

GOVERNMENT POLYTECHNIC, NAGPUR
DIPLOMA IN INFORMATION TECHNOLOGY
TEACHING AND EXAMINATION SCHEME (CURRICULUM 2021)
FIRST SEMESTER INFORMATION TECHNOLOGY

Sr. No.	Course Code	Course Title	Course Category	Teaching Scheme (TH,TU,PR Hrs/Week)*			Credit	Examination Scheme (Max.Marks)				
								Theory Marks		Practical Marks		Total Marks
				TH	TU	PR		TEE	CA	TEE	CA	
1	MH101G	Basic Mathematics	Basic Science	3	1		4	60	40			100
2	CH101G	Chemistry	Basic Science	3		2	4	60	40	25@	25	150
3	EN101G	English	Humanities and Social Science	2		2	3	30	20	25@	25	100
4	EC104G	Principles of Electronics	Engineering Science	3		2	4	60	40	25@	25	150
5	CM151G	Computer Workshop	Engineering Science			4	2			25@	25	50
6	ME151G	Engineering Graphics	Engineering Science			4	2			25@	25	50
7	IT151G	Introduction to IT Systems(Online Course)	Engineering Science				2			25@	25	50
8	IC151G	Indian Constitution	Audit	1								Grades
			Total	12	1	14	21	210	140	150	150	650

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.

Student Centered Activity –Library -1 Hour, Sports- 2Hours,

Student Creative Activity-2 Hours Self Learning Mode Through MOOCS/NPTEL/SWAYAM

GOVERNMENT POLYTECHNIC, NAGPUR
DIPLOMA IN INFORMATION TECHNOLOGY
TEACHING AND EXAMINATION SCHEME (CURRICULUM 2021)
SECOND SEMESTER INFORMATION TECHNOLOGY

Sr. No.	Course Code	Course Title	Course Category	Teaching Scheme (TH,TU,PR Hrs/Week)*			Credit	Examination Scheme (Max.Marks)				
								Theory Marks		Practical Marks		Total Marks
				TH	TU	PR		TEE	CA	TEE	CA	
1	MH102G	Applied Mathematics	Basic Science	3	1		4	60	40			100
2	PH101G	Physics	Basic Science	3		2	4	60	40	25@	25	150
3	EE101G	Basics of Electrical Engineering	Engineering Science	3		2	4	60	40	25@	25	150
4	IT101G	Basics of Programming	Engineering Science	3		4	5	60	40	25@	25	150
5	EN151G	Business communication	Humanities and Social Science	1		2	2			25@	25	50
6	LS151G	Life Skills	Humanities and Social Science			2	1				25	25
7	EV151G	Environmental Science	Audit	2								Grades
			Total	15	1	12	20	240	160	100	125	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.

Student Centered Activity - Library -1 Hour, Sports- 2 Hours,

Student Creative Activity-2 Hours Self Learning Mode Through MOOCS/NPTEL/ SWAYAM

GOVERNMENT POLYTECHNIC, NAGPUR
DIPLOMA IN INFORMATION TECHNOLOGY
TEACHING AND EXAMINATION SCHEME (CURRICULUM 2021)
THIRD SEMESTER INFORMATION TECHNOLOGY

Sr. No.	Course Code	Course Title	Course Category	Teaching Scheme (TH,TU,PR Hrs/Week)*			Credit	Examination Scheme (Max.Marks)				
								Theory Marks		Practical Marks		Total Marks
				TH	TU	PR		TEE	CA	TEE	CA	