programming skills.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Apply the features and concepts of data structures.
2. Select proper data structures as per the need of applications.
3. Design algorithms for various operations performed on different data structures.
4. Design the programs using different data structures.
5. Debug and execute the programs.
6. Develop efficient software using various data structures

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Introduction to data structure	1. Define the related terms. 2. State the needs of data structure. 3. List different types of data structure. 4. Compare different data structure.	1.1 Definition of data structure. Basic Terminology, Elementary Data Organization Data structure operations 1.2 Need of data structure. 1.3 Types of data structure: Arrays, Stack, Queue, Linked List, Trees & Graphs	02
2. Stack & recursion	1. Define searching & sorting. 2. List types of searching & sorting techniques. 3. Define Stack. 4. State the operations on stack. 5. Describe the representation of stack in C. 6. Construct different types of polish expression. 7. Enlist the applications of stack. 8. Describe recursion in C. 9. Design & develop programs using recursion. 10. List the use of stack in recursion.	2.1 Searching – Linear Search & Binary Search and Sorting– Selection, Bubble, Insertion, Merge, Radix 2.2 Stack–Introduction Definition, basic terminologies, Examples 2.3 Operation on Stack :- Push and Pop operation, Algorithm for push and pop operation 2.4 Representation of Stack in C Array representation and Linked representation of stack 2.5 Polish Notation:- Infix, Postfix, Prefix Notation, Evaluation of Postfix and prefix expression, Conversion of infix to postfix Expression, Conversion of prefix to postfix expression 2.6 Application of stack 2.7 Recursion in C Definition, Programs based on Recursion 2.8 Implementation of Recursion using Stack 2.9 Implementation of Tower Of Hanoi problem using Stack	12
3. Queue	1. Describe the representation of Queue. 2. State the operations of queue. 3. Compare the circular and double ended queue. 4. Develop the programs based on queue .	3.1 Representation of Queue Array representation and linked representation of queue 3.2 Operation on Queue:- Special terminology for inserting and deleting operation ,Algorithm for inserting and deleting	10

		operation 3.3 Implementation of Queue in C 3.4 Circular Queue:- Insert and delete operation on circular queue, Advantages of Circular queue 3.5 Double Ended Queue	
4. Linked list	1. Describe the concept of linked list. 2. Describe the use of different functions for dynamic memory allocation. 3. Illustrate the implementation of singly linked list. 4. State the various operations performed on linked list. 5. Design the program for searching, Adding and deleting a node from linked list, counting number of nodes.	4.1 Introduction – Dynamic memory Allocation 4.2 Singly Linked List – Implementation 4.3 Searching operation 4.4 Creating Sorted Linked List 4.5 Adding & deleting a node from different position 4.6 Counting number of nodes in a Linked List 4.7 Reversing a Linked List	08
5. Tree	1. Describe the concepts of tree 2. Define the binary tree 3. State the binary tree Representation 4. Describe the binary tree traversal 5. Design Algorithms for different Tree Traversal 6. Define binary search tree 7. State the use of operations like searching ,adding, deleting node from BST 8. State the use of Heap sort	5.1 Introduction 5.2 Binary Tree 5.3 Binary tree representation 5.4 Binary tree traversal 5.5 Algorithms for In-order Traversal , Pre- order Traversal, Post-order Traversal 5.6 Binary tree with header node 5.7 Binary Search Tree 5.8 Searching a node in a BST 5.9 Adding a new node in BST 5.10 Deleting a node from BST 5.11 Heap Sort	10
6. Graph & their application	1. Describe the concepts of Graph 2. Define different terminology used in graph 3. State the use of Adjacency Matrix ,Pathmatrix Warshall's Algorithm 4. Describe different traversal method in graphs 5. Define the automatic list Management	6.1 Introduction 6.2 Different terminology used in Graph 6.3 Sequential representation of Graph 6.4 Adjacency Matrix , path Matrix 6.5 Warshall's Algorithm 6.6 Linked representation of Graph 6.7 Traversal used for Graph 6.8 Automatic List Management 6.9 Dynamic memory Management	6

	6. State and describe the dynamic memory management 7. Design Algorithms for different graph Traversal		
Total Hrs			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Develop and execute a program for Linear search	Stack and Recursion	2
2	Develop and execute a program for Binary search		2
3	Develop and execute a program for Selection sort		2
4	Develop and execute a program for Bubble sort		2
5	Develop and execute a program for Insertion sort		2
6	Develop and execute a program for Merge sort		2
7	Develop and execute a program for Radix sort		2
8	Develop and execute a program to implement a stack		4
9	Develop and execute a program for Implementation of Recursion using Stack		4
10	Develop and execute a program to convert a expression into post fix expression.	Queue	4
11	Develop and execute a program for implementation of Queue		2
12	Develop and execute a program for Implementation of Tower Of Hanoi problem using Queue		4
13	Develop and execute a program to evaluate postfix expressions		4
14	Develop and execute a program to create sorted link list.	Linked list	4
15	Develop and execute a program for inserting and deleting a node from a sorted link list.		2
16	Develop and execute a program for counting number of nodes and reverting a link list		2
17	Develop and execute a program for searching a node in binary tree.	Trees	4
18	Develop and execute a program for inserting and deleting a node from Binary tree		4
19	Develop and execute a program for traversal of graph	Graphs & their application	4
20	Develop and execute a program using the dynamic memory allocation functions		4
Skill Assessment			4
Total Hrs			64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction to Data structures	02(02)	04(00)	00(00)	06(02)
02	Stack and Recursion	00(02)	08(04)	06(00)	14(06)
03	Queue	02(00)	08(08)	06(00)	16(08)
04	Linked list	02(00)	04(04)	06(06)	12(10)
05	Trees	02(00)	04(08)	06(00)	12(08)
06	Graph & their application	02(00)	08(00)	00(06)	10 (06)
	Total	10(04)	36(24)	24 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	3	R	2	4	R	2	5	R	2	6	R	2	1	R	2	5/7
	2	R	2																
02	1	U	4	2	U	4	2	U	4	3	U	4	2	U	4				3/5
03	3	U	4	3	U	4	4	U	4	3	U	4	4	U	4				3/5
04	5	U	4	6	U	4	6	U	4	5	U	4	5	U	4				3/5
05	2	A	6	3	A	6	4	A	6										2/3
06	4	A	6	5	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing the steps for algorithm and designing the program	20
2	Performance	20
3	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes (COs)	Program Outcomes (POs)										PSO's	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	3	-
2	-	3	-	-	-	-	-	-	-	-	3	-
3	-	3	-	-	-	-	-	-	-	-	3	2
4	-	3	3	3	-	-	-	3	3	3	3	-
5	-	3	3	3	-	-	-	3	3	3	3	-
6	-	3	3	3	-	-	-	3	3	3	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes (COs)	Program Outcomes (POs)										PSO's	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	-	3
2	-	3	-	-	-	-	-	-	-	-	-	3
3	-	3	-	-	-	-	-	-	-	-	-	3
4	-	3	3	3	-	-	-	3	3	3	-	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Data Structures in 'C'	Tanenbaum, Langsman, Augenstein Pearson Education, 2003	10: 8131702294 13: 978-8131702291
2.	Introduction to Data Structure: With applications	Jean Paul Tremblay, Paul Gordon Sorenson, International Student Edition ,1983	10:0070651574 13:9780070651579
3.	Data Structures with C	Seymour Lipschutz, Schaum's Outline Series, 2010	10: 0070701989 13: 978-0070701984

❖ E-REFERENCES:

<http://nptel.ac.in/courses/106102064/>, accessed on 02nd September 2016

<http://www.old.w3professors.com/Pages/Courses/Data-Structure/Algorithms/Data-Structure-Algorithm.html> accessed on 02nd September 2016

<https://www.youtube.com/watch?v=92S4zgXN17o>, accessed on 02nd September 2016

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION

1. Computer (Dual CORE and above) with Internet connection.
2. Network printer.
3. Office Suite
4. C compiler

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1	Mr.S.P.Lambhade	HOD ,Computer Engineering	Government Polytechnic, Nagpur.
2	Dr.A.R.Mahajan	HOD ,Information Technology	Government Polytechnic, Nagpur.
3	Ms. D.M.Shirkey	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4	Prof.V.A.Raje	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
6.	Prof. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
7	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: PROFESIONAL COURSES
COURSE CODE	: CM404E ^s
COURSE TITLE	: OPERATING SYSTEMS
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT =1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (External)
PT.	: 01 HR

❖ RATIONALE:

The course provides the students with an understanding of the basic concepts of operating system and its working. Operating Systems are very essential components of the Computers. It is the interface between the user and the computer system. It is the first piece of software to run on a computer system when it is booted. Its job is to co-ordinate and provides services for the execution of application software. This is core technology subject and the knowledge of which is absolutely essential for Computer Engineers .It familiarizes the students with the concepts and functions of operating system. This subject provides knowledge to develop systems using advanced operating system concepts.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

- 1 Implement the functions of operating systems and the system calls.
- 2 Apply techniques of memory management and file system management.
- 3 Analyse various algorithms based on CPU scheduling, memory management and deadlock.
- 4 Execute the algorithms for Schedulers, Inter-process communications.
- 5 Perform Memory Management techniques.
- 6 Implement the file system and security concerns.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Introduction to Operating System	1. Define various terms related to Operating system 2. State the organization and architecture of OS 3. List various operations of OS and describe their working. 4. List types of system calls 5. Compare various operating systems.	1.1 Introduction to Operating System - Organization , Architecture, Operations 1.2 Process , Memory , Storage Management 1.3 Special-Purpose Systems, Computing Environments, Open-Source Operating Systems. 1.4 System Calls, Types of System Calls 1.5 System Programs, Operating-System Structure	6
2. Process Management	1. Describe process scheduling. 2. State various operations on processes. 3. Define Inter process Communication 4. Define thread. 5. Compare multithreading and it's various models. 6. Calculate average waiting time. 7. Evaluate the scheduling algorithms	2.1 Process Concept, Process Scheduling, Operations on Processes 2.2 Inter process Communication 2.3 Threads, multithreading model 2.4 Basic Concepts, Scheduling Criteria. Scheduling Algorithms, Algorithm evaluation	9
3. Process Synchronization	1. Define Race condition 2. Define Semaphore. 3. Describe Critical-Section Problem. 4. State the solution for Critical-Section Problem 5. State various problems of synchronization	3.1 The Critical-Section Problem 3.2 Peterson's Solution, Synchronization Hardware 3.3 Semaphores, Classic Problems of Synchronization	6
4. Deadlocks	1. Define related terms. 2. Identify deadlocks. 3. Describe resource allocation graph. 4. Find safe state. 5. State provision for recovery from deadlock.	4.1 System Model, Deadlock Characterization 4.2 Methods for Handling Deadlocks 4.3 Deadlock Prevention, Deadlock Avoidance 4.4 Deadlock Detection, Recovery from Deadlock	8
5. Memory Management	1. Define related terms . 2. Describe swapping. 3. Describe Paging, Paging table.	5.1 Main Memory: Background , Swapping 5.2 Contiguous Memory Allocation 5.3 Paging, Structure of the Page	10

	4. State various operations on segment table. 5. Apply Page replacement policy for solving virtual memory problem. 6. Describe thrashing	Table 5.4 Segmentation 5.5 Virtual Memory: Background, Demand Paging, Copy on Write, Page Replacement. Allocation of frames, Trashing. 5.6 Memory Mapped Files	
6. File System and Security	1. Define related terms 2. Describe related terms. 3. Describe File system 4. List various goals of protection. 5. Compare access matrix, access control 6. Describe security problem.	6.1 File-System Interface: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing, Protection 6.2 File-System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management 6.3 Protection: Goals of Protection, Principles of Protection, Domain of Protection 6.4 Access Matrix, Implementation of Access Matrix, Access Control 6.5 Security: The Security Problem, Program Threats, System and Network Threats	09
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Execute the Disk Operating System (DOS) commands	Introduction to Operating System	2
2.	Install and configure Windows 9x, Windows NT, Windows 2000 & Windows XP Operating Systems.		4
3.	Execute the LINUX Commands - man, apropos, clear, ls, mkdir, cd, rmdir, pwd, rm, touch, mv, tr, wc, sort, grep, wall, write, who, chmod, useradd, usermod, kill, ssh, ftp, telnet		2
4.	Develop, debug and Execute a C program to simulate the FCFS CPU scheduling algorithms to find turnaround time and waiting time.	Process Management	2
5.	Develop, debug and Execute a C program to simulate the SJF CPU scheduling algorithms to find turnaround time and waiting time.		2
6.	Develop, debug and Execute a C program to simulate the Round Robin CPU scheduling algorithms to find turnaround time and waiting time.		2
7.	Develop, debug and Execute a C program to simulate the priority CPU scheduling algorithms to find turnaround time and waiting time.		2
8.	Develop, debug and Execute a C program to simulate producer-consumer problem using semaphores.	Process Synchronization	4
9.	Develop, debug and Execute a C program to simulate FIFO page replacement algorithms	Memory Management	2
10.	Develop, debug and Execute a C program to simulate LRU page replacement algorithms		2
11.	Develop, debug and Execute a C program to simulate Optimal page replacement algorithms		2
12.	Develop, debug and Execute a C program to simulate LFU page replacement algorithms		2
13.	Develop, debug and Execute a C program to simulate the following contiguous memory allocation techniques a) Worst-fit b) Best-fit c) First-fit		2
Skill Assessment			2
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1.	Introduction to Operating System	04(02)	04(00)	00(00)	08(02)
2.	Process Management	06(02)	04(04)	06(04)	16(10)
3.	Process Synchronization	02(00)	06(04)	00(00)	08(04)
4.	Deadlocks	02(00)	04(04)	06(00)	12(04)
5.	Memory Management	02(04)	08(00)	06(06)	16(10)
6.	File System and Security	02(06)	04(04)	04(00)	10(10)
	Total	18(14)	30(16)	22 (10)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	1	R	2	5/7
	2	R	2																
02	1	U	4	6	A	4	2	U	4	3	U	4	4	U	4				3/5
03	2	R	4	4	U	4	6	U	4	2	A	4	5	R	4				3/5
04	5	U	4	5	U	4	1	R	4	2	U	4	6	U	4				3/5
05	2	A	6	4	A	6	5	A	6										2/3
06	3	U	6	5	A	6	6	R	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing flow chart	10
2	Writing program	10
3	Debug the program	10
4	Execution of program	10
5	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	-
2	-	3	-	3	-	-	-	-	-	3	3	-
3	-	3	-	3	-	-	-	3	3	3	-	-
4	-	3	2	3	-	-	-	3	3	3	3	-
5	-	3	2	3	-	-	-	3	3	3	3	-
6	-	3	2	3	1	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	-
2	-	3	-	3	-	-	-	-	-	3	-	-
3	-	3	-	3	-	-	-	3	3	3	-	-
4	-	3	2	3	-	-	-	3	3	3	-	2
5	-	3	2	3	-	-	-	3	3	3	-	2
6	-	3	2	3	1	-	-	3	3	3	-	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Operating System Concepts	Abraham, Silberschatz , Greg Gagne , Peter B. Galvin, Wiley India, 9 th Edition, 2012	13: 9788126520510
2.	Operating Systems: Internals and Design Principles	William Stallings. Pearson 8 th Edition, 2014	13:9780133805918
3.	Operating System	Achyut Godbole, Atul Kahate, Tata McGraw Hill Education, 3 rd Edition, 2005	13:9780070702035
4.	Operating System Concepts	EktaWalia, Khanna Publishers, 2 nd Edition, 2015	13:9789380016658

❖ **E-REFERENCES:**

<http://nptel.ac.in/courses/106108101/>, accessed on 21st August 2016

https://onlinecourses.nptel.ac.in/noc16_cs10, accessed on 21st August 2016

<https://www.youtube.com/watch?v=MaA0vFKt-ew>, accessed on 21st August 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

NIL

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. Mrs. A R Mahajan	Head, Information Technology	Government Polytechnic, Nagpur.
2	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
3.	Shri R L Meshram	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4	Shri L D Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
5	Shri. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
6	Shri. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
7	Shri. Manoj Jethawa	HOD Computer Science	ShriDattaMeghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: CM406E ^s
COURSE TITLE	: RELATIONAL DATABASE MANAGEMNT SYSTEM
PREREQUISITE	: NIL
TEACHING SCHEME:	TH: 03; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
THEEE EXAM	: 03 HRS
PR.EEE EXAM	: 02 HRS (External)
PT EXAM	: 01 HRS

❖ RATIONALE:

Database Management Systems (DBMS) are vital components of modern information systems. The course focuses on the fundamentals of knowledge base and relational database management systems. In this course the relational data model, relational query languages, relational database design are reviewed. The students will have theoretical foundation required for working with different types of relational database products, such as ORACLE.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Design database by using different models.
2. Design the normalized relational database for any given system, apply locks and partitions.
3. Identify basic keys in the designed database & apply different constraints.
4. Create, update and administer a relational database.
5. Retrieve data from database by using different clauses, operators & functions etc.
6. Write PL/SQL block, procedures, functions and exceptions.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Database System Concept	1. Define database and different Database terms. 2. Compare old file processing system and DBMS. 3. State the importance of DBMS tools. 4. Describe the overall structure & components of DBMS 5. Describe architecture of Client/ Server system. 6. State codd's law. 7. State the different functions of DBA. 8. Describe different types of users.	1.1 An Introduction to database. Data, database, DBMS, Disadvantages of file processing system, and advantages of DBMS over file processing system, Application of database. 1.2 What is RDBMS, Difference between DBMS and RDBMS, Names of various DBMS and RDBMS software 1.3 Data abstraction, Instance and schema, Data independence - Logical and Physical Independence, Data abstraction levels. 1.4 Components of DBMS and overall Structure of DBMS. Database Users, functions of Database Administrator. 1.5 Introduction to client server architecture. Two/Three tier Architecture. 1.6 The 12 Rules (Codd's laws) for fully functional RDBMS.	06
2. Relational Data Model, Security and Integrity Specification	1. Define different terms related to relational model. 2. Design E-R Model for given system. 3. State use of different components of ER Model. 4. State use of various data constraints. 5. State the need of data security. 6. Compare different data model. 7. Apply different constraints. 8. Design database by Using various data models.	2.1 Data Model: Structure of: Network Model, Hierarchical Model, Relational Model 2.2 Relational Model - Basic Concepts, Entity, Attributes, Tuple and Domains. Key Concepts-Primary key, Super key, Alternate key, Candidate key, Composite key and Foreign key. 2.3 E-R model- Components of ER Model, Types of attributes, weak & strong entity set. 2.4 Integrity Constraints: Domain Integrity Constraints, Entity integrity Constraints & Referential Integrity Constraints, on delete cascade. 2.5 Database Security: introduction, Data security requirements,	05

		authorization.	
3. Relational Database Design, Storage & File System	1. Describe the process of Normalization. 2. Apply various Normal forms to reduce or remove data redundancy. 3. Define different terms related to normalization. 4. State different techniques of record organization. 5. Define functional dependency and its types. 6. State properties of FD. 7. Apply different types of indexes on table data.	3.1 Introduction: Purpose of normalization, Data Redundancy, update anomalies, decomposition properties, Functional dependency (FD), Classification of Functional dependency, properties of FD. 3.2 Normalization using: 1NF, 2NF, 3NF and BCNF. Multi-valued dependencies. 3.3 File organization, organization of records in files. Basic concept of indexing & hashing, Index Types.	08
4. SQL and Database Languages	1. Design SQL queries to create Relational database and apply data constraints 2. State various DML commands. 3. Apply various operators & functions to retrieve data from database. 4. State the use of NULL value. 5. State the use of nested query, different types of join to retrieve data from more than one object. 6. Apply appropriate clauses to retrieve data. 7. Write relational algebra expression to retrieve data from database. 8. Translate relational algebra expression into relation calculus expression.	4.1 Data Types in SQL 4.2 Components of SQL: DDL- create alter rename drop, truncate, DESC, Use of constraints, DML- insert, update, delete, select TCL begin transaction, commit, rollback, save-point DCL- Grant & Revoke 4.3 Clauses: select, from, where, group by, having and order by 4.4 Operators: Arithmetic, relational, set, comparison, Functions: Aggregate, string, date-time & conversion functions. 4.5 Null Value, sub-query, Nested Sub-queries, break, compute command & compute functions. 4.6 Join Concept, types of join- Natural Join, Self join, Outer join types- left, right & Full outer join, View 4.7 Indexes: Creating Indexes, Dropping Indexes. 4.8 Creating users, locks and partitions, Sequences: Creating Sequences, Altering Sequences and Dropping Sequences. 4.9 Database languages-Procedure oriented- Relational algebra, Non-procedure oriented – Relational Calculus (Tuple and Domain calculus)	14

5. PL/SQL	1. State the features and components of the PL/SQL. 2. Write simple PL/SQL Code using control structure and handle various exceptions. 3. Create stored procedures and implement functions. 4. State the difference between simple PL/SQL program and same with cursor. 5. Create different cursor to store more than one record. 6. Design package to store different procedure and functions. 7. Plan database trigger. 8. Create database trigger using PL/SQL.	5.1 Introduction of PL/SQL, Advantages of PL/SQL ,The PL/SQL Block Structure, PL/SQL execution environment, PL/SQL data Types, Variables, Constants 5.2 Control Structure: Conditional Control, Iterative Control, Sequential Control. 5.3 Exception handling: Predefined Exception, User defined Exception. 5.4 Cursors: Implicit and Explicit Cursors, Declaring, Opening and Closing a Cursor, Fetching a Record from Cursor, Cursor for loops, Parameterized Cursors. 5.5 Procedures: Advantages, Creating, Executing and Deleting a Stored procedure. 5.6 Functions: Advantages, Creating & Deleting a Function, use of Package 5.7 Database Triggers: Use of Database Triggers, Types of Triggers, Syntax for Creating Trigger, Deleting Trigger.	10
6. Query Processing, Deadlock & Introduction to Warehousing	1. Define transaction. 2. Describe different States of Transaction. 3. Enlist and describe Transaction properties. 4. Describe the process of transaction evaluation. 5. Write equivalent expression for different operation. 6. Define serializability. 7. State use of different protocols. 8. State different functions used in data warehousing.	6.1 Query processing strategy, equivalence expression for selection & join operation. 6.2 Transaction Processing: The concept of Transaction, Definition in SQL, Transaction properties, States of Transaction, Concurrent execution of multiple transaction, Serializability, Recoverability. 6.3 Lock Based Protocols: share & Exclusive, 2 phase locking, time stamp based, validation based & Multiple Granularity 6.4 Deadlock Handling, prevention, detection & recovery 6.5 Introduction to Data Mining & Data Warehousing, functions used in Data Mining and Data Warehousing.	05
Total Hours			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Design database by using Network Model, Hierarchical Model, Relational Model & E-R Model.	Relational Data Model, Security and Integrity Specification	02
2	Identify Entity, Attributes, Tuple, Domains & prime keys available in above created model.		02
3	Design a Normalized Database. Identify available dependencies in created database. Identify types of used normal form.	Relational Database Design, Storage & File System	02
4	Create & Execute DDL commands in SQL & Apply various Integrity constraints on above created table.	SQL and Database Languages	04
5	Create & Execute DML commands in SQL.		04
6	Write Queries using various operators Arithmetic, Set operator, Relational operator and Comparison Operator to retrieve data.		04
7	Use different Aggregate functions, String functions, Date-time functions, Data Conversion functions such as To char(), To Number() and To date(). Also display special date formats using To char() function.		04
8	a. Write sub query & Nested Sub queries to retrieve data from more than one table. b. Use break & compute command, apply different compute functions.		04
9	Execute Queries using the Select Command with Where, Having, Group by and order by clauses.		02
10	Execute the queries for implementation of Inner, Outer and Cross Join.		04
11	Execute DCL and TCL commands in SQL		02
12	Create Views. Retrieve data from view by using all six clauses.		02
13	Create table with four partitions for any database.		02
14	Write the basic PL/SQL Programs. Write a PL/SQL programs using control statements.	PL/SQL	02
15	Write PL/SQL Programs using Iterative Control statements.		04
16	Write a PL/SQL code to implement implicit and explicit cursors.		04
17	Write PL/SQL Programs based on Exceptions handling.(Predefined and user-defined exceptions)		02
18	Write PL/SQL code for creating Procedures, functions and package.		02
19	Create database triggers. Use DML operations to fire created trigger.		02
20	Mini project (based on any application)		06
Skill Assessment			04
Total Hrs			64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Database System Concept	02(00)	04(04)	00(00)	06(04)
02	Relational Data Model, Security and Integrity Specification	02(00)	08(04)	00(00)	10(04)
03	Relational Database Design, Storage & File System	02(02)	04(04)	06(00)	12(06)
04	SQL and Database Languages	02(00)	08(04)	12(06)	22(10)
05	PL/SQL	00(02)	08(04)	06(06)	14(12)
06	Query Processing, deadlock & Introduction to warehousing	02(00)	04(04)	00(00)	06(04)
	Total	10(04)	36(24)	24 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	4	R	2	6	R	2	3	R	2	5/7
	5	R	2																
02	1	U	4	2	U	4	2	U	4	2	U	4	1	U	4				3/5
03	3	U	4	4	U	4	4	U	4	3	U	4	4	U	4				3/5
04	5	U	4	5	U	4	6	U	4	5	U	4	6	U	4				3/5
05	3	A	6	4	A	6	4	A	6										2/3
06	4	A	6	5	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Design normalized database, apply proper constraints, make use of operators etc.	20
2	Performance	10
3	Selection of proper clauses and functions, writing PL/SQL programs to retrieve data etc.	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**❖ **Computer Engineering :-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	1	-	-	-	-	3	3	3
2	-	3	-	-	-	-	-	-	-	3	3	3
3	-	3	-	-	-	-	-	-	-	3	3	3
4	-	3	3	3	-	-	-	3	3	3	3	3
5	-	3	3	3	-	-	-	3	3	3	3	3
6	-	3	3	3	-	-	-	3	3	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **Information Technology :-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	1	-	-	-	-	3	1	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	-	-	3	-	3
4	-	3	3	3	-	-	-	3	3	3	1	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Database System Concepts	Abraham Silberschatz, Henry F. Korth And S. Sudarshan, Mcgraw hill Education, 6 th Edition, 2013	9789332901384
2.	Introduction to Database Management Systems	2006 ISRD Group, Tata McGraw Hill Education, 2005.	9780070591196
3.	An Introduction to Database System	Bipin Desai, West Publishing Company, 1997	13: 9780314667717
4.	Database Systems The Complete Book	Hector Garcia-Molina Jeffrey D.Ullman Jennifer Widom, Pearson Education Inc, 2,2002	0-13-606701-8 978-0-13-606701-6

❖ **E-REFERENCES:**

- <http://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm> , assessed on 29th July 2016
- <http://www.studytonight.com/dbms/rdbms-concept.php>, assessed on 29th July 2016
- <https://www.youtube.com/watch?v=0mn7wIAdu98>, assessed on 29th July 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Personal Computer with Operating system (XP, Windows etc)
2. Open Source Database Tools (Oracle/ Mysql)

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S. P. Lambhade	HOD, Computer Engineering	Government Polytechnic, Nagpur.
2	Dr. Mrs. A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
3	Ms. S. N. Chaudhari	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4	Ms. D. M. Shirkey	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5	Ms. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
6	Prof. Manoj Jethawa	HOD Computer Science	Shri. Datta Meghe Polytechnic, Nagpur
7	Prof. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongari, Nagpur
8	Mr. Atul Upadhyay	CEO	Vista Computers, Ram Nagar, Nagur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM / IT
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: CM407E
COURSE TITLE	: MICROPROCESSORS
PREREQUISITE	: EC310E
TEACHING SCHEME	: TH:03;TU:00;PR:02(CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 2 PR CREDIT = 1 CLOCK HR.)
THEORY TEE	: 03 HRs
PRACTICAL TEE	: 02 HRs (Internal)
PT EXAM	: 01 HR

❖ **RATIONALE:**

Microprocessor is brain of computer. Intel family is widely used all over the world. 8085 is the 8-bit CPU and 8086 is the 16-bit CPU. 8086 is the base of all upward developed processors. It is more powerful and efficient computing machine. It overcomes all major limitations of the previous processors. It is able to get interfaced with 8-bit, 16-bit systems. This subject covers Basics of 8085, architecture of 8086 along instruction set. It also covers assembly language programming with effective use of procedure and macros. This will act as base for the advanced assembly language programming for next generation microprocessors.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Apply the fundamentals of assembly language programming in developing microprocessor based applications.
2. Develop assembly language program for interfacing various peripheral devices.
3. Identify and illustrate the need of advance microprocessors
4. Develop and execute programs in 8086 assembly language.
5. Design the hardware and software necessary to realize a project idea.
6. Interface external devices to the processor according to user requirements to create novel products and solutions for real life problems.

❖ **COURSE DETAILS:****A. THEORY:**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
01.8-Bit Microprocessor	1. Describe the evolution of microprocessors. 2. Enlist the features of 8085. 3. Describe the architecture of 8085. 4. Illustrate the 8085 flag register. 5. Illustrate how the control and status signals can be separated.	1.1. Evolution of microprocessors 1.2. 8085 bus structure 1.3. Salient features of 8085 microprocessor 1.4. Architecture of 8085 microprocessor 1.5. 8085 pin diagram 1.6. Control & status signals 1.7. Separation of control signals 1.8. 8085 flags 1.9. Limitations of 8-bit microprocessors	06
02. 16-Bit Microprocessor 8086	1. Enlist the features of 8086 microprocessor. 2. Describe the architecture of 8086. 3. Enlist and specify the buses in 8086. 4. Describe the 8086 minimum/maximum system configuration. 5. Illustrate how memory addresses are generated. 6. Illustrate the pipelining Process. 7. Generate the memory address for interfacing a block of memory to 8086.	2.1 Features of 8086 microprocessor 2.2 Register organization of 8086 microprocessor 2.3 8086 architecture 2.4 Signal descriptions of 8086 2.5 General Bus operation 2.6 I/O addressing capability 2.7 Minimum mode 8086 system 2.8 Maximum mode 8086 system 2.9 Concepts of pipelining, memory segmentation and memory address generation.	10
03.8086 Assembly Language Programming	1. Identify the addressing mode of a particular instruction. 2. Select a particular instruction for a specified action. 3. Develop basic programs for 8086 microprocessor. 4. Illustrate different types of microprocessor instructions with suitable example programs 5. Develop and execute a program to perform	3.1 Machine language instruction formats 3.2 Addressing modes of 8086 3.3 8086 Instruction set 3.4 Assembler directives and operators 3.5 Simple programs based on instruction set 3.6 Assembly Language Programming tools- Editor, Assembler, Linker, Debugger. 3.7 Program development steps: • Defining problem • Algorithms	10

	arithmetic operations.	- Flowchart - Initialization checklist - Choosing instructions - Converting algorithm to ALP 3.8 Programming using assembler	
04.Interrupts, Procedures & Macro	- Describe the operation of stack and its significance. - Classify interrupts. - Illustrate the use of interrupts with suitable programs. - Describe various maskable and non-maskable interrupts. - Describe the CALL procedure. - Describe Macros. - the use of procedures and macros with suitable example programs. - Develop and execute a program for transferring a block of data using stack. - Develop and execute a program making use of non-maskable interrupts.	- Introduction to stack - Stack structure of 8086 - Interrupts and Interrupt Service Routine - Interrupt cycle of 8086 - Non-maskable interrupts - Maskable Interrupt (INTR) - Software interrupts - Defining Procedure (Directives used, FAR and NEAR, CALL and RET instructions) - Nested, Reentrant & Recursive procedures - Defining and calling a Macro without parameters, Passing parameters to macros - Assembly language programs using procedures and macros.	8
05.System Interfacing	- Describe I/O mapping and memory mapping. - Illustrate the odd and even bank memory concept. - Describe the interfacing of 8255 PPI with 8086 microprocessor. - Describe the interfacing of ADC 0808 with 8086 microprocessor. - Describe the interfacing of DAC 0800 with 8086 microprocessor - Develop and execute a program to interface ADC for converting a signal from analog to digital.	- Memory interfacing techniques (I/O mapped I/O, Memory mapped I/O, Comparison of both) - Even and Odd bank concept - Memory Interfacing - RAM, ROM - Interfacing Input/ Output (I/O) ports 8255 Programmable Peripheral Interface – Configuration, Operation Modes, Interfacing 8255 with 8086 microprocessor - Interfacing of Analog to Digital converter - Interfacing of Digital to Analog converter	8
06.32-Bit Microprocessors	- State the features of advance microprocessors 80286, 80386, 80486, 80586. - Compare advance	- Salient features of 80286 microprocessor - Salient features of 80386 microprocessor - Salient features of 80486	06

	microprocessors. 3. State the need of higher processors.	6.4 Comparison of various microprocessors 6.5 Introduction to Pentium processors.	
Total Hrs			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Develop and execute an Assembly Language Program (ALP) to add / subtract two 16 bit numbers	8086 Assembly Language Programming	2
2	Develop and execute an ALP to find sum of series of numbers.		2
3	Develop and execute an ALP to multiply two 16 bit unsigned/ signed numbers. OR Develop and execute an ALP to divide two unsigned/ signed numbers (32/16, 16/8, 16/16, 8/8).		4
4	Develop and execute an ALP to find smallest/ largest number from array of n numbers. OR Develop and execute an ALP to arrange numbers in array in ascending/ descending order.		4
5	Develop and execute an ALP to perform block transfer data using string instructions / without using string instructions.		4
6	Develop and execute an ALP to compare two strings using string instructions / without using string instructions. OR Develop and execute an ALP to display string in reverse order, string length, Concatenation of two strings.		2
7	Determine digital equivalent of a analog signal by interfacing ADC with 8086 microprocessor.	System Interfacing	2
8	Generate a square wave, ramp wave by interfacing a DAC with IC8255 to 8086 microprocessor		2
9	Develop and execute an ALP to interface a stepper motor to 8086 microprocessor and rotate it in clockwise and anticlockwise direction.		2
10	Design and Prepare mini project based on any one application of 8086 microprocessor.	Mini-Project	6
Skill Assessment			2
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	8-Bit Microprocessor	04(00)	04(04)	00(00)	08(04)
02	16-Bit microprocessor 8086	02(00)	04(04)	08(04)	14(08)
03	8086 assembly language programming	02(00)	08(04)	06(06)	16(10)
04	Interrupts, Procedure & Macro	00(02)	08(00)	06(06)	14(08)
05	System Interfacing	02(02)	04(04)	06(00)	12(06)
06	32-bit microprocessors	00(00)	06(04)	00(00)	06(04)
Total		10(04)	34(20)	26(16)	70(40)
Total Marks					70(40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	2	R	2	3	R	2	5	R	2	4	R	2	5/7
	5	R	2																
02	1	U	4	2	U	4	3	U	4	1	U	4	2	U	4				3/5
03	3	U	4	4	U	4	5	U	4	2	A	4	3	U	4				3/5
04	2	A	4	2	A	4	4	U	4	5	U	4	6	U	4				3/5
05	3	A	6	4	A	6	3	A	6										2/3
06	5	A	6	6	U	6	4	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, selection of equipment's. writing procedure etc.	10
2	Performance	20
3	Calculation, Result, Drawing Graphs(if any	10
5	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	3	-
2	-	3	-	-	-	-	-	-	-	3	3	-
3	-	3	-	-	-	-	-	-	-	3	3	-
4	-	3	3	3	-	-	-	3	3	3	3	-
5	-	3	3	3	-	-	-	3	3	3	3	-
6	-	3	3	3	-	-	-	3	3	3	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2.Information Technology :-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	-	-	3	-	3
4	-	3	3	3	-	-	-	3	3	3	-	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Microprocessor and Interfacing (Programming and hardware)	Douglas V. Hall, Tata McGraw Hill, Second Edition, 1974	978007601673
2.	Advanced microprocessor & peripherals	A.K. Ray & K.M. Bhurchandi, Tata McGraw Hill, Second Edition, 2009	0070606587
3.	Microprocessor Architecture programming & applications with 8085	Ramesh A. Gaonkar, Penram International, Fourth Edition, 1999	0139012578
4.	Advance Microprocessor and interfacing	Badri Ram, Tata McGraw-Hill Education, 12 th Reprint, 2001	0070434484, 9780070434486

❖ E-REFERENCES:

1. www.electronics.dit.ie/staff/tscarff/8086_instruction_set/8086_instruction_set.html , assessed on 30th August, 2016
2. <http://ece425web.groups.et.byu.net/stable/labs/8086Assembly.html> , assessed on 30th August, 2016
3. [nptel.ac.in>pdf>Teacher_Slides>mod1](http://nptel.ac.in/pdf/Teacher_Slides/mod1) , assessed on 30th August, 2016

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION

1. PS – 8086 Specifications
 - i. Operating frequency: 18.432MHz
 - ii. 16KB powerful software monitor two 27C256 EPROM
 - iii. Three 16-bit programmable timers from 8253
 - iv. 48 programmable I/O lines from 8255
 - v. Serial interface using 8251
 - vi. 50 pin FRC connector for bus expansion
 - vii. 20pin FRC connector foe user interface from 8255
 - viii. 9 pin D type connector for RS232 interface
 - ix. 101 PC type keyboard for entering user data/address and for commands

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1.	Shri S. S. Tadas	HOD, Electronics	Government Polytechnic, Nagpur.
2.	Shri A. A. Ali	HOD, Electronics (IInd Shift)	Government Polytechnic, Nagpur.
3.	Ms. K. G. Giri	Lecturer, Electronics	Government Polytechnic, Nagpur.
4	Mr.Sandip V.Darwhekar	Director	Beta Computronics Pvt.Ltd.Nagpur

5	Mrs.Gazala Ali	HOD, Electronics	Anjuman Polytechnic, Nagpur.
6	Mr.S.M.Kale	Lecturer in Electronics & Telecomm Engineering	Government Polytechnic, Gadchiroli.

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.
(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN CM/IT

LEVEL NAME : PROFESSIONAL COURSES

COURSE CODE : CM412E

COURSE TITLE : COMPUTER HARDWARE AND MAINTENANCE

PREREQUISITE : NIL

TEACHING SCHEME: TH: 00; TU: 00; PR: 04(CLOCK HRs.)

TOTAL CREDITS : 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)

TH. TEE : NIL

PR. TEE : 02 HRs (External)

PT. : NIL

❖ **RATIONALE:**

Computer architecture is concerned with the structure and behavior of the various functional modules of the computer and their interaction, the course provides the necessary understanding of the hardware operation of digital computers. This course develops student's technology skills required for troubleshooting computer software and hardware problems. Students will learn software and hardware troubleshooting techniques used to identify and correct computer problems.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Connect the computer peripherals by identifying their matching internal/external ports.
2. Assemble/setup and upgrade personal computer system.
3. Install, configure, and upgrade computer hardware and software.
4. Use CMOS setup to perform system setting.
5. Perform preventive maintenance of computer peripherals.
6. Identify Hazardous Substances in e-Waste and different ways of e-Recycling

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Identify major components and sub-systems of Personal Computer by visual examination.	Introduction to Computer Hardware	2
2	Identify the components needed to convert a PC into a “Multimedia PC”.		2
3	Assemble and disassemble a PC, with a view towards upgrading PCs by motherboard replacement and substitution of major components.		4
4	Identify the hardware layout of Desktop computer and Laptops.		4
5	Install and configure hard disk drive.	Installation of Peripheral Devices	4
6	Install and configure CD-ROM drive, sound card and video card.		6
7	Install Scanner, Modem, Laser Printer.		6
8	Perform system setting using CMOS setup	CMOS Setup	6
9	Identify most typical kinds of hardware failures in an IBM-class PC when presented with a faulty PC.	Troubleshooting of Computer Hardware	4
10	Troubleshoot following : a)Problems related to Monitor b) Problems related to Processor c) Problems related to Keyboard and Mouse d) Problems related to Printer.		4
11	Install antivirus software.		2
12	Use diagnostic and evaluation software (such as Check it or Norton Utilities) to analyze or troubleshoot an operating system or faulty PC.		4
13	Prepare the checklist needed for preventive maintenance of computer hardware.	Hardware Maintenance and Introduction to e-Waste	2
14	Perform Preventive Maintenance of a computer system.		4
15	Identify Hazardous Substances in e-Waste and different ways of e-Recycling.		2
16	Install and use network software and other kinds of data communications software (such as Novell Netware and Procomm).	Network Related Troubleshooting	2
17	Install and troubleshoot a network card in a PC.		2
Skill Assessment			4
Total			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER : NIL**❖ **QUESTION PAPER PROFILE FOR THEORY PAPER : NIL**

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Activities: Identification of hardware devices, Writing steps for installation and configuring hardware devices, finding problems of hardware parts	20
2	Performance	20
3	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering :-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3	3	-	-	-	3	3	3	-	-
2	-	3	3	3	-	-	-	3	3	3	-	-
3	-	3	3	3	-	-	-	3	3	3	-	-
4	-	3	3	3	-	-	-	3	3	3	-	1
5	-	3	3	3	-	-	-	3	3	3	-	-
6	-	3	3	3	-	1	-	3	3	3	-	-

1. Slight (Low)

2. Moderate (Medium)

3. Substantial (High)

2. Information Technology :-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3	3	-	-	-	3	3	3	-	-
2	-	3	3	3	-	-	-	3	3	3	3	-
3	-	3	3	3	-	-	-	3	3	3	-	-
4	-	3	3	3	-	-	-	3	3	3	3	1
5	-	3	3	3	-	-	-	3	3	3	3	-
6	-	3	3	3	-	1	-	3	3	3	3	-

1. Slight (Low)

2. Moderate (Medium)

3. Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Modern Computer Hardware Course	Manahar Lotia, Pradeep Nair , Payal Lotia, BPB Publication,2006	10:0074639714
2.	The Complete PC Upgrade and Maintenance Guide	Mark Minasi, BPB Publication, Revised Second Edition, Sept 1997.	10:8170292328
3.	Upgrading and Repairing PCs	Scott Mueller, PHI Publication, 15 th edition, 2003.	13:9780789712950

❖ **E-REFERENCES:**

- <http://academic.pgcc.edu/~wlloyd/ent284.pdf> , assessed on 06/09/2016
- http://www.nitkkr.ac.in/clientFiles/FILE_REPO/2015/JAN/14/1421225726725/COT-314_Computer_Hardware_and_Trouble_Shooting_Lab_Questions.pdf , assessed on 06/09/2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer (Dual CORE and above)
2. Laser printer, scanner, modem.
3. Internet connectivity.

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S. P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
2.	Dr. A. R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
3.	Mrs. D. P. Chanmanwar	Lect. In IT	Government Polytechnic, Nagpur.
4.	Mrs. V. A. Raje	Lect. In CM	Government Polytechnic, Nagpur.
5.	Ms. S. N. Chaudhari	Lect. In CM	Government Polytechnic, Nagpur.
6.	Shri. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
7.	Shri. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
8.	Shri. Manoj Jethawa	HOD , Computer Science	Shri Datta Meghe Polytechnic, Nagpur

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: CM413E
COURSE TITLE	: WEB PAGE DESIGN
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT =2 CLOCK HR.)
TH. TEE EXAM	: NIL
PR. TEE EXAM	: 02 Hrs (External)
PT. EXAM	: NIL

❖ RATIONALE :

It is estimated that across the Internet, over 100 million domain names are in use. With fast and cheap broadband Internet connections available to the masses, online users now are exceeding 500 millions. Students will get acquainted with the current developments in web and Multimedia, which would be helpful in IT applications. It is a practical oriented course which will enable student to develop Web sites using HTML.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Design the web page using basic tags of HTML.
2. Organize information using tables and formatting tables.
3. Use tags for linking HTML documents.
4. Use of style sheets to gain full control of formatting within web pages.
5. Implement the JavaScript in HTML.
6. Develop the static website.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Design Web page with HTML using basic tags - <HTML>, <HEAD>, <TITLE>, <BODY> elements	Introduction to html	2
2	Design Web page and apply some block level tags and some text level tags.		2
3	Design Web page using font Color , font face , font size ,background color.		2
4	Design Web page including links in a Web page. - Local page in same folder - Page in different folder - Page in web - Specified location within document		2
5	Write a code to create a web page including i) ordered lists ii) unordered list iii) nesting list.		4
6	Write a code to create a web page using Image tags with height and width and also Used for background image.	Images, Colors And Backgrounds	2
7	Design Web page Include images with different alignments and wrapped text in and also link the image in web page		2
8	Design table in web page using basic tables tags- <table>,<tr> ,<td> , <th>.	Tables and Forms	2
9	Write a code to create a web page using Table tags a)Using rowspan and colspan b)Background Image in a table		2
10	Write a code to create a web page using Table tags a)Create table of 3 rows and Columns b)Having border , border size, border color c)Image in a particular cell.		4
11	Write a code to create a web page using Form tag. Example:- Admission Form		2
12	Create a web page using frame tag a) rows And columns b) border and border color.	Frames	2
13	Design web page to create frames using name, frameborder, marginheight, marginwidth, src, resize, scrolling attributes.		4

14	Apply in-line CSS to change colours of certain text portion, bold, underline and italics certain words in your HTML web page. Also change background colour of each paragraph using in-line CSS	Style sheets	4
15	Write a program to create menu using HTML and CSS.		2
16	Develop a simple JavaScript in HTML	JavaScript	2
17	Write a program to print date using JavaScript		2
18	Write a program to Sum and Multiply two numbers using JavaScript		2
19	Write a program to redirect, popup and print function in JavaScript.		2
20	Write a code to Put validation checks on values entered by the user using JavaScript (such as age should be a value between 1 and 150).		2
21	Mini project on Website design		12
Skill Assessment			4
Total Hrs			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:** Nil

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:** Nil

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	40	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	10	--	Journal	1, 2, 3, 4,5,6
				TOTAL	50	20		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Activities/ Writing program and Drawing flow chart	20
2	Performance/Execution of program	20
3	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3	-	-	-	-	3	3	3	3	-
2	-	3	3	-	-	-	-	3	3	3	3	-
3	-	3	3	-	-	-	-	3	3	3	3	-
4	-	3	3	-	-	-	-	3	3	3	3	2
5	-	3	3	-	-	-	-	3	3	3	3	2
6	-	3	3	-	-	-	-	3	3	3	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3	-	-	-	-	3	3	3	-	3
2	-	3	3	-	-	-	-	3	3	3	-	3
3	-	3	3	-	-	-	-	3	3	3	-	3
4	-	3	3	-	-	-	-	3	3	3	-	3
5	-	3	3	-	-	-	-	3	3	3	-	3
6	-	3	3	-	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	HTML and XHTML – The complete reference	Thomas Powell, Tata McGraw Hill, Fourth Edition, 2003	10: 007222942X 13: 978-0072229424
2.	Web Design	G.S. Baluja Tata McGraw Hill, New Delhi	10: 81-87522-178 13: 9788187522171

❖ **E-REFERENCES:**

- <http://nptel.ac.in/courses/106105084/13> accessed on 08th September 2016
- http://www.w3schools.com/html/html_youtube.asp accessed on 08th September 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer (Dual CORE and above) with Internet connection.
2. Windows 7 or 8 or latest (Prof.Edition/Academic edition)
3. Network printer.

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S. P. Lambhade	H.O.D, Computer Engineering	Government Polytechnic, Nagpur.
2	Dr. A. R. Mahajan	H.O.D, Information Technology	Government Polytechnic, Nagpur.
2	Ms. D. M. Shirke	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
3	Ms. S. N. Chaudhari	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4	Ms. V. A. Raje	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5	Shri. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
6	Shri. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
7	Shri. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM / IT
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: CM414E \$
COURSE TITLE	: SOFTWARE PROJECT MANAGEMENT
PREREQUISITE	: NIL
TEACHING SCHEME:	TH: 00; TU: 00; PR: 04 (CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT.	: NIL

❖ RATIONALE:

This course gives the experience about survey and collection of technical information, preparation of Reports and Presentation of Seminars. Students will get the information about current trends and technology in the field of IT.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Manage the selection and initiation of individual projects
2. Conduct project planning activities and execute project effectively
3. Gather the information from available resources.
4. Explore the solutions for the real problems encountered in a real life job
5. Prepare a report
6. Present Seminar.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical's	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Gather information related to Software Project management basics concepts. Conduct a case study of any software system. With synopsis.	Project Management	4
2	Prepare the steps of Life cycle of a project. Prepare rough project task list and plan for software project.		4
3	Conduct a case study for Roles played by the project Manager and various team members in Software project. Distribute the project work according to role of team members.		4
4	Prepare data showing Software Time, Effort and Cost Estimation of given project using various methods.		4
5	Prepare Gantt chart (Task Entry) for project plan of software project with duration and create baseline and milestones.	Project Planning	4
6	Prepare PERT (Project Evaluation & Review Techniques) for project plan of software project with duration.		4
7	Prepare CPM (Critical Path Method) for project plan of software project with duration.		4
8	Prepare Bar Chart for parallel activities of software project		4
9	Prepare list of resource in Software project task. Assigned resources to particular task. Enter respective entry in PERT, CPM and Gantt chart	Scope Management	4
10	Conduct a case Study on Risk management using given software project		4
11	Track the project using recording actual duration or work done in each task of project. Enter data in Tracking Gantt chart wizard		4
12	Conduct a case study on common mistakes made during different phases of a project	Analysis	8
13	Conduct a case study of various projects Management CASE tools and compare their functionalities.		8
Skill Assessment			4
Total			64

❖ **SPECIFICATION TABLE FOR THEORY PAPE** : **NIL**❖ **QUESTION PAPER PROFILE FOR THEORY PAPER** : **NIL**

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	40	--	Rubrics & Assessment Sheets	12,3,4,5,6
		Journal Writing		Continuous	10	--	Journal	1,2,3,4,5,6
				TOTAL	50	20		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	1,2,3,4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ SCHEME OF PRACTICAL EVALUATION:

S.N.	Description	Max. Marks
1	Writing case studies	10
2	Execution of project	10
3	Prepare report	10
4	Present seminar	10
5	Viva voce	10
	TOTAL	50

❖ MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3	3	-	-	-	3	3	3	-	3
2	-	3	3	3	-	-	-	3	3	3	-	3
3	-	3	3	3	-	-	-	3	3	3	-	3
4	-	3	3	3	-	-	-	3	3	3	-	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Software Engineering: A Practitioner's Approach	Roger S. Pressman, 7 th Edition, McGraw Hill, 2009	13:9780073375977
2.	Software Engineering	Ian Somerville, 8 th Edition, Pearson Education, 2006	13:9780321313799

❖ E-REFERENCES:

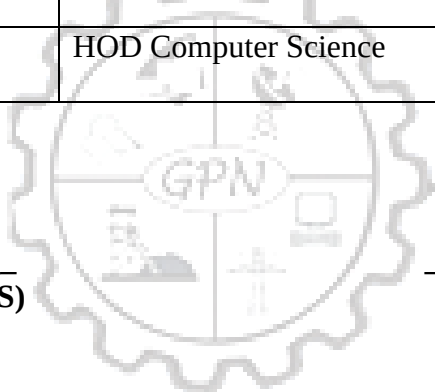
- <https://www.youtube.com/watch?v=Z6f9ckEElsU> accessed on 1st Sept 2016
- http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Soft%20Engg/New_index1.html accessed on 1st Sept 2016
- <http://www.csis.pace.edu/~scharff/cs389/ref/cs389indexref.html> accessed on 1st Sept 2016
- <http://www.letu.edu/people/jaytevis/Software-Engineering/Presentations/Pressman/pressman-presentations.html> accessed on 1st Sept 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer (Dual CORE and above) with Internet connection.
2. Network printer.
3. Office Suite
4. C compiler

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. Mrs. A R Mahajan	Head, Information Technology	Government Polytechnic, Nagpur.
2.	Shri. S. P. Lambhade	Head, Computer Engineering	Government Polytechnic, Nagpur.
3	Shri. L. D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4	Shri. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
5	Shri. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
6	Shri. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur



(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME : PROFESSIONAL COURSES
COURSE CODE : IT408E
COURSE TITLE : INDUSTRIAL PROJECT
PREREQUISITE : 90 CREDITS
TEACHING SCHEME : TH:00; TU:00;PR: 04(CLOCK Hrs.)
TOTAL CREDITS : 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM : NIL
PR. TEE EXAM : 02 HRs (External)
PT. EXAM : NIL

❖ RATIONALE:

Industrial project course is the manifestation of technical knowledge acquired by the student during their course of work. This course provides an opportunity to the students to identify and solve real life problem of the industries /research organization / society. Students also get opportunity to provide innovative, economic and technological viable solution to the world of work.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

- 1 Carryout market survey /Literature survey
- 2 Select project and Prepare planning
- 3 Perform project work in group
- 4 Test project work
- 5 Prepare project report
- 6 Present project work

❖ COURSE DETAILS:

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
Nil			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Perform introductory Task - Form project batch of four-five students - Select project as per area of interest - Select topic / industrial problem / work by consulting the guide from following list - Automated Software Engineering - Business Data Analytics - Computer Networks - Computer Security - Data Communication - Data Compression - Data Mining - Database Systems - Human Computer Interaction - Image Processing - Internet and Web Applications - Mobile Computing Perform Literature Survey - Refer various Periodicals, Journals, Books, Internet literature related to project topic - Note down findings - Prepare database of collected literature on the basis of title, area of work, methodology used, type of work - Analyze industrial need - Prepare brief report	Introductory Task and Literature Survey	08
2	Plan project - Prepare Synopsis in standard format which includes following. Title Page: Project Title, Purpose of submission, Institute logo, Students Name, Guide Name, Department and Institute Name - Use Latex for preparing synopsis. - Submit the Synopsis to guide. - Approve synopsis from guide - Prepare action plan of project activities - Submit the action plan to guide. - Approve action plan from guide	Planning	8
3	Perform Project work - Present the overview of the complete system using block diagrams. - Specify design parameters for the system. - Discuss the design and its associated properties.	Project Work	20

	• Discuss all the dependencies in a system design. • Present each module with its associated flowcharts. • Draw E-R Diagrams and Data Flow Diagrams. • Implement the code and give validation rules.		
4	Test Project work	Testing	12
5	Prepare project report in standard format, which includes following. • Title Page which includes: Project Title, Purpose of submission, Institute logo, Students Name, Guide Name, Department and Institute Name • Certificates: Student declaration, Certificate from guide • Acknowledgement • Table of contents • List of Tables • List of Figures • List of abbreviations and acronyms (if any) • Text 1. Introduction, objectives 2. Literature Survey 3. Methodology/Materials/Methods/Estimate. 4. Results 5. Summary/Conclusion. 6. References Use Latex for preparing report. Perform plagiarism check from free internet site. • Submit report of plagiarism check to the guide with project report	Project Writing	8
6	Present project work • Prepare power point presentation of work done. • Prepare yourself to handle examiner questions after presentation. • Practice group presentation. • Present before guide.	Presentation	4
Skill Assessment			4
Total Hrs.			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Not Applicable

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

Not Applicable

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	40	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	10	--	Project Report	1, 2, 3, 4,5,6
				TOTAL	50	20		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	100	40	Rubrics & Project Report	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Selection of topic	10
2	Literature survey	10
3	Project planning and implementation	10
4	Work done, Feasibility of work, Results	50
5	Report writing	10
6	Presentation of work and viva voce	10
Total		100

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	-	-	2	1	-	3	3	3	-	-
2	-	3	-	-	2	-	-	3	-	3	-	-
3	-	3	3	3	-	-	-	3	3	3	3	3
4	-	3	3	3	-	-	-	3	-	3	3	3
5	-	-	-	3	-	-	-	3	-	3	-	-
6	-	-	-	-	-	-	-	3	3	3	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Computer-Based Construction Project Management	Tarek Hegazy, Pearson Education, Limited, 1 st Edition, 2013	10: 1292027126
2.	Successful Project Management: A Step-by-Step Approach with Practical Examples	Milton D. Rosenau, Gregory D. Githens, John Wiley & Sons, Inc, 4 th Edition, 2013	13: 9780471680321

❖ **E-REFERENCES:**

- https://www.ieee.org/publications_standards/publications/periodicals/journals_magazines.html accessed on 29th August 2016
- http://people.csail.mit.edu/billf/publications/How_To_Do_Research.pdf accessed on 30th August 2016
- <http://www.duluth.umn.edu/~hrallis/guides/researching/litreview.html> accessed on 30th August 2016
- <http://library.bcu.ac.uk/learner/writingguides/1.04.htm> accessed on 4th September 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer System with latest configuration
2. Latex (for writing project report)

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	HOD, Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	HOD, Computer Engineering	Government Polytechnic, Nagpur.
3.	Mr. S. A. Khatri	Lecturer, Computer Engineering	Government Polytechnic, Nagpur.
4.	Mr. R. L. Meshram	Lecturer, Information Technology	Government Polytechnic, Nagpur.
5.	Dr. S.W.Rajurkar	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.
6	Mr. G.V.Gotmare	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.
4.	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
5.	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
6	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN CE/ME/EE/EC/CM/IT/AE/MT/PK/TX

LEVEL NAME : PROFESSIONAL COURSES

COURSE CODE : SE401E

COURSE TITLE : SEMINAR

PREREQUISITE : 60 Credits

TEACHING SCHEME: TH:00; TU:00;PR: 02(CLOCK Hrs.)

TOTAL CREDITS : 01(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)

TH. TEE EXAM : NIL

PR. TEE EXAM : 02 HRs (Internal)

PT. EXAM : NIL

❖ **RATIONALE:**

Seminar course is the manifestation of soft skills acquired by the student during their course of work. This course provides an opportunity to develop and present their own technical knowledge, communication skills, presentation skills, self-learning abilities, creativity, and team working abilities. This course will also enable them to gain confidence to face the world of work.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

- 1 Select seminar topic
- 2 Carryout Literature survey
- 3 Prepare planning
- 4 Prepare seminar report
- 5 Prepare seminar presentation
- 6 Present interpersonal skills, presenting skills, soft skills and creativity.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
Nil			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Perform introductory Task - Select seminar topic individually as per area of interest - Select recent technical topic, not covered in curriculum, by consulting the guide.	Topic Selection	2
2	Perform Literature Survey - Refer various Periodicals, Journals, Books, Internet literature related to seminar topic - Note down findings - Prepare brief report	Literature Survey	6
3	Plan Seminar - Prepare outline of selected seminar topic in standard format - Approve seminar topic from guide - Prepare action plan of work - Submit the action plan to guide. - Approve action plan from guide	Planning	2
4	Prepare seminar report in standard format, which includes following. - Title Page which includes: Seminar Title, Purpose of submission, Institute logo, Students Name, Guide Name, Department and Institute Name - Certificates: Student declaration, Certificate from guide - Acknowledgement - Text - Introduction - Literature Survey - Methodology/Materials/Methods - Results - Summary/Conclusion. - References Use Latex for preparing report. Perform plagiarism check from free internet site. - Submit report of plagiarism check to the guide with seminar report	Report Writing	12
5	Prepare power point presentation Prepare yourself to handle audience / examiner questions after presentation. Practice presentation before group of students	Preparation	08
6	Present before guide Present before assessment panel.	Presentation	02
Total Hrs.			32

- ❖ **SPECIFICATION TABLE FOR THEORY PAPER:** Not Applicable
- ❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:** Not Applicable
- ❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	40	--	Rubrics, Assessment Sheets & Seminar Report	1,2,3,4,5,6
		Report Writing		Continuous	10	--	Seminar Report	1,2,3,4,5,6
				TOTAL	50	20		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics, Seminar Report & Presentation	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Selection of topic	05
2	Literature survey	05
3	Project planning and implementation, Work done, Feasibility of work	05
4	Report writing	05
5	Presentation Skills	25
6	Viva voce	05
Total		50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSO 1	PSO 2
	1	2	3	4	5	6	7	8	9	10	1	2
1	–	3	–	–	–	–	–	3	3	–	–	–
2	–	3	3	3	–	–	3	3	3	3	–	–
3	–	3	3	3	–	–	3	3	3	3	–	–
4	–	3	3	3	–	–	3	3	3	3	–	–
5	–	3	3	3	–	–	3	3	3	3	–	–
6	–	–	–	–	–	–	–	3	3	3	–	–

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	The Presentation Secrets of Steve Jobs: How to Be Insanely Great in Front of Any Audience	Carmin Gallo, McGraw-Hill Education, 1 st Edition, October 2009	10: 0071636080 13: 978-0071636087
2.	Speaking Your Mind: Oral Presentation and Seminar Skills	Rebecca Stott, Tory Young, Cordelia Bryan, Longman, 2001	0582382432, 9780582382435
3.	How to Design TED-Worthy Presentation Slides: Presentation Design Principles from the Best TED Talks	Akash Karia, Create Space Independent Publishing Platform, 3 rd Edition, February 2015	10: 1507638124 13: 978-1507638125
4.	Presenting with Credibility: Practical Tools and Techniques for Effective Presentations	Bruna Martinuzzi, Six Seconds Emotional Intelligence Press, Kindle Edition, April 2012	978-1-935667-12-4

❖ **E-REFERENCES:**

- http://www.prepareforsuccess.org.uk/skills_for_presenting_in_seminars.html , accessed on 5th November, 2016
- <http://www.che.iitb.ac.in/faculty/jb/courses/seminar/tips.html> , accessed on 5th November, 2016
- <https://www.youtube.com/watch?v=dEDcc0aCjaA> , accessed on 5th November, 2016
- <https://www.youtube.com/watch?v=V2q7Q2j7ESs> , accessed on 5th November, 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. DLP Projector, latest specification
2. Computer, latest specification

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. S. W. Rajurkar	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.
2.	Mr. G. V. Gotmare	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/CM/IT/AE/MT/PK/TX
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: ID401E
COURSE TITLE	: INDUSTRIAL TRAINING
PREREQUISITE	: 70 Credits
TEACHING SCHEME:	TH: 00; TU: 00; PR: 02(CLOCK Hrs.)
TOTAL CREDITS	: 01(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT. EXAM	: NIL

❖ RATIONALE:

The aim of the polytechnic education is to create a pool of skill based manpower to support shop floor and field operations as a middle level link between technicians and engineers. Diploma pass out plays an important role in managing shop-floor operations. Therefore, it is necessary to the diploma pass out to get acquainted with the actual shop floor operations in the industry. This course has been designed to give actual working environment exposure to the diploma students.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

- 1 Adhere industrial safety practices
- 2 Work in industrial working environment.
- 3 Carry out survey related to industrial processes.
- 4 Identify industrial problems for industrial Project Course
- 5 Prepare industrial training report based on work experience
- 6 Present report

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
Nil			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Adhere Industrial Safety Practices - Talk to safety officer - Record the safety practices to be followed in industry. - Record Don'ts and Do's. - Follow all instructions.	Safety Practices	04
2	Perform Industrial Process Survey - Collect information regarding various processes carried out in an industry by discussing the allotted supervisor/officer - Note down findings - Prepare brief report	Survey	06
3	Work in industrial working environment - Follow instructions of supervisor - Observe industrial processes - Record daily work done in diary	Working Experiences	18
4	Identify industrial problems - Discuss with the supervisor and workers - Identify the problem in any of the industrial process/system - Record your findings	Problem Identification	04
5	Prepare industrial training report in standard format, which includes following. - Title Page which includes: Title, Purpose of submission, Institute logo, Students Name, Industry Name, Department and Institute Name - Certificates: Student declaration, Certificate from industry - Acknowledgement - Text - Introduction to Industry - Safety Practices in Industry - Industrial Process - Working Experience - Results - Summary/Conclusion. - References Use Latex for preparing report. Perform plagiarism check from free internet site. - Submit report of plagiarism check to the allotted teacher with industrial training report	Report Writing	After Completion of Training
6	Prepare power point presentation Present before panel of teachers.	Presentation	
Total Hrs.			32

- ❖ **SPECIFICATION TABLE FOR THEORY PAPER:** Not Applicable
- ❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:** Not Applicable
- ❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	40	--	Rubrics, Assessment Sheets & Report	1,2,3,4,5,6
		Report Writing		Continuous	10	--	Report	1,2,3,4,5,6
				TOTAL	50	20		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics, Report & Presentation	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Selection of industry/ industry supervisor's remark	05
2	Survey	05
3	Work done and Feasibility of work/ problem identified	15
4	Report writing	15
5	Presentation Skills	05
6	Viva voce	05
Total		50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	2	2	2	-	-	3	3	3	-	-
2	-	3	2	2	2	-	-	3	3	3	-	-
3	-	3	-	-	-	-	-	3	3	3	-	-
4	-	3	-	-	-	-	3	3	3	3	-	-
5	-	3	-	-	-	-	3	3	3	3	-	-
6	-	3	-	-	-	-	3	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Industrial Training and Education	Lokesh Choudhary, Mittal Publications, 2007	10: 8183242367 13: 9788183242363
2.	Training Practice	Penny Hackett, McGraw-Hill Education, September 2003	10: 0852929803 13: 9780852929803

❖ **E-REFERENCES:**

- <http://ihmshimla.org/wp-content/uploads/2013/05/Industrial-Training-Rule-Book.pdf>, assessed on 25th September, 2016

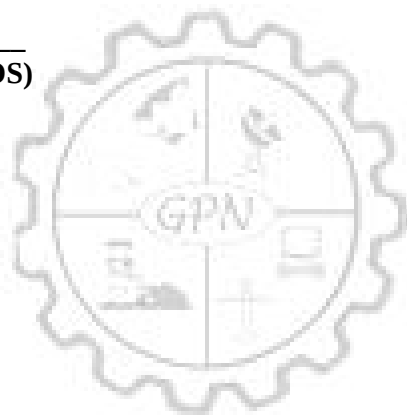
❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

- DLP Projector, latest specification
- Computer, latest specification

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. S. W. Rajurkar	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.
2.	Mr. G. V. Gotmare	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.

(Member Secretary PBOS)



(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/CM/IT/AE/MT/PK/TX
LEVEL NAME	: PROFESSIONAL COURSES
COURSE CODE	: ID402E
COURSE TITLE	: INDUSTRIAL PRACTICES
PREREQUISITE	: 70 Credits
TEACHING SCHEME	: TH:00; TU:00;PR: 02(CLOCK Hrs.)
TOTAL CREDITS	: 01(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: NIL
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: NIL

❖ RATIONALE:

The aim of the polytechnic education is to create a pool of skill based manpower to support Construction site and field operations as a middle level link between technicians and engineers. Diploma pass out plays an important role in managing Construction site operations Therefore, it is necessary to the diploma pass out to get acquainted with the actual Construction site operations in the Construction industry. This course has been designed as an optional course to industrial training to give actual working environment exposure to the diploma students, through virtual industry in class room.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

- 1 Visit industries.
- 2 Get acquainted with industrial safety practices through videos and industrial experts.
- 3 Carry out survey related to industrial processes.
- 4 Explore industrial working environment through videos and industrial experts.
- 5 Identify industrial problems for industrial Project Course discussing with industrial experts.
- 6 Prepare and present report based on virtual industrial exposure and industrial visit.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
Nil			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Visit any two industries related to program. Small scale, medium scale, large scale and perform task given in following point 2 to 5.	Industrial Visits	18
2	Get acquainted with industrial safety practices - Observe Video and listen industrial experts - Talk to industrial experts - Record the safety practices to be followed in industry. - Record Don'ts and Do's.	Safety Practices	02
3	Carryout survey related to industrial processes - Observe Video and listen industrial experts - Collect information by discussing with industrial experts - Note down findings - Prepare brief report	Survey	02
4	Explore industrial working environment - Observe Video and listen industrial experts - Observe industrial processes - Note down findings	Working Experiences	08
5	Identify industrial problems - Discuss with industrial experts - Identify the problem in any the industrial process/system - Record your findings	Problem Identification	02
6	Prepare and present report in standard format, which includes following. - Title Page which includes: Title, Purpose of submission, Institute logo, Students Name, Industry Names, Department and Institute Name - Certificates: Student declaration - Acknowledgement - Text - Introduction to Industry - Safety Practices in Industry - Industrial Process - Results - Summary/Conclusion. - References Use Latex for preparing report. Perform plagiarism check from free internet site. - Submit report of plagiarism check to the allotted teacher with industrial training report	Report Writing	Home Assignment
6	Prepare power point presentation Present before panel of teachers.	Presentation	
Total Hrs.			32

- ❖ SPECIFICATION TABLE FOR THEORY PAPER: NIL
- ❖ QUESTION PAPER PROFILE FOR THEORY PAPER: NIL
- ❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	40	--	Rubrics, Assessment Sheets & Report	1,2,3,4,5,6
		Report Writing		Continuous	10	--	Report	1,2,3,4,5,6
				TOTAL	50	20		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics, Report & Presentation	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Selection of industry/ industry supervisor's remark	05
2	Survey	05
3	Work done and Feasibility of work/ problem identified	15
4	Report writing	15
5	Presentation Skills	05
6	Viva voce	05
Total		50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	2	2	2	-	-	3	3	3	-	-
2	-	3	2	2	2	-	-	3	3	3	-	-
3	-	3	-	-	-	-	-	3	3	3	-	-
4	-	3	-	-	-	-	3	3	3	3	-	-
5	-	3	-	-	-	-	3	3	3	3	-	-
6	-	3	-	-	-	-	3	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Industrial Training and Education	Lokesh Choudhary, Mittal Publications, 2007	10: 8183242367 13: 9788183242363
2.	Training Practice	Penny Hackett, McGraw-Hill Education, September 2003	10: 0852929803 13: 9780852929803

❖ **E-REFERENCES:**

- <http://ihmshimla.org/wp-content/uploads/2013/05/Industrial-Training-Rule-Book.pdf>, assessed on 25th September, 2016

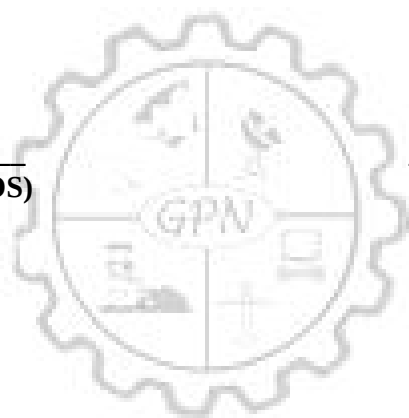
❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

- DLP Projector, latest specification
- Computer, latest specification

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. S. W. Rajurkar	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.
2.	Mr. G. V. Gotmare	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.

(Member Secretary PBOS)



(Chairman PBOS)

LEVEL - V

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN IT/CM
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: IT501E ^s
COURSE TITLE	: ADVANCE JAVA
PREREQUISITE	: IT402E
TEACHING SCHEME	: TH: 03; TU:00; PR:04 (CLOCK HRs.)
TOTAL CREDITS	: 05(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (External)
PT.	: 01 HR

❖ RATIONALE:

This course provides the knowledge necessary to understand java and develop dynamic web pages using java server page (JSP). It covers the basic underlying concepts and techniques recently used in the IT industry. After going through this course student will be able to do Web Development and Desktop Application Development.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Comprehend Java SDK environment to create, debug and run advanced Java programs.
2. Comprehend building blocks of Object Oriented Programming language.
3. Summarize different Object Oriented features of Advanced Java.
4. Develop program in java using Networking, Sockets, Beans and Remote Method Invocation.
5. Develop, debug and execute java programs on Java Database Connectivity.
6. Design GUIs using Swing and implement Server side programming using Servlet and Java Server Pages

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs .
1. Networking And Socket Programming	1. Compare TCP with UDP 2. Describe the client server communication. 3. Describe Socket and server socket, URL format, proxy servers, Factory methods, instance method 4. Apply Socket Programming 5. Develop Client server communication programs	1.1 TCP\IP addressing, TCP\IP internals 1.2 Network programming basics- TCP client, TCP server, client server communication 1.3 Socket and server socket, URL format, proxy servers 1.4 The networking classes & interfaces 1.5 Factory methods, instance method, Datagram packets 1.6 Creating servers/clients sockets- Sending Data from client to server or vice-versa, 1.7 Creating proxy server, Datagram server & client.	08
2. Java Database Connectivity	1. Describe the Database client/server methodology 2. List and Describe Database Design 3. Describe the limitations Using JDBC 4. List And Describe the types of JDBC Drivers 5. Describe the Security Considerations of JDBC 6. Apply java database connectivity through all types of drivers 7. Develop program using JDBC to query database and modify it	2.1 Java as a Database front end ,Database client/server methodology 2.2 Two-Tier Database Design, Three-Tier Database Design 2.3 The JDBC API- The API Components, Limitations Using JDBC(Applications vs. Applets) 2.4 Security Considerations, JDBC Database Example 2.5 JDBC Drivers, JDBC-ODBC Bridge, Current JDBC Drivers, Alternate connectivity strategies 2.6 database Connectivity using JDBC API, sending queries through JDBC bridge & handling result 2.7 Connectivity to object databases, Connectivity with Web based Database systems	08
3. Remote Method Invocation And Java Beans	1. Describe RMI 2. Describe the RMI Architecture 3. Develop program using RMI 4. Describe Java Beans 5. List advantages of java beans	3.1 REMOTE METHOD INVOCATION: Serialization, Deserialization, object persistence and RMI, RMI architecture, RMI example, The common object request broker	09

	6. Describe CORBA and its Architecture. 7. Describe JAR, persistence, customizers. 8. Develop program of simple Bean using BDK	architectures(CORBA) 3.2 JAVA BEANS : Introduction to Java Beans, Advantages of Java Beans, Application Builder Tools, The Bean Developer kit(BDK), JAR Files, Introspection, Developing a simple Bean, Using Bound properties Using the Win interface Constrained properties, Persistence, Customizers The Java Beans API Developing simple bean using BDK(Beans Developing Kit)	
4. Swings	1. Describe Swing 2. List advantages of Swing 3. Describe various components of Swing 4. Develop programs in java using various swing components	4.1 Introduction to swing, 4.2 JApplet, Icons and Labels 4.3 TextFields, Buttons 4.4 Combo Boxes 4.5 Tabbed Panes 4.6 Scroll Panes 4.7 Trees 4.8 Tables 4.9 Exploring the Swings 4.10 Creating Buttons, Labels , Check box, table	06
5. Servlets	1. Describe Servlet and its application 2. Describe Servlet life cycle 3. State types of Servlet 4. Develop programs using javax.servlet package 5. Develop programs on servlet for reading parameters 6. Describe session tracking, security issues. 7. Develop programs to handle HTTP Requests and responses	5.1 The Life Cycle Of a Servlet, The Java Servlet 5.2 Development Kit, The Simple Servlet, The Servlet API 5.3 The Javax Servlet Package 5.4 Reading Servlet Parameters 5.5 Reading Initialization Parameters 5.6 The javax.servlet.http package 5.7 Handling HTTP Requests and responses, Using Cookies 5.8 Session Tracking, Security Issues, Exploring Servlet 5.9 Create simple servlet, Reading servlet parameters 5.10 Handling client requests through servlet	09
6. Java Server Pages	1. Describe the architecture of JSP, JSP Life cycle 2. List and Describe components of JSP, JSP Tags 3. Develop programs using Java Server Pages 4. Apply Session Tracking 5. Develop program for Form	6.1 Introduction to Java Server Pages 6.2 JSP Syntax and Semantics: The JSP Development Model, Components of JSP page, Simple example of JSP 6.3 Expressions, Scriptlets and Declarations 6.4 JSP Tags 6.5 Sessions Tracking	08

	Editing, Database Connectivity	6.6 Form Editing, Log-in pages 6.7 JSP Applications: Database Access With JDBC, Overview of JDBC, JDBC Drivers, Connecting to a Database With Driver manager	
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Create, debug and execute programs based on Socket and server socket.	Networking And Socket Programming	1
2.	Create, debug and execute programs based on TCP client server communication.		1
3.	Create, debug and execute programs based on servers/clients sockets and Sending Data from client to server.		2
4.	Create, debug and execute programs based on connectivity to MS ACCESS using JDBC	Java Database Connectivity	2
5.	Create, debug and execute programs based on connectivity to oracle using JDBC.		2
6.	Create, debug and execute programs based on RMI (client server communication)	Remote Method Invocation And Java Beans	2
7.	Create, debug and execute programs based on developing a simple Bean.		2
8.	Create, debug and execute programs based on Developing simple bean using BDK(Beans Developing Kit).		2
9.	Create, debug and execute programs based on Buttons, Labels.	Swings	1
10.	Create, debug and execute programs based on Check box, table.		1
11.	Create, debug and execute programs based on applet using Icons and Labels, Text Fields Buttons, Combo Boxes.		2
12.	Create, debug and execute programs based on Generic Servlet.	Servlets	2
13.	Create, debug and execute programs based on HTTP Servlet.		2
14.	Create, debug and execute programs based on Java Server Pages (JSP).	Java Server Pages	2
15.	Create, debug and execute programs based on Java Server Pages (JSP).		2
16.	Mini Project		4
Skill Assessment			2
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Networking And Socket Programming	02(02)	04(04)	04(00)	10(06)
02	Java Database Connectivity	04(02)	04(04)	06(00)	14(06)
03	Remote Method Invocation And Java Beans	04(00)	08(06)	00(00)	12(06)
04	Swings	00(04)	04(00)	06(04)	10(08)
05	Servlets	02(00)	04(04)	06(04)	12(08)
06	Java Server Pages	02(00)	04(00)	06(06)	12(06)
	Total	14(08)	28(18)	28 (14)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	3	R	2	3	R	2	5	R	2	6	R	2	1	R	2	5/7
	2	R	2																
02	2	R	4	1	U	4	5	U	4	4	A	4	2	U	4				3/5
03	2	U	4	3	U	4	6	U	4	4	R	4	5	A	4				3/5
04	3	U	4	4	U	4	1	A	4	1	U	4	5	U	4				3/5
05	4	A	6	6	A	6	3	U	6										2/3
06	2	A	6	5	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing program, Logic of the program	10
2	Debug the program	10
3	Execution of program, Program Output, Complexity of program	20
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Information Technology:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	-	3
2	-	3	-	-	-	-	-	-	-	-	-	3
3	-	3	-	-	-	-	-	-	-	-	-	3
4	-	3	2	2	-	-	-	2	2	2	-	3
5	-	3	2	2	-	-	-	2	2	2	-	3
6	-	3	2	2	-	-	-	2	2	2	-	3

2. Computer Engineering:

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	3	3
2	-	3	-	-	-	-	-	-	-	-	3	3
3	-	3	-	-	-	-	-	-	-	-	3	3
4	-	3	2	2	-	-	-	2	2	2	3	3
5	-	3	2	2	-	-	-	2	2	2	3	3
6	-	3	2	2	-	-	-	2	2	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Java 2: The Complete reference	Patrick Naughton, McGraw Hill Edu., Fifth Edition, reprint 2015	13:9780072119763
2.	Programming with Java: A Primer	Balagurusamy –TATA McGraw Hill Edu First Reprint 2010	13:9780070141698
3.	JDBC, Servlets and JSP Black Book	Santosh Kumar K. , Kogent Solutions Inc., dreamtech, New ed Paperback – 13 May 2008	13:9788177228373
4.	Advanced Java Programming	Uttam K. Roy, Oxford higher education, illustrated, 2015	13:9780199455508

❖ **E-REFERENCES:**

- Java Development Kit:
<http://www.oracle.com/technetwork/java/javase/downloads/index.html> , assessed on 16th September 2016
- <http://docs.oracle.com/javase/specs/jls/se8/html/index.html>, assessed on 16th September 2016
- <http://docs.oracle.com/javase/tutorial/java/index.html> , assessed on 16th September 2016
- <http://www.tutorialspoint.com/java/> , assessed on 16th September 2016
- <http://www.tutorialspoint.com/javaexamples>, assessed on 16th September 2016
- <http://www.learnjavaonline.org/> , assessed on 16th September 2016
- <http://www.c4learn.com/javaprogramming/> , assessed on 16th September 2016
- <https://www.webucator.com/tutorial/learn-java/index.cfm> , assessed on 16th September 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer System with latest configuration
2. Java Development Kit 1.8 and above
3. Editors : Notepad, Textpad, NetBeans, eclipse (Freeware)

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
3.	Mr. R. L. Meshram	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mr. L. D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.

5.	Mrs. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
7	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
8	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
9	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: IT502E ^s
COURSE TITLE	: WEB TECHNOLOGIES
PREREQUISITE	: CM413E
TEACHING SCHEME:	TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 2 PR CREDIT = 1 CLOCK HR.)
TH. TEE EXAM	: 03 HRs
PR. TEE EXAM	: 02 HRs (External)
PT. EXAM	: 01 HR

❖ RATIONALE:

Web technology is widely used client-server technology for development of applications in industry and commerce. This course focuses on building interactive web sites and web applications. Emphasis is placed on standard web controls and database programming. This course aims that student should learn creating interactive web applications using server controls, database and Ajax and easily get absorbed in current industry requirement. This course is therefore a core course for students who want to work in the area of webpage development.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Illustrate the concept of Client Server architecture.
2. Develop simple Web Form using Built-in ASP.Net Objects.
3. Design and Develop small Applications using enlisted Server Controls in ASP.Net.
4. Design web pages for state management techniques to store and transfer page data.
5. Design web pages for asynchronous web application using database programming and Ajax Control.
6. Design dynamic real life website using the concept of ADO and ASP.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Introduction to Active Server Pages	1. Describe the use of different objects of ASP. 2. Transfer values from one ASP web form to other web form using methods of objects of ASP. 3. Describe the methods and properties of application and server objects of ASP. 4. Design XML and XSL script	1.1 Introduction to ASP 1.2 Benefits of ASP 1.3 Advantages of ASP over HTML 1.4 Using scripting language 1.5 Introduction to IIS 1.6 ASP Objects : Response Object- Sending text with response object and embedded quotes, Response. Cookies collection, Response. Add Header method and Redirect method, Properties of the response object(Expires, Expires absolute), Properties of the response object(Expires, Expires absolute) Request Object Collections- Request. Server Variables, Request. Cookies, Request. Query String, HTML Forms, Request. Form, Request. Client Certificate 1.7 Introduction to XML: Difference between HTML and XML, Use of XML, elements, tags and attributes, Introduction to XSL, Use of XSL	04
2. Introduction to ASP.Net Web Programming & IDE	1. Describe features of ASP.Net over ASP and Client Server Architecture 2. Describe utilization of various parts of IDE 3. Design a New Web application Project (ASP.NET)	2.1 Basics of ASP.NET: Features of ASP.NET, Differences between ASP.NET and Classic ASP, Web Applications and Webpage, Components of Web application, Client Server Architecture 2.2 Creating simple Web Application in ASP.NET: Introduction to Visual Studio, Creating a New Web Project (ASP.NET) , Opening an Existing Web Site, Building Web Sites, Set up of work environment, start page, the menu system, toolbars, the new project dialog box, graphical designer, code designer	06

3. Introduction to VB.Net	1. Recognize various parts of visual basic .net IDE 2. List data types, operators 3. Design small programs using operators, loops and array 4. Apply the dialog boxes in developed applications 5. Differentiate sub procedures and functions 6. Describe exception handling in developed application using structured and unstructured error handling	3.1 Getting Started with Visual Basic .net IDE : Set up of work environment, start page, the menu system, toolbars, the new project dialog box, graphical designers, code designers, the object explorer, the toolbox, the solution explorer, the class view window, the properties window, the dynamic help window, the server explorer, the output window, the command window 3.2 Visual basic language concept :variables, Constants, Data Types, Operators, Control Structures and loops, Arrays : single and multidimensional array, declaring, dynamic array 3.3 Dialog Boxes: Open File Dialog, Save File Dialog, Font Dialog, Color Dialog, Print Dialog 3.4 Sub Procedures and functions : declaring, passing and returning arguments, exiting from it, pass by value and pass by ref 3.5 Exception Handling : Structured Error Handling (Try Catch finally), Unstructured Error Handling (On error go to line, goto 0, goto -1, resume next) 3.6 Multiple document interface (MDI) : MDI Parent form and child form	10
4. ASP.Net Web Forms & Server Controls	1. Develop simple Web Form using Built-in ASP.Net Objects 2. Design and Develop small Applications using enlisted Server Controls in ASP.Net with Visual Basic 3. Describe the Properties, Events and Methods of Server Controls 4. Describe Validation Control	4.1 Working with ASP.Net Web Forms Types of ASP.Net Files ,Web Form Round Trip, Stages in Web Form Processing , ASP.Net Objects (Request, Response, Server, Application, Session) Form Validation 4.2 Introduction of HTML Controls, ASP.Net Server Controls and Validation Controls 4.3 Working with Properties, Events & Methods of Server Controls : Button, Text Box, Label, Check Box, Check Box list, Radio Button, Link Button, List Box, Drop Down List, Image, Hyperlink, Panel, Place Holder,	08

		File Upload 4.4 Validation Controls (Required Field Validator, Compare Validator, Range Validator, Regular Expression Validator, Custom validator, Validation Summary, Validation Group)	
5. State Management & Working with Master Page & Themes	1. Describe state management techniques to store and transfer page data. 2. List steps to configure ASP.Net Configuration files. 3. Design Master Page and its Content pages in ASP.Net 4. Apply skin and theme to your web application	5.1 State Management : View State, Session State, Application State , Query String, Cookies 5.2 ASP.Net Configuration : Global.asax application file , Web.config file 5.3 Master Pages: Create Master pages, Create & Develop Content Pages, Nest Master Page, Access master page controls from content page 5.4 Themes :Create theme , Applying existing theme to an application, Create Skin, Applying skin to a control	10
6. Database Programming using ADO.Net and AJAX	1. Describe ADO.Net Architecture 2. Describe data binding concept on various Data Bound Controls. 3. Describe Connection Object 4. Develop simple web application with AJAX controls 5. Describe Ajax Framework	6.1 Introduction of ADO 6.2 Connection Object : Creating connections with OLEdb and ODBC, Creating System DSN, FileDSN, Opening and Closing connections 6.3 Recordset Object : Cursors, Locks using recordset, Disconnected Recordset, Field Object, Command Object 6.4 Data Reader, Data Sets , Data Adapter, Data View 6.5 Insert, Update, Delete and Data Binding operation using Data Grid, Data List and Repeater Control 6.6 ASP.Net AJAX Control :Ajax Framework, Script Manager, Update Panel & Update Progress Bar Control of Ajax	10
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Create new web project, Open existing web project, building website, and study of toolbars, menu etc.	Introduction to ASP.Net Web Programming & IDE	2
2	Observe and Draw visual .net IDE layout and hands on practice to create, save and open the project	Introduction to VB.Net	2
3	Design, test and debug at least 5 loop, array and operator based vb.net programs		
4	Create a page in ASP.Net using VB.Net, to choose a color from drop-down-list and display a message "you have chosen 'color name' ".		
5	Design a ASP.Net web form for User Registration using different Server Controls and Validate all details in above application using validation controls and display all the details in the same form.	ASP.Net Web Forms & Server Controls	2
6	Develop a web form to perform add, update, delete operation on ListBox control.		2
7	Create a web page, for book sales. Enter the quantity, title and price of the book. Calculate the extended price, discount (15%) and after discount, the actual price of the book. Show the summary of book sales. (Like total no of books, total discount given, total discounted amount and average discount.) You will need command buttons- calculate, clear sale.		2
8	Design a web page to implement upload and download files functionality using File Upload Control.		2
9	Develop a web page to implement the concept of state management using Cookies	State Management & Working with Master Page & Themes	2
10	Develop a web page to implement the concept of state management using Session and Application		2
11	Create a web application using Global.asax file which will count the number of visitors on web page.		2
12	Create a web site using Master Page Concept having two content pages.		2
13	Create a web application implementing Nested Master Page concept.		
14	Design a sample application to connect to database, Fetching and inserting data from database and using Data Reader		2

15	Develop a User Registration form. Insert user details in Database and show the same in DataGrid/GridView control.	Database Programming using ADO.Net and AJAX	2
16	Create a login page in your web application. Login page must have user name and password fields. If user enters correct ID, Password, he must be redirected to the homepage of your website.		2
17	Develop a web application to Add, Update, View and Delete records from Database data shown in Gridview.		2
18	Design a web form showing record in Repeater and Data List.		2
19	Develop a Login application and show Ajax Progress bar while user trying to log in.		
Skill Assessment			2
Total Hrs			32



❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction to Active Server Pages	04(04)	04(00)	00(00)	08(04)
02	Introduction to ASP.Net Web Programming & IDE	04(00)	04(04)	00(00)	08(04)
03	Introduction to VB.Net	00(00)	08(12)	06(00)	14(12)
04	ASP.Net Web Forms & Server Controls	08(00)	04(00)	00(06)	12(06)
05	State Management & Working with Master Page & Themes	02(02)	04(00)	06(06)	12(08)
06	Database Programming using ADO.Net and AJAX	00(06)	04(00)	12(00)	16(06)
	Total	18(12)	28(16)	24(12)	70 (40)

R- Remember U- Understand A- Analyze/Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	2	R	2	2	R	2	5	R	2	5	R	2	5/7
	6	R	2																
02	4	R	4	4	R	4	1	U	4	1	R	4	6	R	4				3/5
03	2	U	4	3	U	4	3	U	4	3	U	4	3	U	4				3/5
04	5	U	4	6	U	4	4	U	4	3	U	4	2	U	4				3/5
05	3	A	6	5	A	6	4	A	6										2/3
06	6	A	6	6	A	6	5	A	6										2/3

T= Unit/Topic Number L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Design sample web page application using ASP.NET	10
2	Performance	20
3	Writing programs to retrieve data using MYSQL and AJAX, Writing programs using Forms, Server Controls and sessions and Cookie etc.	10
5	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3		-	-	-	-	-	-	3	3
2	-	3	3		-	-	-	-	-	-	3	3
3	-	3	3		-	-	-	-	-	-	3	3
4	-	3	3	3	-	-	-	3	3	3	3	3
5	-	3	3	3	-	-	-	3	3	3	3	3
6	-	3	3	3	-	-	-	3	3	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	ASP.NET: The Complete Reference Book	Matthew Macdonald, McGraw Hill Education, 2002	10:007049536X
2.	Murach's ASP.Net Web Programming in VB-Net	Mike Murach ,Shroff Publishers & Distributors Pvt Ltd; 5 th Edition , 2014	10: 9351104419
3.	Programming in Visual Basic. NET	Julia Case Bradley, Anita C. Millsaugh , McGraw Hill Education; 4 th Edition , 2002	10: 0070529094
4.	ASP.NET 4.5, Covers C# and VB Codes, Black Book	Kogent Learning Solutions Inc, Dreamtech Press , May 2013	10: 9351190803
5.	Web Technologies: Black Book	Kogent Learning Solutions Inc., Dreamtech Press, 2009	10: 177229974

❖ **E-REFERENCES:**

- <http://www.asp.net-tutorials.com/basics/introduction/>, assessed on 09th Aug 2016
- <http://www.w3schools.com/asp/default.asp>, assessed on 10th Sept 2016
- <http://www.tutorialspoint.com/asp.net/>, assessed on 10th Sept 2016
- <http://www.learnvisualstudio.net/courses/> assessed on 20th Sept 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer System with latest configuration
2. Multimedia Projector
3. Software - .NET Framework , Web server Internet Information Services (IIS), Visual Studio , Microsoft SQL Server

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	HOD, Dept. of Information Technology	Government Polytechnic, Nagpur.
2.	Mr.S.P.Lambade	Head of Computer Engg.	Government Polytechnic, Nagpur
3.	Ms. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4.	Ms. D. M. Shirkey	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5.	Mr. L. D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
6.	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur
7.	Prof. N.V.Chaudhari	Asst. Professor(CSE)	DBACEO, Wanadongari, Nagpur
8.	Mr. Atul Upadhyay	CEO	Vista Computers, Ram Nagar, Nagpur

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: IT503E ^s
COURSE TITLE	: MULTIMEDIA TECHNIQUES
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (External)
PT.	: 01 HR

❖ RATIONALE:

In the present era of information technology Multimedia techniques is a powerful tool and application development technique and used for developing variety of projects related to interfacing of audio, video text used in real life.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify a range of concepts, techniques and tools for creating and editing the interactive multimedia applications.
2. Identify the current and future issues related to multimedia technology.
3. Describe different multimedia techniques available in market.
4. Develop animated objects.
5. Develop multimedia application for a given scenario.
6. Operate on different software tools for creating multimedia files.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Introduction	1. Define Multimedia 2. Describe the different media types 3. Describe the history of Multimedia 4. List the Multimedia Applications	1.1 Definition of Multimedia, Communications Viewpoint 1.2 Media Types : Static time-dependent discrete media, Dynamic time-dependent continuous media 1.3 Data stream characteristics of continuous media 1.4 Multimedia Application Scenarios 1.5 History of Multimedia	08
2.Multimedia Basics	1. Describe the concept of Frequency and Amplitude of a sound 2. Describe the Principles of Digitization, Sampling and Quantization 3. Define the Nyquist Theorem and give its applications 4. Define the terms : Pixels, Image Resolution, Bit-Map 5. Describe the different types of images. 6. Compare the terms : Monochrome image vs. Grayscale image 7. Describe the different image, audio and video formats 8. Justify the use of different file formats for multimedia files. 9. Recommend the file format for a given multimedia application.	2.1 Basic concepts underlying sound, Definition of frequency and amplitude of a sound, Principles of Digitization, Concept of Sampling and Quantization, Nyquist Theorem and its application, Study of Audio formats (.au, .aiff, .wav) 2.2 Definition of Pixels, Image Resolution, Bit-Map, Concept of Monochrome, Grayscale and Color Images 2.3 System Independent Formats (GIF, JPEG, TIFF, Graphics Animation Files, Postscript / PDF) 2.4 System Dependent Formats (Windows – BMP, Macintosh – PAINT, PICT, X windows - XBM) 2.5 PNG : The Future 2.6 Digital Video, Characteristics of Motion, Persistence of Vision, Television, CRTs, LEDs and Plasma, Color Models for Video, Video Formats (NTSC, PAL-SECAM, HDTV)	08

3. Lossless Compression	1. Describe the concept of compression 2. Define the term redundancy and state its role in compression 3. Compare various coding algorithms in lossless compression 4. Describe various coding algorithms in lossless compression 5. Justify the importance of different compression techniques.	3.1 Introduction to compression, compression with loss, compression without loss, importance of compression, introduction to redundancy 3.2 Minimum Redundancy Coding based on Information Theory: Shannon-Fano Coding, Huffman Coding 3.3 Adaptive Coding based on statistical modeling: Adaptive Huffman, Arithmetic Coding 3.4 Dictionary-based Coding: LZW	09
4. Compression with Loss	1. Describe the concepts of image, audio and video compression 2. Describe JPEG, GIF and PNG 3. Describe the concepts related to image, audio and video compression 4. Compare different modes of JPEG (lossless and hierarchical) 5. Justify the use of different compression techniques for various types of multimedia files.	4.1 Image Compression Concept, Joint Photographic Experts Group (JPEG), Hierarchical JPEG, Lossless JPEG, Graphics Interchange Format (GIF), Portable Network Graphics (PNG) 4.2 Audio compression concept, The Psychoacoustic Model, Threshold of Hearing, Adaptive Pulse Code Modulation (ADPCM), Linear Predictive Coding, MPEG Layer 1-2-3 (MP3) 4.3 Video Compression Concept, Persistence of Vision, Motion Estimation, Motion JPEG, H 261, Bi-directional coding, H 263, Motion Picture Experts Group (MPEG)	06
5. Storage, Retrieval and Presentation of Media	1. Describe various storage mechanisms for multimedia 2. Describe multimedia presentation (Dolby Sound, Television and HDTV) 3. Compare different levels of multimedia synchronization 4. Describe the concept of multimedia DBMS 5. List the major issues in multimedia DBMS 6. Identify the requirements for multimedia DBMS 7. Justify the need of the requirements identified for multimedia DBMS.	5.1 Portable low-form factor Media, DLT for Audio, Optical Storage: Compact Disk Audio(CD), Digital Versatile Disk(DVD) 5.2 Dolby Sound, Television and HDTV 5.3 Three levels of Multimedia Synchronization: Intra-Media, Inter-Media and Inter-Party 5.4 Multimedia database, Requirements of multimedia DBMS, Major issues in multimedia DBMS : Query Support, Storage Support, Presentation and Delivery Support	09

6. Images and Animation	1. Define the terms related to images and animation 2. Describe the various organizing tools in multimedia 3. Describe the various animation file formats 4. Describe the principles of animation 5. Describe various animation techniques 6. Justify the power of animation for a multimedia application using any scenario 7. Recommend the appropriate animation technique for a given scenario.	6.1 Organizing tools, Multiple Monitors 6.2 Making still images, Bitmaps, Vector Drawing, 3 -D Drawing and Rendering 6.3 The Power of motion, Principles of Animation, Animation Techniques (Traditional, 2D, 3D, Motion Graphics, Stop Motion) 6.4 Animation File Formats(FLI,GIF,MNG,SWF), Making Animation That Works	08
	Total Hrs.		

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Set the system required for multimedia development.	Multimedia Basics	2
2.	Interface various multimedia devices.		2
3.	Develop an animation to represent the growing moon.	Images And Animation	4
4.	Develop an animation to indicate a ball bouncing on steps.		4
5.	Develop an animation to simulate movement of a cloud.		4
6.	Develop an implement the procedure to display the background given through your name		4
7.	Design a visiting card containing atleast one graphic and text information.		4
8.	Prepare a cover page for the book in given subject area.		4
Skill Assessment			4
Total Hrs.			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction	02(02)	04(04)	00(00)	06(06)
02	Multimedia Basics	04(02)	04(04)	06(00)	14(06)
03	Lossless Compression	04(00)	08(06)	04(00)	16(06)
04	Compression with Loss	00(04)	04(00)	06(04)	10(08)
05	Storage, Retrieval and Presentation of Media	02(00)	04(04)	06(04)	12(08)
06	Images and Animation	02(00)	04(00)	06(06)	12(06)
	Total	14(08)	28(18)	28 (14)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	3	R	2	3	R	2	5	R	2	6	R	2	1	R	2	5/7
	2	R	2																
02	2	R	4	1	U	4	5	U	4	4	A	4	2	U	4				3/5
03	2	U	4	3	U	4	6	U	4	4	R	4	5	A	4				3/5
04	3	U	4	4	U	4	3	A	4	1	U	4	5	U	4				3/5
05	4	A	6	6	A	6	3	U	6										2/3
06	2	A	6	5	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		Questionnaires	1, 2, 3, 4,5,6
	End Of Course			End Of The Course				

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing program, Logic of the program	10
2	Debug the program	10
3	Execution of program, Program Output, Complexity of program	20
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	3	3
2	-	3	-	-	-	-	-	-	-	3	3	3
3	-	3	-	-	-	-	-	-	-	3	3	3
4	-	3	3	3	-	-	-	3	3	3	3	3
5	-	3	3	3	-	-	-	3	3	3	3	3
6	-	3	3	3	-	-	-	3	3	3	3	3

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Multimedia: Making It Work	Tay Vaughan, McGraw-Hill Education, 9 th Edition, 2014	10: 0071832882
2.	Multimedia: Concepts and Practice	Stephen McGloughlin, Pearson, 1 st Edition, 2000	10: 0130188301
3.	Principles of Multimedia	Ranjan Parekh, McGraw Hill Education, 2 nd Edition, 2012	10: 1259006506

❖ **E-REFERENCES:**

- <http://users.ece.utexas.edu/~ryerraballi/MSB/Contents.html>, assessed on 16th October 2016
- <http://www4.comp.polyu.edu.hk/~cstyng/cyberu.02/MMPresentation.ppt>, accessed on 28th October 2016
- <http://cis.k.hosei.ac.jp/~jianhua/course/mm/>, accessed on 28th October 2016
- http://cd1.edb.hkedcity.net/cd/tech_edu/handout/Files/Multimedia_Production_and_Web_Authoring_Day1.pdf, accessed on 28th October 2016
- <http://ocw.unimas.my/course/view.php?id=38>, accessed on 7th November 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Adobe Flash and Adobe Photoshop

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
3.	Mr. S. A. Khatri	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4.	Mr. L. D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
5.	Mrs. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
7	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
8	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
9	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: IT504E^s
COURSE TITLE	: DATA MINING AND DATA WAREHOUSING
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03; TU: 00; PR: 02 (CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (External)
PT.	: 01 HR

❖ RATIONALE:

This course introduces advanced aspects of data warehousing and data mining, encompassing the principles, research results and commercial application of the current technologies.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify the concepts of data warehousing and data mining.
2. Identify difference between DBMS and Data warehouse.
3. Appreciate the issues underlying database implementation.
4. Perform various operations using Data warehousing and data mining.
5. Perform query facilities to formulate queries and manipulate the database e.g. Structured Query Language (SQL).
6. Create Data Warehouse

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1.Introduction to data warehouse and Data mining	1. Define the term Data warehouse and Data mining 2. List the functionalities Data warehouse 3. Describe the stages of KDD 4. Describe Issues in Data Warehouse and Data Mining 5. List Application of Data Warehouse and Data Mining.	1.1 Concepts of Data Warehouse and Data Mining 1.2 Functionalities 1.3 stages of Knowledge discovery in database(KDD) 1.4 Setting up a KDD environment 1.5 Issues in Data Warehouse and Data Mining, 1.6 Application of Data Warehouse and Data Mining	06
2.Datawarehouse and OLAP Technology	1. Differentiate between DBMS vs. Data Warehouse. 2. Design Multidimensional data model 3. Describe/Define the term related to Data, metadata 4. Define Data cubes 5. Design Data Warehouse Architecture 6. Describe Distributed and Virtual Data Warehouse 7. Define the term: OLTP, OLAP, 8. List types of OLAP	2.1 DBMS vs. Data Warehouse 2.2 Data marts 2.3 Metadata 2.4 Multidimensional data model, Data Cubes 2.5 Schemas for Multidimensional Database: Stars, Snowflakes and Fact Constellations 2.6 Data Warehouse Architecture 2.7 Distributed and Virtual Data Warehouse 2.8 Data Warehouse Manager, OLTP (online transaction processing), OLAP (online analytical processing) types of OLAP, Servers.	14
3.Datamining	1. Define the term Data mining 2. Distinguish between KDD versus Data mining 3. Describe the Data mining techniques, tools. 4. List application of Data mining. 5. Analyse the pattern presentation & visualization specification 6. Describe	3.1 Data Mining definition and Task 3.2 KDD versus Data Mining 3.3 Data Mining techniques, tools and application 3.4 Data mining query languages 3.5 Data specification, specifying knowledge, hierarchy specification 3.6 Pattern presentation & visualization specification 3.7 Data mining languages and	8

	standardization of data mining	standardization of data mining.	
4.Mining Association Rules in Large Databases	1. Define/Describe Association Rule Mining 2. Describe why Association Mining is necessary 3. Describe the characteristics of Pros and Cons of Association Rules 4. Write Apriori Algorithm	4.1 Association Rule Mining 4.2 Need of Association Mining 4.3 Pros and Cons of Association Rules 4.4 Apriori Algorithm	4
5.Classification and Prediction	1. Describe the Issues regarding classification and Prediction 2. Classify decision Tree Induction 3. Define Regression 4. State the types of Regression 5. Illustrate Issues regarding Classification & Prediction	5.1 Issues regarding 5.2 Classification & Prediction 5.3 Classification by Decision Tree Induction 5.4 Introduction to Regression 5.5 types of Regression	6
6.Clustering And Applications And Trends In Data Mining	1. Describe the term related to Cluster analysis 2. Select appropriate methods for categorization of cluster. 3. Illustrate k-mean method 4. Differentiate between different methods of clustering. 5. List application of Data mining.	6.1 Cluster Analysis 6.2 Types of Data 6.3 Categorization of Major Clustering Methods 6.4 K-means, Partitioning Methods 6.5 Hierarchical Methods 6.6 Density-Based Methods ,Grid Based Methods, Model-Based Clustering Methods 6.7 Data Mining Applications.	10
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Identify the fundamental concepts of data warehouse and Data mining	Introduction to data warehouse and Data mining	2
2.	Create a simple data warehouse		2
3.	Perform OLAP operations such as Roll Up, Drill Down, Slice, Dice through SQL- Server	Data warehouse and OLAP Technology Data mining	2
4.	Perform preprocessing on dataset Weather. ARFF (Specify the name of the dataset chosen by each individual, instead of Weather) includes creating an ARFF file and reading it into WEKA using the WEKA Explorer.	Classification and Prediction	2
5.	Implement Data Cleansing applying uppercase on first name and last name in C++.		4
6.	Perform Preprocessing, Classification and Visualization techniques on Agriculture dataset.	Clustering And Applications And Trends In Data Mining	4
7.	Perform Association rule based on (Apriori algorithm) or Clustering algorithm (Kmeans)		4
8.	Perform Clustering technique on Customer dataset		4
9.	Perform Association technique on Agriculture dataset.		4
Skill Assessment			4
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction to data warehouse and Data mining	04(04)	04(04)	06(00)	14(08)
02	Data warehouse and OLAP Technology	04(00)	04(08)	06(00)	14(08)
03	Data mining	00(02)	04(04)	06(00)	10(06)
04	Mining Association Rules in Large Databases	00(02)	06(04)	06(00)	12(06)
05	Classification and Prediction	04(00)	04(00)	00(06)	08(06)
06	Clustering And Applications And Trends In Data Mining	02(00)	10(00)	00(06)	12(06)
	Total	14(08)	32(20)	24 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	4	U	2	6	U	2	6	R	2	3	R	2	5/7
	4	R	2																
02	2	R	4	1	U	4	2	U	4	2	U	4	2	U	4				3/5
03	3	U	4	4	U	4	5	R	4	1	R	4	1	U	4				3/5
04	5	U	4	6	U	4	6	U	4	3	U	4	4	U	4				3/5
05	1	A	6	2	A	6	5	A	6										2/3
06	3	A	6	4	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing diagram, selection of equipment's., writing procedure etc.	10
2	Performance	20
3	Knowledge	10
4	Viva voice	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	3	3	-	-	-	-	-	3	3	3
2	-	3	3	3	-	-	-	-	-	3	3	3
3	-	3	3	3	-	-	-	-	-	3	-	3
4	-	3	3	3	-	-	-	3	3	3	3	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	3	3

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Data Warehousing	Reema Thareja, Oxford,2009	13: 9780198096221
2.	Data Warehousing Fundamentals	Paulraj Ponnian, John Willey, 2001.	13:978047046207-2
3	Data Mining Techniques	Arun K pujari, Universities Press, Second Edition, 2010.	13:978 81 7371 672 0
4.	Introduction to Data Mining	Ping-Ning Tan, Vipin kumar, Steinbach, Pearson, 2006	13: 9780321321367
5.	Introduction to Data Mining with Case Studies	G.K.Gupta, PHI learning Pvt. Ltd.,2014	13:9788120343269

❖ **E-REFERENCES:**

- https://docs.oracle.com/cd/B28359_01/datamine.111/b28129/process.htm, assessed on 01 August 2016
- <https://www.youtube.com/watch?v=dGDuD10U4-M>, assessed on 01 August 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Operating System(Windows 98/2000/XP/7/8/8.1/10)
2. CPU Intel core i3/i5/i7
3. Printers(INK JET/LASER)
4. Softwares:
 - i. IBM - Intelligent Miner and more
 - ii. SAS - Enterprise Miner
 - iii. Silicon Graphics - MineSet
 - iv. Oracle - Thinking Machines - Darwin
 - v. Angoss – knowledge SEEKER

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr.A.R.Mahajan	Head of Information Technology	Government Polytechnic, Nagpur
2.	Mr.S.P.Lambade	Head of Computer Engg.	Government Polytechnic, Nagpur
3.	Ms.I.G.Lokhande	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mr.R.L.Meshram	Lecturer in Information Technology	Government Polytechnic, Nagpur
5.	Prof. Manoj Jethawa	HOD, Computer Science	ShriDattaMeghe Polytechnic, Nagpur
6	Prof. N. V. Choudhari	Asst. Professor(CSE),	DBACOE, Wanadongari, Nagpur
7	Mr. Atul Upadhyay	CEO	Vista Computers, Ramnagar, Nagpur

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: IT505E ^s
COURSE TITLE	: MOBILE COMPUTING
PREREQUISITE	: NIL
TEACHING SCHEME:	TH: 03; TU: 00; PR: 02 (CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 03 HRs
PR. TEE	: 02 HRs (External)
PT.	: 01 HR

❖ RATIONALE:

The use of mobile communication and android based applications are increasing day by day. It is therefore necessary for students to know that how mobile communication works and how to build mobile apps for android operating system. This course covers the necessary concepts which are required to understand mobile communication and to develop Android Applications. Thus it is key course for computer engineers, who want to work in the area of communication.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Comprehend functioning of different mobile technology
2. Impart the fundamentals concepts of mobile communication systems
3. Apply various techniques on working with menu
4. Develop programs based on Android activities life cycle
5. Execute operations on GUI objects
6. Perform Event driven programming

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1 Introduction to Mobile Computing	1. Describe Mobile technology and generations 2. Define and Describe characteristics of GSM and CDMA 3. Describe services and architecture of GSM AND Mobile Computing 4. Describe mobile handoff and its types 5. Describe the location management with different schemes	1.1 Concept of Mobile Communication 1.2 Different generations of wireless technology 1.3 Basics of cell, cluster and frequency reuse concept 1.4 Noise and its effects on mobile 1.5 Understanding GSM and CDMA 1.6 Basics of GSM architecture and services like voice call, SMS, MMS, LBS, VAS 1.7 Evolution of mobile system: CDMA, FDMA, TDMA, GSM, GPRS 1.8 Mobility: handoff, types of handoffs 1.9 Location management, HLR-VLR scheme, Hierarchical scheme, predictive location management schemes	08
2. Mobile Communication	1. Describe characteristics, Application & Security issue of Mobile Computing 2. Describe Middleware and Gateway for Mobile Computing 3. Describe Mobile IP and mobile Communication Protocol 4. Analyze Mobile computing through telephony	2.1 Modes used for Mobile Communication 2.2 Architecture of Mobile Computing(3 tier) 2.3 Design considerations for mobile computing 2.4 Characteristics of Mobile Communication 2.5 Application of Mobile Communication 2.6 Security Concern Related to Mobile Computing 2.7 Middleware and Gateway required for mobile Computing 2.8 Making Existing Application Mobile Enable 2.9 Mobile IP 2.10 Basic Mobile Computing Protocol 2.11 Mobile Communication via Satellite Low orbit satellite Medium orbit satellite Geo stationary satellite 2.12 Satellite phones	06
3. Introduction to Android	1. Analyze Open source mobile technology, Describe Basics of Application development	3.1 Overview of Android 3.2 Android Internals 3.3 Android for mobile apps	10

	2. Describe Framework, SDK, Emulation 3. Describe Android Application structure 4. Demonstrate android framework	development 3.4 Environment setup for Android apps Development 3.5 Framework - Android- SDK, Eclipse 3.6 Emulators –Emulator / Android AVD 3.7 Android Emulation – Creation and set up. 3.8 First Android Application	
4. Android Activities and GUI Design Concepts	1. Describe Android Activities lifecycle and UI Layout 2. Describe Expressions, Manifest, other necessary UI concept 3. List and Describe GUI Objects, 4. Describe Layout Design concepts 5. Apply simple user interface	4.1 Design criteria for Android Application: Hardware Design Consideration, Design Demands For Android application, Intent, Activity, Activity Lifecycle and Manifest 4.2 Creating Application and new Activities 4.3 Simple UI -Layouts and Layout properties :Introduction to Android UI Design, Introducing Layouts 4.4 XML Introduction to GUI objects viz.: Push Button , Text / Labels , EditText, ToggleButton , Padding	08
5. Advanced UI Programming	1. Describe Android Event driven Programming, Activity Lifecycle, Describe Exception handling 2. Describe Activity Lifecycle of Android 3. Apply event driven programming in android	5.1 Event driven Programming in Android (Text Edit, Button clicked etc.) 5.2 Activity Lifecycle of Android	08
6. Toast, Menu, Dialog, List and Adapters	1. Describe working with menu and dialog, Themes, Dialog 2. Describe Demo Application Launching 3. Describe Database operation 4. Demonstrate application development and launching	6.1 Menu :Basics, Custom v/s System Menus, Create and Use Handset menu Button (Hardware) 6.2 Dialog : Creating and Altering Dialogs 6.3 Toast : List & Adapters 6.4 Demo Application Development and Launching 6.5 Basic operation of SQLite Database 6.6 Android Application Priorities	08
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Installation and setup of java development kit(JDK),setup android SDK, setup eclipse IDE, setup android development tools (ADT) plugins, create android virtual device	Introduction to Android	1
2.	Create “Hello World” application. That will display “Hello World” in the middle of the screen using Text View Widget in the red color		1
3.	Create application for demonstration of android activity life cycle	Android Activities and GUI Design Concepts	1
4.	Create Registration page to demonstration of Basic widgets available in android.		1
5.	Create sample application with login module.(Check username and password) On successful login, Chnage Text View “Login Sucessful”. And on failing login, alert user using Toast “Login fail”		1
6.	Create login application where you will have to validate username and passwords Till the username and password is not validated , login button should remain disabled.		1
7.	Create and Login application as above. Validate login data and display Error to user using setError() method.		1
8.	Create an application for demonstration of Relative and Table Layout in android.		1
9.	Create an application for demonstration of Scroll view in android		2
10.	Create an application for demonstration of Explicitly Starting New Activity using Intent.		2
11.	Create an application that will pass two number using TextView to the next screen, and on the next screen display sum of that number.		2
12.	Create spinner with strings taken from resource folder(res >> value folder). On changing spinner value, change background of screen.		2
13.	Create an application that will get the Text Entered in Edit Text and display that Text using toast (Message).	Advanced UI Programmin g	2
14.	Create an application that will Demonstrate Button on Click() Event and change the Text View Color based on button Clicked		2
15.	Create an UI such that, one screen have list of all the types of cars. On selecting of any car name, next screen should show Car details like: name, launched date, company name	Toast, Menu, Dialog, List and Adapters	2
16.	Create an application that will Demonstrate Dialog Box Control In Android		2
17.		Mini Project	6
Skill Assessment			2
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction to Mobile Computing	02(00)	06(04)	04(00)	12(04)
02	Mobile Communication	02(04)	06(04)	04(00)	12(08)
03	Introduction to Android	04(00)	04(06)	04(00)	12(06)
04	Android Activities and GUI Design Concepts	02(00)	04(04)	06(04)	12(08)
05	Advanced UI Programming	02(02)	04(00)	04(04)	10(06)
06	Toast, Menu, Dialog, List and Adapters	02(02)	04(00)	06(06)	12(08)
	Total	14(08)	28(18)	28 (14)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	4	R	2	5	R	2	6	R	2	5	R	2	5/7
	6	R	2																
02	3	R	4	5	U	4	2	A	4	4	U	4	1	U	4				3/5
03	3	U	4	6	U	4	5	A	4	2	R	4	4	A	4				3/5
04	4	U	4	1	A	4	3	A	4	2	U	4	5	A	4				3/5
05	1	U	6	4	A	6	6	A	6										2/3
06	2	U	6	6	A	6	3	U	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing program, Logic of the program	10
2	Debug the program	10
3	Execution of program, Program Output, Complexity of program	20
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	-	3
2	-	3	-	-	-	-	-	-	-	-	-	3
3	-	3	-	-	-	-	-	-	-	-	-	3
4	-	3	2	2	-	-	-	2	2	2	-	3
5	-	3	2	2	-	-	-	2	2	2	-	3
6	-	3	2	2	-	-	-	2	2	2	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Building Android Apps In Easy Steps	McGraw Hill Education; 1 st Edition 8 August 2012	13:9781259060977
2.	Professional Android 4 Application Development	Reto Meier, Wiley India Pvt Ltd, April 2012	13:9781118102275
3	Beginning Android 4	Mark L Murphy, Grant Allen - Wiley India Pvt Ltd, 2012	13: 9781430226291
4	Pro Android	Dave Maclean, Satya Komatineni, Grant Allen, Dreamtech Press, October 2015	13:9781430215967

❖ **E-REFERENCES:**

- <http://www.tutorialspoint.com/android/> assessed on 04th October 2016
- http://www.tutorialspoint.com/android/android_overview.htm assessed on 04th October 2016
- <http://pl.cs.jhu.edu/oose/resources/android/Android-Tutorial.pdf> assessed on 04th October 2016
- <http://mobisys.in/blog/2012/01/introduction-to-android-sqlite-database/> assessed on 04th October 2016
- developer.android.com/training/basics/firstapp assessed on 04th October 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Computer System with latest configuration

Hardware: Necessary Kits or Environment to briefly introduce mobile technology environment like GSM, CDMA and GSM services, Computer with latest configuration

2. Software: Java, Netbeans, Eclipse, Android SDK (open source)

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
3.	Mr. R. L. Meshram	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
5.	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
6	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CM/IT
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: CM502E ^s
COURSE TITLE	: SOFTWARE TESTING
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH.TEE	: 03 HRs
PR.TEE	: 02 HRs (External)
PT.	: 01 HRs

❖ RATIONALE:

Computer Engineering and Information Technology students should know basic strategies used to test software developed by them. This course describes the basic concept & principles to create tests that mimic the actions and assessments of a human tester which will describe the Software Quality Assurance. This course is helpful to adopt automated testing capabilities for functional, regression, GUI, and data-driven testing.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Apply strategies for generating system test cases.
2. Find defects in developed software.
3. Select tools for test management and bugs tracking.
4. Execute tests for different types of software.
5. Evaluate test results.
6. Perform automated regression testing.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
1. Software Testing Background	1. State the impact of software bugs on our lives. 2. Describe different types of bugs that they occur. 3. List major components that go into a software product. 4. Identify different people and skills contribute to a software product. 5. Define terms commonly used by software testers.	1.1 Infamous Software Error Case Studies, Terms for Software Failure, Bugs- A Formal Definition, causes of Bugs, The Cost of Bugs, goals of software tester, qualities of good software tester. 1.2 The Software Development Process, Product Components, Software Project Staff, Software Development Lifecycle Models, 1.3 Software Testing Terms and Definitions, Precision and Accuracy, Verification and Validation, Quality and Reliability, Testing and Quality Assurance.	06
2. Testing Fundamentals I	1. Differentiate different types of testing methods. 2. Apply high-level techniques used for reviewing a product specification. 3. Design and try to reduce the number of test cases by using different methods.	2.1 Examining the Specification- Black-Box and white-box Testing, Static and Dynamic Testing, Static Black Box Testing. 2.2 Performing a High Level Review of the Specification, Low Level Specification Test Techniques. 2.3 Testing the software with Blinders on Dynamic Black-Box Testing, Test-to-pass and Test-to-fail, Equivalences Partitioning, Boundary Value Analysis, Data Testing, State Testing, Other Black-Box Test Techniques.	08
3. Testing Fundamentals II	1. Enlist benefits of different static testing methods. 2. Apply coding guidelines and standards. 3. Review code for errors. 4. Describe dynamic testing method. 5. Differentiate between debugging and testing by using different methods.	3.1 Examining the Code: Static White Box Testing, Formal Review, Coding Standards and Guidelines. 3.2 Generic Code Review Checklist: Data Reference Errors, Data Declaration Errors, Computation Errors, Comparison Errors, Control Flow Errors, Subroutine	08

	6. Describe and apply different testing strategies.	Parameter Errors, Input/ Output Errors, and Other checks. 3.3 Testing the software with X-Ray Glasses: Dynamic White Box Testing, Dynamic white box testing versus debugging, testing the Pieces. 3.4 Data Coverage: Data Flow, Sub-Boundaries, Formula and Equations, Error Forcing. 3.5 Code Coverage: Program Statements and Line Coverage, Branch Coverage, Condition Coverage, basis path testing.	
4. Applying Your Testing Skills	1. State necessity of Configuration Testing. 2. Apply standard s and guidelines for software usability and compatibility testing. 3. Describe fundamental parts of a Web page that need to be tested. 4. Describe and apply basic white-box and black-box techniques to test Web page.	4.1 An Overview of Configuration Testing, Approaching the Task. 4.2 Compatibility Testing Overview, Platform and Application Versions, Standards and Guidelines, Data Sharing Compatibility. 4.3 User Interface Testing, Making a Good UI, Testing for the Disabled. 4.4 Web Site Testing: Web Page Fundamentals, Black-Box Testing, Gray-Box Testing, White-Box Testing, Configuration and Compatibility Testing, Usability Testing, Introducing Automation.	08
5. Automated Testing & Testing Tools	1. State necessity of test tools and automation. 2. Describe how to feed and care for “monkeys”. 3. State the purpose of using different test tools. 4. Choose proper testing tools.	5.1 The Benefits of Automation and Tools, Test Tools, Software Test Automation, Random Testing, Realities of Using Test Tools and Automation. 5.2 Bug Bashes and Beta Testing:- Only as far as the eye can see, Test sharing, beta testing, outsourcing your testing. 5.3 Types of test Tools- Tools for test management and Control, Test Specification, Static Testing, Dynamic Testing, Non functional testing. 5.4 Selection and Introduction of Test Tools, Tool Selection and Introduction, Cost Effectiveness of Tool Introduction.	10

6. Test Management	1. Apply Test Strategies. 2. State benefits and drawbacks of independent testing. 3. State Roles and qualification of different profiles. 4. Apply guidelines for structuring the quality assurance plan. 5. State Metrics for monitoring the test process.	6.1. Test Organization, Test teams, tasks and Qualifications. 6.2. Test Planning, Quality Assurance Plan, Test Plan, Prioritization Plan, Test Exit Criteria. 6.3. Cost and economy Aspects 6.4. Test Strategies, Preventive versus Reactive Approach, Analytical versus heuristic Approach, Testing and Risk 6.5. Test Activity Management, Incident Management, Configuration Management.	08
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Write a program in C/C++ to find the roots of a quadratic equation and perform Boundary Value Analysis (BVA).	Testing Fundamentals I	2
2	Write a program in C/C++ to find the area of a circle, triangle, square and rectangle and perform Equivalence Class testing		2
3	Write Test Cases for any one given Application.	Testing Fundamentals II	2
4	Write a program in C/C++ to read 3 sides of a triangle & to determine whether they form scalene, isosceles or equilateral triangle and test the same using basis path testing and and find its V(G) by all the three methods.		4
5	Test a website using automation tool like QTP, Winrunner , Selenium etc)	Applying Your Testing Skills	4
6	Use any automated test tool.(e.g. Autoit V3 tool) and demonstrate the use of 1) If....else 2) For ...Loop 3) Do...Until 4) Switch ... Case	Automated Testing & Testing Tools	4
7	Create any GUI Application e.g. Calculator and Automate using Autoit V3 tool.		4
8	Automate Notepad Application using AutoIT.		2
9	Automate any installation procedure (e.g. WinZip, Winrar, Acrobat Reader etc.)		2
10	Choose any one Bug Tracking Tool (e.g. Bugzilla, Bugit, etc) and demonstrate it.		2
11	Choose any one test management tool (e.g. Test Director) and demonstrate it.	Test Management	2
Skill Assessment			2
Total HRs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Software Testing Background	02(00)	08(04)	00(00)	10(04)
02	Testing Fundamentals I	00(00)	04(04)	06(00)	10(04)
03	Testing Fundamentals II	02(02)	04(04)	06(00)	12(06)
04	Applying Your Testing Skills	02(00)	04(04)	06(06)	12(10)
05	Automated Testing & Testing Tools	02(00)	08(04)	06(06)	16(10)
06	Test Management	02(02)	08(04)	00(00)	10(06)
	Total	10(04)	36(24)	24 (12)	70 (40)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	3	R	2	4	R	2	5	R	2	6	R	2	3	R	2	5/7
	6	R	2																
02	1	U	4	2	U	4	3	U	4	1	U	4	2	U	4				3/5
03	1	U	4	4	U	4	5	U	4	3	U	4	4	U	4				3/5
04	5	U	4	6	U	4	6	U	4	5	U	4	6	U	4				3/5
05	2	A	6	3	A	6	4	A	6										2/3
06	4	A	6	5	A	6	5	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Write Test Cases , Use any automated test tool, demonstration of any test management tool	20
2	Performance	10
3	Automate any installation procedure, selection of proper testing method	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:****1. Computer Engineering:-**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	-	-	3	-	3
4	-	3	2	2	-	-	-	2	2	3	2	3
5	-	3	2	2	-	-	-	2	2	3	2	3
6	-	3	2	2	-	-	-	2	2	3	2	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	-	-	3	-	3
4	-	3	2	2	-	-	-	2	2	3	-	3
5	-	3	2	2	-	-	-	2	2	3	-	3
6	-	3	2	2	-	-	-	2	2	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S. N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Software Testing	Ron Patton, Sams; 2 Edition , August 5, 2005	10: 0672327988 13: 978-0672327988
2.	Software Testing Foundations	Andreas Spillner, Tilo Linz, Hans Schaefer, Spillner, Linz, Schaefer, 4th Edition, 2014	978-1-937538-42-2
3.	Foundations Of Software Testing	Aditya Mathur, Addison-Wesley Professional; 1 Edition (April 17, 2008	10: 8131716600 13: 978-8131716601
4.	The Art Of Software Testing	Glenford J. Myers Tom Badgett Corey Sandler, Johnwiley & Sons, Inc., Hoboken, New Jersey., Third Edition, October 2011.	978-1-118-03196-4 978-1-118-13313-2
5.	Software Testing Principles and Practices	Srinivasan Desikan, Gopalswamy Ramesh, Dorling Kindersley, Sixth Emprression, 2008	978-81-7758-121-8

❖ **E-REFERENCES:**

- http://www.tutorialspoint.com/software_testing/software_testing_types.htm , assessed on 30th August 2016
- <http://www.softwaretestingtimes.com/2010/04/software-testing-tutorials-for.html>, assessed on 30th August 2016
- <http://www.softwaretestinghelp.com/15-best-test-management-tools-for-software-testers/> , assessed on 30th August 2016
- <http://www.etestinghub.com/testdirector.php> , assessed on 30th August 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

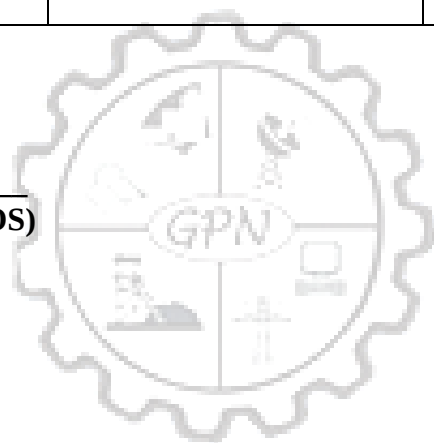
1. Personal Computer with Operating system (XP, Windows etc)
2. Test management tool (e.g. Test Director) Wattmeter 0-3000 W
3. WinZip, Winrar, Acrobet Reader.
4. Bug Tracking Tool (e.g. Bugzilla, Bugit, etc).
5. Automation tool like QTP, Winrunner , Selenium etc).
6. Automation tool (eg. AutoIT).

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S. P. Lambade	HOD, Computer Engineering	Government Polytechnic, Nagpur.
2	Dr.A.R.Mahajan	H.O.D, Information Technology	Government Polytechnic, Nagpur.
3.	Ms. S. N. Chaudhari	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4.	Ms. D. M. Shirkey	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5	Ms. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
6	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur
7	Prof. N.V.Chaudhari	Asst.Proffessor(CSE)	DBACEO, Wanadongari,Nagpur
8	Mr. Atul Upadhay	CEO	Vista Computers, Ram Nagar,Nagur

(Member Secretary PBOS)

(Chairman PBOS)



FREE ELECTIVES

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/CM/IT/MT/PK/AE/TX/TR
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: FS501E
COURSE TITLE	: FINISHING SCHOOL
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK Hrs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: NIL
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: NIL

❖ RATIONALE:

Polytechnic Diploma pass outs who are not readily employable in the desired target jobs, need further grooming. Diploma engineers are not fit for relevant jobs in related work areas in corporate due to lack of required skills like communication, team work, arithmetic, public speaking, attitude building, ethics, business etiquettes etc. This 'disconnects' between the desired jobs and the qualifications obtained needs to be addressed by institutes. This course helps in bridging the gap between Formal education and Industry requirements. Industries and Institutes have a role to play. A pre-employment training programme in which curriculum is developed for students to prepare them for requirements of industries. It aims to provide soft skills to student to facilitate their employability and play a part in the supply side issues (of talent) of the industry. Students then can adapt themselves to the industrial scenario.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

- 1 Perform SWOT analysis
- 2 Demonstrate soft skills.
- 3 Enhance employability skills.
- 4 Adapt ethics and values.
- 5 Practice interpersonal skills.
- 6 Refine communication skills.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes(Cognitive Domain)	Topics and subtopics	Hrs
Nil			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	- Identify Strengths and Weaknesses of Self - Observe Opportunities and Threats in Self - Exhibit different interpersonal skills in given situations.	A. Soft Skills Understanding self & others a. SWOT Analysis b. Interpersonal Skills	4
2	- Practise face to face communication in formal/informal groups. - Observe Body Language of others and note the changes in different persons. - Construct and demonstrate short public speech of five minutes on a topic of interest. - Identify signs and signals as a means of communication and list them.	A. Soft Skills Communication Skills a. Verbal & Non Verbal Communication b. Body Language c. Sixth sense Intuition d. Public Speaking	8
3	- Identify factors in self esteem. - Produce a list of behavioural elements of concentration. - Practise tongue twister to enhance power of concentration.	A. Soft Skills Self Confidence a. Strength of Conviction b. Power of Concentration c. Self Esteem	4
4	- Practise three different dress combinations for professional presentation. - Demonstrate three social manners and etiquettes in a group task	A. Soft Skills Presenting Self a. Fine Grooming b. Dress Sense c. Manners & Etiquettes	4
5	- Set career goals for next five years and list activities to achieve these goals. - Prepare a chart of daily routine activities with Important, Very important, Urgent and Very urgent	A. Soft Skills Effective Self Management a. Goal Setting b. Time Management c. Emotional Quotient d. Motivating self and	6

	classification. - Identify assertive behavioural aspects of persons in your surrounding - Identify factors/elements related to emotional balance in given situations.	Others e. Positive Thinking & Assertiveness	
6	- Practise yoga /meditation. - Prepare a habit plan and list steps for action plan. - Construct diet chart for self.	A. Soft Skills Personality Development a. Physical & Mental Health b. Habit formation- Do's & Don'ts c. Diet Pyramid	6
7	Exhibit attitude as response to various situations (case studies).	B. Employability Skills Attitudes	2
8	Demonstrate technical skills of different subjects.	B. Employability Skills Technical Skills	6
9	Observe the weakness domain of the individuals in given situations.	B. Employability Skills Adaptability	4
10	- Compose creative essay. - Suggest creative solutions to various given situations.	B. Employability Skills Creativity and Innovation	4
11	Exhibit team spirit and leadership qualities while working in a team.	B. Employability Skills Interpersonal Skills a. Working in Team b. Leadership	4
12	Practise Role play in group to exhibit corporate culture.	B. Employability Skills Corporate culture	4
13	- Prepare Resume. - Practise Group Discussions. - Demonstrate interview techniques through mock interview.	B. Employability Skills Job Selection Process a. Resume Writing b. Group Discussions c. Personal Interview	8
Total Hrs.			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Not Applicable

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

Not Applicable

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Report writing	20
2	Presentation Skills	20
3	Viva voce	10
Total		50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (Cos)	Program Outcomes (Pos)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	3	2	-	-	-	3	-	3	-	-
2	-	-	3	-	3	-	3	3	3	3	-	-
3	-	-	-	2	3	-	3	3	3	3	-	-
4	-	-	-	-	3	2	3	3	3	3	-	-
5	-	-	3	-	3	2	3	3	3	3	-	-
6	-	-	3	-	3	2	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	How to win friends and Influence people	Dale Carnegie, Fingerprint Edition 2016	10: 8175993480 13: 978-8175993488
2.	The SWOT Analysis	Lawrence G. Fine, Createspace Edition 2009	10: 1449546757 13: 978-1449546755
3.	Body Language	Allan Pease, Manjul Publishing House Pvt. Ltd., Edition 2014	10: 8183224105 13: 978-8183224109
4.	The Spark is Within You	Jagdish Bali, Authorspress, Edition 2016	10: 9352072332 13: 978-9352072330
5.	How to Read a Person Like a Book	Rupa Publications India, Edition 2012	10: 8129119188 13: 978-8129119186

6.	Believe in Yourself	Dr. Joseph Murphy, Manjul Publishing House Pvt. Ltd., 1 st Edition 2014	10: 8183225098 13: 978183225090
7.	Think and Grow Rich	Napoleon Hill, Jaico Publishing House; First edition 2007	10: 817992792X 13: 9788179927922
8.	Communication Skills	Sanjay kumar, Oxford Edition 2011	10: 0198069324 13: 9780198069324
9.	The Power of your Sub conscious Mind	Dr. Joseph Murphy, Amazing Reads Edition 2015	10: 8192910962 13: 9788192910963
10.	The Power of Positive Thinking	Norman Vincent Peale,	10: 0091906385 13: 9780091906382
11.	The Ace of Soft Skills: Attitude, Communication and Etiquette for Success	Gopalaswamy Ramesh	10: 8131732851 13: 978-8131732854

❖ E-REFERENCES:

- https://en.wikipedia.org/wiki/Soft_skills accessed on 20th September, 2016
- <http://www.p21.org/about-us/p21-framework/262> accessed on 1st November 2016
- <http://innovationexcellence.com/blog/2012/08/04/whats-the-difference-between-creativity-and-innovation/> accessed on 10th October 2016
- <http://study.com/academy/lesson/self-understanding-and-self-concept.html> accessed on 20th October, 2016
- <http://www.skillsyouneed.com/ips/understanding-others.html> accessed on 20th October, 2016
- <http://articles.bplans.com/how-to-perform-swot-analysis/> accessed on 19th September, 2016
- <http://www.skillsyouneed.com/ips/body-language.html> accessed on 19th September, 2016
- <https://www.mindtools.com/CommSkll/PublicSpeaking.htm> accessed on 19th September 2016
- https://www.mindtools.com/pages/article/newHTE_90.htm accessed on 20th October 2016

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION

Nil

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. D.S. Kulkarni	HOD, Textile Manufacture	Government Polytechnic, Nagpur.
2.	Dr. Surendra Gole	Corporate HR Trainer, Former Principal,	Nagpur Institute of Technology, Nagpur
3.	Mr. Ashish Khole	Divisional Manager	TAL - Areospace Business Unit – (Tata Group of company) Nagpur
4.	Dr. Rozina Rana	Director	ELAN Finishing School, Priyadarshini Group of Institutions
5.	Mr. Sarang Sawangikar	Asstt. Vice President(HR)	Vidarbha Power Ltd., Butibori
6.	Ms. M.M.Machale	Lecturer in English	Government Polytechnic, Nagpur
7.	Dr. S.W.Rajurkar	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.
8.	Mr. G.V.Gotmare	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN ME/EE/EC/CM/IT/ TX/MT/PK
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: FE501E
COURSE TITLE	: BASIC BUILDING DRAWING
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04 (CLOCK HRs.)
TOTAL CREDITS	: 02 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR)
TH.TEE	: NIL
PR.TEE	: 02 HRs (Internal)
PT	: NIL

❖ RATIONALE:

Various agencies involved in engineering works use drawings as effective medium of communication. Engineering professionals of fields, other than civil engineering like mechanical, electrical, chemical, polymer mining, metallurgy etc. are required to interpret the space in the given building to assess whether their installations can be housed in the building or to specify the space requirements of their machineries, assemblies and installations. Moreover as an individual everyone of any profession wants to visualize his/her home before it is build, therefore these professionals need to study basic of building drawings such as plan, elevation and sections etc. This curriculum is designed to develop the basic skills of drawing building plan, elevation and section.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify different types of lines and symbols used in working drawings.
2. Prepare line plans of buildings for different orientations and with different scales.
3. Prepare plan, elevation and section of an existing building by taking measurements.
4. Develop working drawing duly considering rules, regulations and byelaws of sanctioning authority.
5. Identify the units and their sizes required in a building for serving a given purpose.
6. Interpret plan, elevation and section of building.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Draw different types of lines, common notations/symbols used in civil engineering and also symbols used in their field to be shown in the plan (A1size sheet).	Basics of Civil Drawing	10
2	Prepare line plans of small residential building (1BHK) for different plot orientation and with different scale on graph paper (A1size).	Drawing line plans	10
3	Prepare line plans of Public building like (Primary school building and Primary Health Centre) specifying names and sizes of different units. Prepare a separate report giving units, their sizes and justification for sizes.		10
4	Prepare a Measured drawing of institutional workshop/any small building. Show placement of machines/electrical fixtures etc.	Measured drawing	12
5	Develop a working drawing of any one of the building drawn in Practical no.2 considering rules, regulations and bye laws of local /other sanctioning authority.	working drawing	12
6	Draw plan and sectional elevation of Bifurcated/ Dog legged staircase.		06
7	Interpret dimensions and sizes of various units in the given building drawing.	Interpretation	04
Total			64

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
	Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6
End Of Course		End Of The Course	Questionnaires					

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Draw to the suitable scale a detailed plan of two room building.	20
2	Dimensioning	10
3	Neatness	10
4	Viva -Voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	-	-	-	-	-	3	-	3	-	-
2	-	-	3	3	-	-	-	3	3	3	-	-
3	-	-	3	3	-	-	-	3	3	3	-	-
4	-	-	3	3	2	2	2	3	3	3	-	-
5	-	-	-	-	-	-	-	3	-	3	-	-
6	-	-	-	-	-	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Building Drawing: With an Integrated Approach to Built Environment	M.G. Shah, C.M.Kale and V. Y.Patki Tata McGraw-Hill Publishing Company Ltd. 4 th edition, 2002	10:0074638769
2.	Building Planning and Drawing	Dr.Kumara Swamy and A. Kameshwara Rao , Charotar Publications , 8th edition, 2015	13:9789385039126
3.	Civil Engineering Drawing and House planning	B.P.Verma, Khanna Publications, 11 th Edition,1986	13:9788174091688
4.	Civil Engineering Drawing	Gurucharan Singh, Standard Publications, 2009	13:9788180140044
5.	Civil Engineering Drawing	R. S. Malik,G.S. Meo, Computech Publications ltd./ New Asian Publications, 5 th edition, 2015	13:9788173180026

❖ **E-REFERENCES:**

1. <http://bie.telangana.gov.in/Pdf/civilenggdrawing.pdf>, accessed on 3rd September, 2016
2. <http://www.iar.unicamp.br/lab/luz/ld/Arquitetural/livros/interior%20design%20student%20handbook.pdf>, accessed on 3rd September, 2016.
3. <https://law.resource.org/pub/in/bis/S03/is.962.1989.pdf> accessed on 3rd September, 2016
4. http://civilengineering-notes.weebly.com/uploads/1/1/7/5/11750056/building_bye_laws.pdf accessed on 3rd September, 2016
5. <http://civil.emu.edu.tr/courses/civ1103/Tutorial%205.pdf> accessed on 3rd September, 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

Nil

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. R. N.Giradkar	Head of Civil Engineering Deptt.	Government Polytechnic, Nagpur.
2.	Dr. D. N. Kongre	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
3.	Mr. S. R. Kukadapwar	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
4.	Mr. M.K.Panchwate	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
5	Dr. S. J. Nikam	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
6	Mr. M. R. Shelote	Consultant Engineer	M. R. Associates, Nagpur.
7	Dr. R. N. Khapre	Associate Professor	Ramdeobaba College of Engineering and Management, Nagpur
8.	Mr. A. J. Fulzele	Assistant Secretary (Technical)	MSBTE, Regional Office, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/EE/EC/CM/IT/MT/PK/AE/TR/TX
LEVEL NAME	: FREE ELECTIVES
COURSE CODE	: FE502E
COURSE TITLE	: RAC MAINTENANCE
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: NIL
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: NIL

❖ RATIONALE :

The knowledge of repair and maintenance of domestic refrigerator and air conditioner is helpful in daily life. One should acquire skills in carrying out basic repairs and maintenance of refrigeration and air conditioning.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify various components of refrigeration and air conditioner.
2. Handle various tools
3. Test and find faults in refrigerator and air conditioner
4. Diagnosis fault of refrigerator and air conditioner.
5. Practice maintenance procedure
6. Practice safety procedure.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical No.	Specific Learning Outcomes (Psychomotor Domain)	Topics	Hrs.
1.	Identify the components of domestic refrigerator and write report. Report includes- -Basic concept of refrigeration -Vapor Compression Refrigeration system -COP, Ton of refrigeration	Introduction to Refrigerator	10
2.	Identify the hand tools required for maintenance of domestic refrigerator. Use tools for various applications and write report. -Specification of tools	Hand Tools	04
3.	Dismantle compressor, identify various components in compressor and write report. Report includes – -Hermitically sealed compressor - various components of compressor	Compressor	08
4.	Test Electric circuit and electrical controls used in refrigerator and report writing. Report writing includes – -Electric circuit diagram -Various controls and its function	Electric circuit of refrigerator	04
5.	Identify various faults and write report Report includes – -Various faults - Remedies	Fault finding and maintenance of refrigerator	08
6.	Run water cooler test rig and Write report. Report writing includes- -Working of water cooler -various components of water cooler	Water cooler	04
7	Identify the components of air conditioning system and write report. Report includes- -Basic concept of air conditioning -Various air conditioning systems like summer AC, winter AC, comfort AC.	Air conditioning system	08
8	Identify of various faults and write report Report includes – -Various faults - Remedies	Fault finding of air conditioner	08
9	Test Electric circuit and electrical controls used in AC and report writing.	Electric circuit of air conditioner	04

	Report writing includes – -Electric circuit diagram -Various controls and its function		
10	Identify the components of car air conditioning system and write report. Report includes- -Basic concept of car air conditioning -function of various components of car AC	Car Air Conditioning system	04
Skill Assessment			02
Total Hrs.			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

NIL

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

NIL



❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing of Sketch, selection of equipment's, procedure etc.	20
2	Performance	10
3	Conclusion	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	3	-	-	-	-	3	3	-	-	-
2	-	-	3	3	-	-	-	3	-	3	-	-
3	-	-	3	3	-	-	-	3	3	3	-	-
4	-	-	3	3	1	-	-	3	3	3	-	-
5	-	-	3	3	-	-	-	3	3	3	-	-
6	-	-	3	3	1	-	-	3	3	3	-	-

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Refrigeration and air conditioning servicing	S. Kumar, New Heights Publication New Delhi	--
2.	Refrigeration and Air Conditioning	R.S. Khurmi, S.Chand and Co.	81-219-1687-9
3.	Refrigeration and Air Conditioning	C.P. Arrora, Tata Mc-Graw Hill,	0-07-451515-2
4.	Refrigeration and Air Conditioning	Manohar Prasad, New Age Publications.	13: 9788122414295
5.	Refrigeration and Air Conditioning	P.N. Ananthanarayanan; Tata McGraw Hill	0074620088

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Air conditioning trainer kit
2. Water cooler trainer kit
3. Ice plant trainer kit
4. Window Air conditioner
5. Split air conditioner
6. Domestic Refrigerator
7. Car air conditioning trainer kit

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1	Prof. O. V. Sarode	Head, Mechanical Engineering	Government Polytechnic, Nagpur
2	Dr. S. W. Rajurkar	Lecturer, Mechanical Engineering	Government Polytechnic, Nagpur.
3	Prof. D. J. Ghode	Lecturer, Mechanical Engineering	Government Polytechnic, Nagpur.
4	Prof. K. S. Thekedar	Lecturer, Mechanical Engineering	Government Polytechnic, Nagpur.
5	Er. A.M.Onkar	Chief Executive Officer	Onkar Furnitures, MIDC, Nagpur
6	Shri. G.F.Potbhare	Principal	NIT, Polytechnic, Nagpur
7	Dr.S.S.Baraskar	Lecturer in Mechanical Engineering	Govt. Polytechnic, Arvi

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

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COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/AE/PK/MT/EC/IT/CM /TX
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: FE503E
COURSE TITLE	: ELECTRICAL MAINTENANCE
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1PR CREDIT =2CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT.	: NIL

❖ RATIONALE:

Electricity is a basic need of human beings. All are dealings with the different electrical gadgets as well as electrical installations in day to day life. Therefore, the knowledge of electrical maintenance is must for all the peoples. One should have ability to acquire skills in carrying out repairs of electrical gadgets with accuracy and maintain the electrical installations. This course imparts the practical skills of electrical maintenance.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Use electrical maintenance tools and equipment's.
2. Use fire-fighting equipment on different types of fires.
3. Test, Repair and maintain the domestic appliances.
4. Locate and repair the faults in electrical installation.
5. Identify the faults.
6. Follow safety precautions.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
Nil			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practic als	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Identify electrical measuring instruments, sources, ICDP/ICTP, switches, loads, wires and execute safety precautions in laboratory.	Electrical Safety	4
2	Use firefighting equipment on different fire.		4
3	Identify different electrical maintenance tools and electrical accessories.	Maintenance Tools	4
4	Test single phase and three phase supply using test lamp and identify phase and neutral using test lamp.		4
5	Perform continuity, open circuit, short circuit and earth fault test using series test board.		4
6	Test and find fault in an automatic/ semiautomatic/ steam electric iron/toaster/room heater/hot plate	Domestic Appliances	4
7	Test, find faults and repair ceiling fan.		4
8	Test, find faults and repair electric mixer.		4
9	Identify different wiring systems in the premises & prepare list of accessories required for each.	Electrical Installation	4
10	Test & measure insulation resistance of Electrical lab wiring installation by using megger.		4
11	Measure the earth resistance of earth electrode by using earth tester.		4
12	Connect single phase and three phase energy meter to load and note the reading.		4
13	Prepare a wiring of two lamp controlled by two one way switch by using conduit wiring.		6
14	Fix ICDP/M CB/ DB/ELCB on wiring board & connect it to supply.		4
15	Locate the fault in electrical installation		4
Skill Assessment			2
Total Hrs			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Not Applicable

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

Not Applicable

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram/selection of equipment's/writing procedure etc.	10
2	Performance	20
3	Result	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	3	3	3	-	-	3	3	3	-	-
2	-	-	3	3	3	-	-	3	3	3	-	-
3	-	-	3	3	3	-	-	3	3	3	-	-
4	-	-	3	3	3	-	-	3	3	3	-	-
5	-	-	3	3	3	-	-	3	-	3	-	-
6	-	-	-	-	3	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Electrical Design Estimating and Costing	K.B. Raina and Dr. S.K. Bhattacharya, New Age International (P) Ltd. (2010)	10: 8122403638 13: 978-8122403633
2.	Study of Home Appliances	K. B. Bhatiya, Khanna Publication 2010 Edition.	1234567146703
3.	Home Appliances Servicing	E.P. Anderson, Audels	030114

❖ **E-REFERENCES:**

- <http://nptel.ac.in/courses/108108076/1> , assessed on 18th January 2016
- <http://www.electrical4u.com> , assessed on 18th January 2016
- <https://www.youtube.com/watch?v=A9KSGAnjo2U>, assessed on 18th January 2016
- <http://www.electricaltechnology.org/2015/09> assessed on 30 Jan 2016
- www.slideshare.net/bawaparam/made-by-param assessed on 30 Jan 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Electrical Maintenance Tool Kit.
2. Megger 500V Hand driven
3. Earth tester 3 spike.
4. Digital Multi-meter

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. C.S.Thorat	Principal	Government Polytechnic, Nagpur.
2.	K.M.Gaidhane	I/C, Head of Electrical Engineering	Government Polytechnic, Nagpur.
3.	R.I.Kamble	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
4.	S.P.Thote	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
5.	Dr. R.S.Surjuse	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
6	G.V.Gotmare	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
7	H,N.Kharkar	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
8	N.H.Adkine	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
9	A.P. Gandhi	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
10	Bhashkar Bale	Dy. Executive Engineer,	MSTCL, Nagpur
11	R.Y.Ghormade	Head of Electrical Engineering	Dharampeth Polytechnic, Nagpur
12	DR. S.S.Bharatkar	Lecturer in Electrical Engineering	Government Polytechnic, Amaravati.

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

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COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/EE/ME/CM/IT/PK/AE/TX/TR
LEVEL NAME	: PROFESSIONAL ELECTIVE
COURSE CODE	: FE504E
COURSE TITLE	: HOBBY ELECTRONICS
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: NIL
PR. TEE EXAM	: 02 HRs
PT. EXAM	: NIL

❖ RATIONALE:

Some students may be interested in interdisciplinary approach therefore it is felt that diploma holder those who have interest in "Hobby Electronics Circuits" must have minimum competency and knowledge of it, so later on some student may take up it as business. Therefore this course has been kept as one of free elective interdisciplinary course in the curriculum.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

- 1 Identify different electronics components.
- 2 Handle electronics circuit development tools & test and measuring equipments.
- 3 Select the hobby electronics circuits as per requirements.
- 4 Test the electronics components and circuits.
- 5 Develop the simple electronics hobby project.
- 6 Present electronics project.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Hrs.
1	Identify and understand different electronics components. -like. resistor, capacitor, inductor, diode, transistor, relay etc.	04
2	Observe and draw Symbols and unit of measurement for electronics parameters like voltage, current, resistor, capacitor, inductor etc.	04
3	Identify the applications of basic electronics test and measuring equipments. Like multimeter LCR meter, Cathode Ray Oscilloscope, Function generator etc.	08
3	Perform the basic handling skill of electronics circuit development tools like soldering gun, de-soldering pump etc	04
4	Test different electronics components like resistor, capacitor, inducer, diode, relay etc.	08
5	Identify simple electronics Hobby circuits by referring journals, websites, and hobby electronics manuals.	04
6	Arrange electronics component and PCB (general purpose) for selected circuit and their testing.	08
7	Prepare component layout of selected electronics circuit.	04
8	Mount and solder electronics components on PCB (general purpose)	08
9	Perform Testing, fault finding, rectification of fault. of circuit.(Test the circuit for performance and rectify the fault)	06
10	Perform the final testing of circuit & packaging.	04
Skill Assessment		02
Total Hrs		64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

NIL

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER**

NIL

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
2	Performance–Demonstration of project work	25
5	Viva voce	25
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-			-	-		3	-	3	-	-
2	-	-	3	3	-	-	3	3	-	3	-	-
3	-	-			-	-	3	3	-	3	-	-
4	-	-	3	3	-	-		3	-	3	-	-
5	-	-	3	3	-	-	3	3	-	3	-	-
6	-	-	3	3	-	-		3	1	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Electronic For You	Journal	--
2.	Electronics Material And Components	Dr. MadhuriA. Joshi, , Shroff Publisher & Dist. Pvt. Ltd. 3 rd Edition,	10: 8173669007 13: 9788173669002
3.	Data Books Of Electronic Components & Devices	Business Promotion Bureau	--

❖ **E-REFERENCES:**

- ❖ Websites www.electronicprojects.com , assessed on 4th May 2016
- ❖ Websites www.circuittoday.com assessed on 4th May 2016
- ❖ Websites www.electroschematics.com assessed on 4th May 2016
- ❖ Websites www.hobbyelectronics.in assessed on 4th May 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Digital Multi-meter
2. LCR-Q meter
3. Cathode Ray Oscilloscope
4. Soldering Gun.
5. De-soldering Pump.
6. Nose Plier

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	S.S.Tadas	HOD, Electronics Telecomm. Engg.	Government Polytechnic, Nagpur.
2.	A.A.Ali	Lecturer (Selection Gr.) Electronics Telecomm. Engg.	Government Polytechnic, Nagpur.
3.	D.A.Brahmankar	Lecturer (Selection Gr.) Electronics Telecomm. Engg.	Government Polytechnic, Nagpur.
4.	U.M.Ramteke	Lecturer (Selection Gr.) Electronics Telecomm. Engg.	Government Polytechnic, Nagpur.
5.	Mr. Sandip V Darwhekar	Director	Beta Computronics Pvt Ltd , Nagpur
6.	Mrs. Gazzala Ali	Head Electronics	Anjuman Polytechnic , Nagpur
7.	Mr S M Kale	Lecturer Electronics	Government Polytechnic, Gadchiroli.

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/IT/CM/AE/MT/TX
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: FE505E
COURSE TITLE	: BASIC PACKAGING TECHNOLOGY
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1PR CREDIT =2CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT.	: NIL

❖ **RATIONALE:**

Packaging is the need of every manufactured commodity. Safe delivery of product to end user through package has got many expectations. Packaging has a various functions and aspects. Packaging process starts as soon as finished product is ready. The package with the product is subjected to various situational hazards. The success of packaging largely depends on how these hazards have been considered and taken care of. This all requires a panoramic or holistic view about the field of packaging.

The concept & technology of packaging has taken years together to develop to where it is today, through evolution of technology, market and business. In spite of being a value to the business and developing economy, packaging by virtue of consuming resources, creating solid waste and pollution, is posing a grave threat to the environment.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to -

1. Collect various primary and secondary packages.
2. Identify the packaging materials and appreciate their properties.
3. Identify product characteristics of a packaged product.
4. Estimate the hazards to the package along with its contents.
5. Record by testing/ measurement/ observation various parameters of a package.
6. Search web resources on environmental issues related with packaging.

❖ **COURSE DETAILS:****A. THEORY :**

Unit Number and Name	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
Nil			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Introduction to Packaging. - Form suitable number of groups of students. - Collect 05 empty packages/ containers of different products. (Primary & Secondary packages) Products may be assigned by the course teacher. - Prepare a list of the packages and the products they contained. - Submit the list along with the collection.	Introduction	02
2.	Assort the collection of various packages by the class into primary and secondary packaging. - Classify the collected packages into Primary, Secondary & Primary as well as Secondary packaging. - Classify the collected packages into Rigid, semi-rigid and flexible packaging. - Note down the classification. - Identify the material/ materials of the packages. - Measure the physical parameters/ characteristics of the packages/ packaging material such as dimensions, weight, thickness, size, etc. - Prepare a power point presentation on it. - Attach the print out of above presentation in the Journal.	Packaging Materials	12
3.	Identify the product properties/ characteristics and estimate packaging functions. - Select appropriate number of products from the collection. - Identify various physical/ physiochemical properties of the products influencing its packaging. - Predict the functions of the packaging material and the package. - Classify predicted functions into Technical/ Primary and Commercial/ Secondary functions of packaging. - Prepare a brief report on it and attach in the Journal.	Product Characteristics	10
4.	Identify the fitness for use of the product contain by its packaging.		

	• Collect at least one package each of – one Perishable food and one Pharmaceutical Product. • Examine the date of manufacture, expiry/best before. • Note down above information and collect the information on usage of unfit products.	Packaging Communication	04
5.	Judge the hazards of handling, warehousing and transportation. • Observe the printed communication on the package and find out the manufacturer and its geographical location. • Trace out the method of handling, warehousing and transportation. • Outline the distribution channel. • Estimate the hazards to the products and packaging due to of handling, warehousing and transportation. • Interpret material handling instructions as printed on the packaging. • Write a report.	Packaging Hazards	12
6.	Carryout following tests on packaging materials and dummy packages. • Drop test. [IS : 7028 (Part 4) – 1987] • Puncture resistance test. (T 803 om-88) • Rolling test [IS : 7028 (Part 5) – 1987] • Vibration test. IS : 7028 (Part 2) - 2002 • Box compression test. (T 804 om-89) • Analyse the test results.	Package Testing	10
7.	Conduct a Survey/ Case study on environmental burdens caused by Packaging. • Select a Packaging Industry. • Visit to the industry or search information through web resources. • Gather information on different operations performed by the industry. • Study the impact of those operations on environment. • Appreciate 3-R concept (Reduce, Reuse and Recycle) • Prepare presentation.	Survey	12
Skill Assessment			02
Total			64

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Identification	10
2	Drawing / flowchart/schematics/symbols	10
3	Procedure/involvement/performance	10
4	Viva voce	20
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	3	-	-	-	-	3	3	3	-	-
2	-	-	-	-	-	-	-	3	3	3	-	-
3	-	-	-	-	-	-	-	3	3	3	-	-
4	-	-	3	-	-	-	-	3	3	3	-	-
5	-	-	3	2	-	-	2	3	3	3	-	-
6	-	-	-	-	1	1	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Fundamentals Of Packaging	F.A. Paine, Newnes-Butterworth, 1973	13: 9780408001076
2.	Packaging users Handbook	F.A. Paine, Springer; 1991	13: 9780751401516
3.	The Packaging Media	F.A. Paine, Blackie Academic & Professional, 1977	13: 9780216901919
4.	Packaging In The Environment	edited by Geoffrey M. Levy	13: 9780751400915
5.	The Wiley Encyclopedia of Packaging Technology.	Marilyn Bakker, John Wiley & Sons Inc. Canada	0471-80940-3
6.	Fundamentals of Packaging Technology	S. Natrajan, M. Govindrajan, B. Kumar, 2E, PHI LPL, Delhi, 2014	978-81-203-5054-0

❖ **E-REFERENCES:**

1. <http://www.iip-in.com/site/default.aspx>
2. <https://books.google.co.in/books?isbn=0470541385>
3. <http://pkt.jinakarn.com/ept.pdf>
4. <http://www.boschpackaging.com/en/pa/homepage/homepage.html>
5. <https://www.youtube.com/watch?v=LbxXpP9ysjo>

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Bursting Strength tester
2. Box compression strength tester
3. Drop tester
4. Universal testing machine
5. Puncture testing machine
6. Edge compression tester

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Prof. R.S.Raool	I/C, Head of Packaging Technology	Government Polytechnic, Nagpur.
2.	Prof. A.S.Bhagat	Lecturer in Packaging Technology	Government Polytechnic, Nagpur.
3.	Prof. Imran K.Syed	Lecturer in Packaging Technology	Government Polytechnic, Nagpur.
4.	Prof. A.P.Pardey	Lecturer in Paper and pulp	Government Polytechnic, Nagpur.
5.	Prof. S.N.Madhugiri	Academician, Ex Principal & Retired Head of	Dharmapeth Polytechnic Nagpur & Dept. Packaging Technology G.P.Nagpur
6.	Prof. P.P Sargaonkar	Consultant & Retired Lecturer in Packaging Technology	Government Polytechnic, Nagpur.
7.	Prof. M.S.Deshpande	BTE Repetitive & Lecturer in Mechanical Engineering	Government Polytechnic, Bramhapuri.
8.	Shri. Suresh Thakur	Industry Expert, Managing Director,	Palekar Food Products, MIDC, Amravati.

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN CE/ME/EE/EC/CM/IT/AE/PK/TX
LEVEL NAME : ELECTIVE COURSES
COURSE CODE : FE506E
COURSE TITLE : INDUSTRIAL METALLURGICAL PRACTICES
PREREQUISITE : NIL
TEACHING SCHEME : TH: 00; TU: 00; PR: 04(CLOCK HRS.)
TOTAL CREDITS : 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM : NIL
PR. TEE EXAM : 02 HRS (Internal)
PT. EXAM : NIL

❖ RATIONALE:

A technician comes across the various problems in metallurgical industries. Also, at the work place, it is always necessary, to tackle the problem so that the sound metallurgical product can be obtained by application of suitable metallurgical engineering techniques. Hence, the basic knowledge of various industrial metallurgical practices is necessary for a technician. This course helps to impart the basic knowledge to technician for increasing the productivity and a sound metallurgical product.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Draw sketches of different tools/machines in metallurgical shops/labs
2. Use of tools and machinery in different metallurgical labs/shops.
3. Operate different equipments/machineries used in basic Metallurgical labs/shops
4. Perform inspection and testing of metallurgical products.
5. Prepare sample for microscopic examination.
6. Choose proper tool for different metallurgical processes.

❖ COURSE DETAILS:

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Observe the demonstration of hand tools, machine Tools and equipments used in pattern making and mouldings shops and draw the sketches and write specifications, details, applications of above tools.	Pattern making and Moulding	02
2.	Prepare sand mould by using any one pattern (mould to be prepared by group of 2 to 4 students depending on volume of work)		08
3.	Observe the demonstration of hand tools, machine Tools and equipments used in casting shop and draw the sketches and write specifications, details, applications of above tools.	Casting	02
4.	Prepare one casting related to mould prepared. (any one type of casting to be prepared by group of 2 to 4 students depending on volume of work)		08
5.	Observe the demonstration of hand tools, machine Tools and equipments used in metal working operations (rolling, wire drawing, etc) and draw the sketches and write specifications, details, applications of above tools.	Metal working	02
6.	Perform practical related to any one metal working operations		08
7.	Observe the demonstration of hand tools, machine Tools and equipments used in heat treatment Shop and draw the sketches and write specifications, details, applications of above tools.	Heat treatment	2
8	Prepare sample for Performing heat treatment operation and conduct any one heat treatment to steel/cast iron sample		8
9	Observe the demonstration of hand tools and equipments used in testing and inspection lab and draw the sketches and write specifications, details, and applications of above tools.	Testing and inspection	2
10	Carry out various necessary testing and write the test report for any one metallurgical product.		8
11	Observe the demonstration of hand tools, machine Tools and equipments used in metallographic lab and draw the sketches and write specifications, details, applications of above tools.	Metallography	2
12.	Prepare one sample for metallographic examination and examine the sample under metallurgical microscope and draw the structure.		8
Skill Assessment			4
Total Hrs.			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Nil

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

Nil

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
	Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6
End Of Course		End Of The Course	Questionnaires					

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing diagram/ selection of equipment's/ writing procedure etc.	10
2	Performance	20
3	Calculation/Result/ Drawing Graphs(if any)	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	-	3	-	-	-	3	-	3	-	-
2	-	-	3	3	-	-	-	3	3	3	-	-
3	-	-	3	3	-	-	-	3	3	3	-	-
4	-	-	3	3	-	-	-	3	3	3	-	-
5	-	-	3	3	-	-	-	3	3	3	-	-
6	-	-	3	3	-	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Principles of metal castings	Dr. P.C. Mukharjee	81-20300716-X
2.	Foundry Engineering	Shrinivasan	81-7409-026-6
3.	Introduction to Physical Metallurgy	Sidney H. Avner McGraw-Hill international edition, 2 nd edition	0-07-085018-6
4.	Testing of materials by	Prof. A.V.K. Suryanarayana.	81-20300716-X
5	The Testing & Inspection of Engineering materials,	H. E. Davis, G. E. Troxell, McGraw Hill	81-7409-026-6
6	Mechanical Metallurgy	George Dieter, McGraw Hill,	0-07-084453-4
7	Heat treatment Principles and techniques	T.V. Rajan , C.P. Sharma, Prentice Hall of India Pvt. Ltd, 12 th edition	81-20300716-X

❖ **E-REFERENCES:**

<http://books.google.co.in/books/isbn=9380026757> , assessed on

17th March 2016

<http://www.youtube.com/watch?v=101M1kaZIFg> , assessed on 27th April 2016

http://www.youtube.com/watch?v=1HuxDVpy_iv , assessed on 27th April 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Patterns
2. Foundry tools
3. Welding Transformer (Oil Cooled) Three Phase
4. Pit type furnace
5. Mould boxes
6. Crucibles
7. Muffle furnace
8. Mould shaking machine
9. Draw bench
10. Rolling mill
11. Grinder
12. Polishing machine
13. Hardness tester
14. Microscopes
15. NDT equipments

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	K.L.Meshram	Head of the Dept Department of metallurgical Engineering	Government Polytechnic, Nagpur.
2.	Ms. V.C. Humney	Lecturer in Metallurgical Engineering	Government Polytechnic, Nagpur.
3	S.M.Waikar	Lecturer Metallurgical Engineering	Government Polytechnic, Nagpur
4.	Y.Y. Mahajan	Assist. Professor , Metallurgy & Material Science	VNIT Nagpur
5	S.B.Varadpande	Managing director	Orange city alloys Pvt. Ltd Nagpur
6	Y. K. Gaiky	Lecturer Mechanical Engineering	Government Polytechnic, Sakoli

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/AE/MT/PK/TX
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: FE507E
COURSE TITLE	: COMPUTER NETWORK
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02(TH/TU CREDIT = 00 CLOCK HR., 1PR CREDIT = 2 CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT.	: NIL

❖ RATIONALE:

The world in the information era has become network centric. A Computer networks has been growing with rapid technological progress. Computer communication through networking becomes essential part of our life. We can manage many application like Air Line Reservation, Railway Reservation, E-banking, E-Governance, On-Line shopping, E-learning etc. by clicking mouse button from our own place. Because of this, world become the global village. By considering importance of networking towards all aspects of our life, we here introduce basic concept of networks, network classification, network topologies, network devices, Transmission media, Network reference models, concept of TCP/IP.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify network and network topologies.
2. Connect and handle different networking devices.
3. Identify network architecture and physical media used to connect computers in network.
4. Identify E-Commerce and E-Governance website on the internet.
5. Use and share Network Recourses.
6. Use various Internet and Intranet Applications

❖ **COURSE DETAILS:****A. THEORY: NIL**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Identify different types of network.	1.Introduction to Computer network and topologies	2
2.	Identify different network topologies.		2
3.	Connect and identify different Transmission Media.		4
4.	Connect and identify different network controlling devices like hub, switches etc.		4
5.	Connect computers in star topology by using wired media and with any network device (eg. Hub)		4
6.	Install and configure LAN card.	2.Local Area Network	4
7.	Prepare a Straight Cable and Network Cross over Cable and test by Line Tester.		4
8.	Share different devices like printer, scanner etc. over LAN network.	3.Applications & Uses of Computer network	2
9.	Share a printer on a network & print a document on it from a different computer on a network		2
10.	Share files and directories from one computer to other computer on the network.		2
11.	Install Win Messenger on LAN network.		2
12.	Create ID on Win messenger.		2
13.	Communicate through Win Messenger over LAN network.		4
14.	Connect through WAN network	4.Wide Area Network	4
15.	Create Email-ID on any WAN software like Gmail, Rediff, Yahoo etc.		4
16.	Communicate through any WAN software.		4
17.	Search information on the internet.		2
18.	Identify different E-commerce website on the internet like amazon.com, ebay.com etc.	5.Concepts of E-Commerce	2
19.	Connect through any E-commerce website on the internet and learn the procedure to buy books.		2
20.	Identify different E-Governance website on the internet like irtc.co.in etc.	6. Introduction to E-Governance	2
21.	Connect through E-governance railway website on the internet and learn the procedure for online railway reservation.		2
Skill Assessment			4
Total Hrs.			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:NIL**❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:NIL**

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Selection, writing steps, installation etc.	10
2	Connection and configuration.	10
3	Performance	20
5	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	3	-	-	-	-	3	3	3	-	-
2	-	-	3	3	-	-	-	3	3	3	-	-
3	-	-	3	3	-	-	-	3	3	3	-	-
4	-	-	3	-	-	-	-	3	3	3	-	-
5	-	-	3	3	-	-	-	3	3	3	-	-
6	-	-	3	3	-	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Computer Networks	Andrew S Tannenbaum, Tata McGraw-Hill Edition, 2012	9780132126953
2.	Fundamentals of computer	E Balaguruswamy, Tata McGraw-Hill Education Pvt. Ltd., 2009	9780070141605
3.	Computer Basics	Micheal Miller, Tata McGraw-Hill Edition, 2012	0789734206
4.	Complete Reference Networking	Craig Zacker, Tata McGraw-Hill Edition	0132126958

❖ **E-REFERENCES:**

<http://www.pcworld.com/article/116583/article.html> , assessed on 20th April 2016

<http://www.computerstepbystep.com/computer-maintenance.html> , assessed on 20th April 2016

<https://www.youtube.com/watch?v=a0rEXzyX0-8>, assessed on 20th April 2016

❖ **LIST OF MAJOR COMPONENTS/DEVICES WITH THEIR SPECIFICATION.**

1. Operating System(Windows 98/2000/XP/7/8/8.1/10)
2. CPU Intel core i3/i5/i7
3. Hub(4 port USB hub, TB-226)
4. Switches
5. Connectors(RJ45/BNC/AUI/FIBER)
6. Printers(INK JET/LASER)
7. Scanner(FLAT BED)
8. Crimps, Strips and cut tools(HT-200R, HT-2008R)

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
2	Dr. Mrs. A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
3.	Ms. Shifa S. Sayyed	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mrs. V A Raje	System Analyst(Lecturer in Computer Engineering)	Government Polytechnic, Nagpur.
5.	Ms. Gayatri B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
6.	Shri. Atul Upadhyay	COE	Vista computers, Ramnagar, Nagpur
7.	Shri N. V Chaudhri	Asst. Professor (CSE)	DBACEO ,Wanadongri, Nagpur
8.	Shri Manoj Jethawa	HOD, Computer Science	Shri DattaMeghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA INCE/ME/EE/EC/PK /TR/AE/TX/MT
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: FE508E
COURSE TITLE	: PC ARCHITECTURE AND MAINTENANCE
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1PR CREDIT = 02 CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT.	: NIL

❖ RATIONALE:

As computers are heavily used for most of the activities like office automation, database management etc, the repair and maintenance of computer and its peripheral devices is becoming an essential part of the information technology. This course will enable the student to assemble different types of computer system and maintenance of different supporting equipments like printer, scanner, etc.

❖ COURSE OUTCOMES:

After completing this course students will be able to –

1. Assemble and de-assemble computer system.
2. Perform different setting on various types of printers.
3. Install various types of software's.
4. Install operating system and device drivers in system.
5. Handle computer system hardware.
6. Maintain peripheral devices.

❖ **COURSE DETAILS:****A. THEORY:**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Identify all the peripheral devices.	1. Pc Motherboard And Its Components	2
2.	Identify all components mounted on motherboard.		2
3.	Perform Basic Input/output System (BIOS) setting and configuration setup using Complementary Metal Oxide Semiconductor (CMOS).		4
4.	Install CDROM drive to system.	2. Storage Devices And Interfacing	2
5.	Copy data on CD, DVD		2
6.	Install different types of cards such as Video Graphics Array (VGA) or Super Video Graphics Array (SVGA) display ,sound card ,LAN card, multimedia cards etc.	3.Display Devices And Interfacing	2
10.	Perform different printer settings on different types of printers. Write down the function of each switch.	4. Input And Output Devices	4
11.	Format, partition and install a Hard Disk Drive (HDD).		4
12.	Identify components of Hard Disk Drive (HDD) as a storage device.		2
13.	Connect scanner, scan documents and pictures on the scanner available in your lab. Sample printout be attached		4
14.	Install Internal and External Modem		4
16.	Per form Internet installation.		2
17.	Connect Switched Mode Power Supply (SMPS) and identify different parts of SMPS.	5. Power Supplies	4
18.	Connect Uninterrupted Power Supply (UPS) and write down function of it.		2
19.	Connect speakers and microphones to system.		2
20.	Assemble, de-assemble computer system.	6.Troubleshooting And Tools	4
21.	Identify installed computer peripherals and test their working using diagnostic software		4
22.	Find faults related to Monitor, CPU, Hard disk, Printer and other peripherals.		4
23.	Form a pico based net using Bluetooth devices and transfer data.		4
24.	Create bootable CD and Install an operating system		2
Skill Assessment			4
Total hours			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:NIL**❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:NIL**

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing steps, selection, procedure	10
2	Performance	20
3	knowledge/block diagram/connection	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	3	3	-	-	-	3	3	3	-	-
2	-	-	3	3	-	-	-	3	3	3	-	-
3	-	-	3	3	-	-	-	3	3	3	-	-
4	-	-	3	3	-	-	-	3	3	3	-	-
5	-	-	3	3	-	-	-	3	3	3	-	-
6	-	-	3	3	-	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Upgrading and repairs PCS	Pearson, Scott Mueller, 20 th Edition, 2012	13: 9780789747103
2.	Troubleshooting Your PC	Mr. David Stone & Alfred Poor, Prentice Hall India, 2000	13: 9780735614901
3.	A+ Complete	David Groth, BPB Publication, 2006	13: 9780782128024
4.	Computer Installation and Servicing	Balasubramaniam, Tata McGraw Hill Education Pvt. Ltd, Reprint, 2011	13: 9781259082467

❖ **E-REFERENCES:**

<http://www.pcworld.com/article/116583/article.html> , assessed on 26th April 2016

<http://www.computerstepbystep.com/computer-maintenance.html> , assessed on 26th April 2016

<https://www.youtube.com/watch?v=a0rEXzyX0-8>, assessed on 26th April 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Operating System(Windows 98/2000/XP/7/8/8.1/10)
2. CPU Intel core i3/i5/i7
3. Fiber optics cable(LSFH Polymer)
4. Unshielded Twisted pairs cable(CAT 1 to CAT5)
5. Connectors(RJ45/BNC/AUI/FIBER)
6. Printers(INK JET/LASER)
7. Scanner(FLAT BED)
8. Crimps, Strips and cut tools(HT-200R, HT-2008R)

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1	Dr. Mrs. A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
1.	Ms.I.G.Lokhande	Lecturer in Information Technology	Government Polytechnic, Nagpur.
2.	Mrs.V.A.Raje	Lecturer in Computer Engg.	Government Polytechnic, Nagpur.
3.	Mrs.D.P.Chanmanwar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Shri. Atulupadhyay	COE	Vista computers, Ramnagar, Nagpur
5.	Shri N. V Chaudhri	Asst. Professor (CSE)	DBACEO ,Wanadongri, Nagpur
6	Shri Manoj Jethawa	HOD, Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/AE/PK/MT/EC/IT/CM /TR
LEVEL NAME	: FREE ELECTIVE COURSES
COURSE CODE	: FE509E
COURSE TITLE	: FABRIC SELECTION AND CARE
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 2 PR CREDIT = 1 CLOCK HR.)
TH. TEE EXAM	: NIL
PR. TEE EXAM	: 02 HRs (Internal)
PT. EXAM	: 01 HR

❖ RATIONALE:

Clothes are as important as food and shelter. You use them for covering, protecting and even decorating yourself. You must be having different types of clothes for different occasions like your casual attire, office wear, party dresses, and your night suit and so on. In this course technology and science behind selection of right fabric and its care is illustrated.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Judge the fibres by means of a physical test.
2. Select the yarn and fabric.
3. Illustrate and draw care labels in Textiles.
4. Identify the different methods for different stain removal from textiles.
5. Perform stain removal on fabric.
6. Suggest precaution for storage of textiles.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs
NIL			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practic als	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Prepare textile fibre classification chart.	Fibre	4
2.	Detect the fibre type by means of physical test.		6
3.	Select the different types of yarn and fabric	Yarn	4
4.	Prepare chart of classification of yarn with their end uses.		6
5.	Identify different fabric formation methods.	Fabric	4
6.	Draw the plain and twill weaves on graph paper.		6
7.	Judge quality of textiles based on fibre, yarn and weave.	Selection of Textiles	4
8.	Prepare a chart of removal of different types of stain in a fabric and		6
9.	Perform stain removal on a given fabric.	Care of Textiles	4
10.	Draw care label symbols with instructions for fabrics.		6
11.	Collect 10 garment samples and note the care labels instructions	Maintenance of textiles	4
12.	Prepare the list of precautions necessary for storage of textiles.		6
Skill Assessment			4
Total Hrs.			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Nil

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

Nil

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF JOB EVALUATION:**

S.N.	Description	Max. Marks
1	Chart preparation	10
2	Analysis of fabric samples	20
3	Draw symbols/diagrams / sketches	10
4	Viva voce	10
Total		50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	3	3	-	-	-	3	3	3	-	-
2	-	-	3	3	-	-	-	3	3	3	-	-
3	-	-	3	3	1	-	-	3	3	3	-	-
4	-	-	3	3	-	-	-	3	3	3	-	-
5	-	-	3	3	-	-	-	3	3	3	-	-
6	-	-	3	3	-	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1	Textile Fabrics:: Their Selection And Care From The Standpoint Of Use, Wear, And Launder ability,	George Henry Johnson : Harper & Brothers (1927)	B000863N32
2	Textiles	Sara J. Kadolph, Pearson Prentice Hall, 2007	0131187694, 9780131187696
3	Fabric Care	Noemia, D Souza : New Age international,1998	978-81-224-1143-0
4	Fundamentals of Textile and their care	Sushila Dantiyagi : Orient Longman private limited, 2006	8125010270

❖ **E-REFERENCES:**

1. <http://www.textileassociationindia.org/> assessed on 20/9/2016
2. <http://www.fiber2fashion.org/>
3. <http://www.nift.ac.in/>
4. www.itamma.org/
5. <http://www.fabriclink.com/> assessed on 20/9/2016
6. <http://download.nos.org/srsec321newE/321-E-Lesson-22.pdf> assessed on 20/9/2016
7. <http://download.nos.org/srsec321newE/321-E-Lesson-26.pdf> assessed on 20/9/2016

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. D. S. Kulkarni	Head of Textile Department	Government Polytechnic, Nagpur.
2.	Dr. S. B. Muttagi	Lecturer in Textile Technology	Government Polytechnic, Nagpur.
3.	Mr. S. G. Gaikwad	Lecturer in Textile Technology	Government Polytechnic, Nagpur
4.	Dr. C. P. Kapse	Lecturer in Textile Technology	Government Polytechnic, Nagpur.
5.	Mrs. L. S. Chakraborty	Lecturer in Textile Technology	Government Polytechnic, Nagpur.
6.	Prof. G.S. Kakad	Head of Textile Department	JDIT, Yavatmal
7.	Mr. R.N.Yadav	President	RSR Mohota Spinning and Weaving Mill

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/EE/EC/CM/TX/MT/PK/IT/TR
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: FE510E
COURSE TITLE	: TWO AND FOUR WHEELER TECHNOLOGY
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT.	: NIL

❖ RATIONALE:

Today majority of people using a vehicle and it becomes a common need of daily life. Therefore, it is felt that one must have knowledge about the various systems and their functional importance and working in the context of automobile and its maintenance. The course aims to impart basic skills and understanding of two and four -wheeler systems basic components their working principle and basic maintenance procedure. Hence, this course has been offered for student of various diploma programme as one of the Allied Courses as “Credit Non-Exam Course”

❖ COURSE OUTCOMES:

After completing this course students will be able to–

- Identify various systems of two wheeler.
- Identify various systems of four wheeler.
- Use different tools required for preliminary maintenance of vehicle.
- Practice to drive two and four wheeler vehicle or simulator.
- Practice various technique and procedure for finding general fault and repair them
- Prepare a report on Motor Vehicle Rules, Road Signals safety and precautions etc.

❖ COURSE DETAILS:

❖ A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
NIL			

❖ **B. PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:**

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Identify the various systems of two wheeler and write report. Report includes- -Classification of two wheeler -Block diagram of various system of two wheeler -function of various systems.	Introduction to Automobile	04
2	Identify the various systems of four wheeler and write report. Report includes- -Classification of four wheeler -Block diagram of various system of four wheeler -function of various systems.		06
3	Use off hand tools and special tools required for maintenance of two and four wheeler vehicle.		06
4	Prepare a report on Motor Vehicle act and traffic signs. Reports includes- -Various motor act. -Driving license requirement. -Traffic signs. -Insurance of vehicle.	Motor Vehicle Act	10
5	Practice four wheeler driving training on simulator.		20
6	Identify below mention faults in two wheeler and repair them. 1) Starting Problem. 2) Mileage Problem. 3) Pick-up Problem. 4) Abnormal sound from Engine and Transmission System.	Fault finding and maintenance of Automobile	08
7	Identify below mention faults in Four wheeler and repair them. 5) Starting Problem. 6) Mileage Problem. 7) Pick-up Problem. 8) Abnormal sound from Engine and Transmission System.		08
Skill Assessment			02
Total hours			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:NIL**❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:NIL**

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing of Sketch, selection of equipment's, procedure etc.	20
2	Performance	10
3	Conclusion	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	-	-	-	-	-	3	3	3	-	-
2	-	-	-	-	-	-	-	3	3	3	-	-
3	-	-	-	3	3	-	-	3	3	3	-	-
4	-	-	3	3	3	-	3	3	3	3	-	-
5	-	-	3	3	3	3	-	3	3	3	-	-
6	-	-	-	-	3	3	3	3	3	3	-	-

1-Slight (Low) 2-Moderate (Medium) 3 –Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Automobile Engineering Vol.I	Dr. Kripal Singh, Standard Publishers Distributors, 13th Edition, 2013	97881801419669
2	Automotive Mechanics	S. Srinivisan, Tata McGraw – HILL, 2nd Edition, 2003	9780070494916
3.	Basic Automobile Engineering	Nakra CP , Dhanpat Rai Publishing Company (P) Limited, 2009	9788187433224
4.	Automotive Mechanics	S. Srinivisan, Tata McGraw – Hill, 2 nd Edition, 2003	9780070494916
5	The Motor vehicle Act	Government Publication, 1989.	Government Publication

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS**

- ❖ Air compressor-1 HP 3 phase, Max Pressure: 4, 95 kg/cm², 70 ltr.
- ❖ Engine Crane –Hydraulic, 2 ton Capacity.
- ❖ Bottle/Floor/Scissor Jacks- 3 ton Capacity.
- ❖ Two Post Lift- Capacity 3.5 Ton, Max Lifting ht - 1830 mm, Min Lowering height - 110 mm, Post height - 3700 mm Lifting time - 55 Secs, Width between posts : 2800 mm, with 1 HP / 2 HP power pack 1 or 3 phase
- ❖ Air hydraulic press - Capacity: 30 Ton. Air pressure: 100-140 PSI. 2 Press plates included (designs may vary) Air inlet fitting: 1/4" NPT
- ❖ Socket/ Impact wrenches- 1/4", 3/8", 1/2" and 3/4"
- ❖ Torque wrenches- 3/8", 1/2" and 3 NM, Ratcheting type/Click-type.
- ❖ Driving simulator.
- ❖ Road signs.
- ❖ Vehicle with two paddle control.

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr.K.S.Dixit	I/C, Head of Automobile Engineering	Government Polytechnic, Nagpur.
2.	Mr. S.D.Thakre	Lecturer in Automobile Engineering	Government Polytechnic, Nagpur.
3.	Mr. R.B.Tirpude	Lecturer in Automobile Engineering	Government Polytechnic, Nagpur.
4.	Mr. Syed J.M.	Lecturer in Automobile Engineering	Government Polytechnic, Nagpur.
5.	Mr. V.S.Kumbhar	Lecturer in Automobile Engineering	Government Polytechnic, Nagpur.
6	Mr. A.R.Yadgire	Lecturer in Automobile Engineering	Government Polytechnic, Nagpur.

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN CE/ME/AE/PK/MT/EC/IT/CM /TX
LEVEL NAME : FREE ELECTIVES
COURSE CODE : FE511E
COURSE TITLE : ENERGY CONSERVATION AND MANAGEMENT
PREREQUISITE : NIL
TEACHING SCHEME : TH: 00; TU: 00; PR: 04(CLOCK HRS.)
TOTAL CREDITS : 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE : NIL
PR. TEE : 02 HRS (Internal)
PT. : NIL

❖ RATIONALE:

Energy conservation is a scientific and basic tool to make balance in different forms of energies. This course imparts the awareness, knowledge and practical skills/ techniques of energy conservation in various sectors. After completion of this course diploma engineering students must use various techniques and methods of energy conservation. Also they should be able to perform energy audit and its implementation.

COURSE OUTCOMES:

After completing this course students will be able to–

1. Determine losses in Mechanical System
2. Use different methods of energy conservation
3. Collect information related to star rating equipment
4. Use energy conservation equipment for energy audit
5. Design efficient illumination scheme for energy conservation
6. Prepare energy audit report.

❖ COURSE DETAILS:

THEORY:

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
Nil			

A. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs
1.	Use different dynamometers and tachometer for measurement of power of rotating shaft.	Mechanical Measurement	4
2	Use RDT PT100 thermal sensor and its module for measurement of temperature at different stages in IC engine.		2
3	Use anemometer and measure quantity of air supplied to IC Engine.		2
4	Determine Volumetric and overall efficiency of two stage reciprocating compressor by conducting trial on test rig.	Mechanical Performance Measurement	4
5	Determine overall efficiency of centrifugal pump and plot operating characteristics by using centrifugal test rig.		4
6	Calculate coefficient of performance by conducting trial on vapour compression refrigeration test rig.		4
7	Collect performance information of 5 stars and 2 stars, same brand split AC and compare the results in terms of energy consumption.	Basic of Energy Conservation	2
8	Calculate electric bill for electric water heating system. Compare it with cost of solar water heating system and calculate payback period of solar water heating system.		2
9	Connect voltmeter, ammeter and wattmeter in electric circuit to measure voltage, current and power required for energy audit.		2
10	Determine losses of single phase Transformer at No load, Half load and Full load by conducting load test.		2
11	Use power guard meter for measurement of different electrical quantities		2
12	Calculate payback period of energy efficient motor. Compare losses of energy efficient motor with similar capacity conventional motor.	Energy Conservation Methods	4
13	Calculate energy saving by using energy efficient equipments like automatic Star – Delta starter for three phase induction motor		4
14	Calculate energy saving in lighting system by retrofitting tube lights with LED lamps. Also calculate payback period.		4
15	Measure illumination level of different places with the help of Digital Lux Meter		4
16	Design illumination Scheme for any one of the following by using energy efficient luminaries; a) Flat b) Bungalow c) Independent House		4
17	Mini project Prepare Energy audit report of any institute/Industry/Hospital/Residence/small workshop.		4

18	Prepare report on visit to cogeneration system.		4
19	Prepare detail report and give presentation in the class on any one of the following topics , i) Energy conservation and Environmental issues ii) Market survey on energy efficient luminaries iii) Market survey on energy efficient motors and transformers. iv) Energy tariff system in India v) Energy conservation equipments vi) Energy Management vii) Energy Audit viii) Energy conservation act 2003		4
Skill Assessment			2
Total Hrs			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Not Applicable

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

Not Applicable



❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		1, 2, 3, 4,5,6	
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, selection of equipments, writing procedure etc.	10
2	Performance	20
3	Calculation, Result, Drawing Graphs (if any)	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	3	-	3	3	-	3	-	3	-	-
2	-	-	3	-	3	3	-	3	-	3	-	-
3	-	-	-	-	-	3	-	3	3	3	-	-
4	-	-	3	2	3	-	-	3	3	3	-	-
5	-	-	3	-	-	-	-	3	-	3	-	-
6	-	-	3	-	3	3	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Generation and Utilization of Electrical Energy	D.Srilatha S.Sivnagraju M.Balasubbareddy Pearson , New Delhi	8131798771, 9788131798775
2.	India – The Energy Sector	P.H. Hederson, University Press,	
3.	Energy management Handbook	W.CTurner, Wiley Press	10: 142008870X
4.	Efficient Use and management of electricity in industry.	B.G. Desai, J.S.Rana, A.V. Dinesh, R. Paraman, Devki Energy Consultancy PVT Ltd	
5.	Renewable Energy Technologies- A Practical guide for beginners	Chetan Singh Solanki, Prentice-Hall of India PVT. Ltd., First, 2008.	978-81-203-3434-2
6	Chetan Singh Solanki, Prentice-Hall of India PVT. Ltd., First, 2008.	Renewable Energy Technologies- A Practical guide for beginners	-978-81-203-3434-2-

7	Non-Conventional Energy Resources	D.S.Chauhan, S.K.Srivastava, New Age International (P) Ltd. Publishers, Second 2011.	13:978-81-224-1768-5
8	Renewable Energy Sources & Conversion Technology	N.K. Bansal, Kleemann, Meliss	0074600230, 9780074600238.
9	Illuminating Engineering	Kamlesh Roy, Laxmi Publication, 2006	9789380386553

❖ **E-REFERENCES:**

1. www.bee.india.nic.in , accessed on 11th November, 2016
2. www.mnes.nic.in , accessed on 11th November, 2016
3. www.energymanagertraining.com , accessed on 11th November, 2016
4. www.greenbusiness.com , accessed on 11th November, 2016
5. www.worldenergy.com , accessed on 11th November, 2016
6. www.mahaurja.com , accessed on 11th November, 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

1. Lux meter
2. Ammeter MI 0-5-10 A
3. Voltmeter MI 0-150-300 V
4. Wattmeter 0-3000 W
5. Digital Multi-meter
6. Rheostat assorted sizes
7. PV Solar panel
8. Energy efficient motors
9. Energy efficient transformer
10. Energy efficient luminaries
11. Energy efficient Equipments /Devices
12. Power Guard Meter (For measurement of V, I, W, VA, PF, KWh)

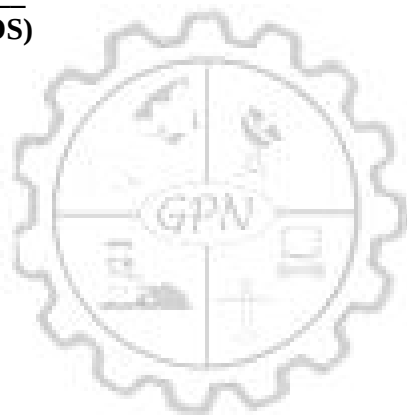
❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. C.S.Thorat	Principal	Government Polytechnic, Nagpur.
2.	Mr. O. V. Sarode	I/C, Head of Mechanical Engineering	Government Polytechnic, Nagpur
3.	Mrs. K.M.Gaidhane	I/C, Head of Electrical Engineering	Government Polytechnic, Nagpur.
4.	Mr. A.R. Shaikh	Lecturer in Mechanical Engineering	Government Polytechnic, Nagpur.

4.	Mrs.S.P.Thote	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
5.	Dr. R.S.Surjuse	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
6	Mr.G.V.Gotmare	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
7	Mr.N.H.Adikine	Lecturer in Electrical Engineering	Government Polytechnic, Nagpur.
8	Bhashkar Bale	Dy. Executive Engineer,	MSTCL, Nagpur
9	R.Y.Ghormade	Head of Electrical Engineering	Dharampeth Polytechnic, Nagpur
10	DR. S.S.Bharatkar	Lecturer in Electrical Engineering	Government Polytechnic, Amaravati.

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN CE/ME/AE/PK/MT/EC/IT/CM /TX/TR
LEVEL NAME	: ELECTIVE COURSES
COURSE CODE	: FE512E
COURSE TITLE	: LEARNING ABILITY DEVELOPMENT
PREREQUISITE	: NIL
TEACHING SCHEME	: TH: 00; TU: 00; PR: 04(CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1PR CREDIT =2CLOCK HR.)
TH. TEE	: NIL
PR. TEE	: 02 HRs (Internal)
PT.	: NIL

❖ RATIONALE:

Learning ability of an engineer or professional is essential through the level at which he/she has developed and persuades his/her hobby. It enhances the creativity. Hobby is integral and important part of human personality. Hobby is best for recreation which rejuvenates a person. To obtain maximum benefits from hobby the overall understanding and competency in performance is utmost important.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Develop learning ability through hobby.
2. Appreciate importance of hobby in developing learning ability.
3. Choose related equipments, consumables and gears.
4. Maintain related equipments.
5. Carry out setting of equipment.
6. Exhibit learning through performance.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
Nil			

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Present following: Learning ability development through hobby.	Introduction	4
2	Collect information about present scenario of related field – Experts in India, Experts in your city	Awareness Development	4
3	Demonstrate different related equipments.	Demonstration	4
4	Demonstrate Performance.		4
5	Practice setting up related instruments	Practice	4
6	Practice performance –level I		20
7	Practice performance –level II		16
8	Practice tuning and preliminary maintenance of related instruments.		4
Skill Assessment			4
Total Hrs			64

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Not Applicable

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:**

Not Applicable

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignments		Continuous	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	1, 2, 3, 4,5,6
		Journal Writing		Continuous	05	--	Journal	1, 2, 3, 4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Printouts	1, 2, 3, 4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Practical on setting up / tuning related instruments	10
2	Performance –level I	20
3	Performance –level II	10
4	Viva voce	10
	TOTAL	50

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	-	-	-	-	-	-	-	-	3	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	3	3	-	3	-	3	3	3	-	-
4	-	-	3	3	-	3	-	3	3	3	-	-
5	-	-	3	3	-	3	-	3	3	3	-	-
6	-	-	3	3	-	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
NIL			

❖ **E-REFERENCES:**

- ❖ <https://en.wikipedia.org/wiki/Hobby>
- ❖ www.justdial.com/Nagpur/Hobby
- ❖ nagpur.quikr.com

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

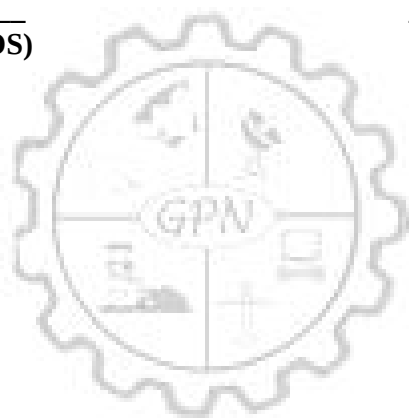
- ❖ As per requirement of related field.

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Dr. C.S.Thorat	Principal	Government Polytechnic, Nagpur.
2.	Dr. K.S.Dixit	Head of Automobile Engineering	Government Polytechnic, Nagpur.
3.	Mr. S.A.Telang	Lecturer in Automobile Engineering	Government Polytechnic, Nagpur.
4.	Mr. R.B.Tirpude	Lecturer in Automobile Engineering	Government Polytechnic, Nagpur
5.	Mr. J.M.Syed	Lecturer in Automobile Engineering	Government Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)



Vision of the Information Technology Program

To promote excellence in teaching and learning to produce lifelong learners who can compete globally to serve information industry and society.

Mission of the Information Technology Program

- M1 :** To enhance the educational experience that inspires students to reach for the highest level of accomplishment and personal growth throughout their lives.
- M2 :** To provide an environment that enables students and faculty to make lasting contributions to the advancement of knowledge and the creative practice of Information Engineering.
- M3 :** To fulfill expectations of the society and industry by equipping students with state of art technology resources for developing sustainable solutions.
- M4 :** Design and deliver curricula to meet the national and global changing needs through student-centric learning methodologies.

Program Educational Objectives - PEOs

- PEO1** : To prepare students who have strong foundation in mathematics, science, engineering fundamentals, laboratory and work-based experiences to formulate and solve engineering problems in Information Technology domains.
- PEO2** : To impart comprehensive knowledge with equal emphasis on theory and practice.
- PEO3** : To improve personality, induce team spirit and leadership quality among students and to promote cultural, social and spiritual values in all activities.
- PEO4** : To sharpen the problem solving skills to acquire competency for interdisciplinary problem solving and train them to excel in application or System development, System analysis and design, Project management in areas of socio-technological issues like environment and sustainability.
- PEO5** : To provide quality education for making the students competent to enter into the Global IT World as well as in the field of Research

Program Specific Outcomes - PSOs

- PSO1** : Ability to formulate, simulate and use knowledge of IT domains to solve hardware and Networking problem.
- PSO2** : Ability to code and test engineering problems using various programming languages and testing techniques.

Program Outcomes

- PO1 : Basic Knowledge:** Ability to apply knowledge of basic Mathematics, Science and Engineering to solve the engineering problems.
- PO2 : Discipline Knowledge:** Ability to discipline specific knowledge to solve core and/or applied engineering problems.
- PO3 : Experiments and Practice:** Ability to plan and perform experiments and practices and use the results to solve engineering problems.
- PO4 : Engineering Tools:** Apply appropriate technologies and tools with understandings of limitations.
- PO5 : The Engineer and Society:** Demonstrate knowledge to assess the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.
- PO6 : Environment and Sustainability:** Understand the impact of engineering solutions in societal and environmental context, and demonstrate knowledge and need for sustainable development.
- PO7 : Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
- PO8 : Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.
- PO9 : Communication:** An ability to communicate effectively.
- PO10: Life-long learning:** Recognise the need for, and have preparation and the ability to engage in independent and life-long learning in context of technological changes.



GOVERNMENT POLYTECHNIC

Opp. Mangalwari Bazar, Sadar, Nagpur-440001

(0712) 2564483 Fax : (0712) 2562741

Website : <http://www.gpnagpur.ac.in>

Email : info@gpnagpur.ac.in.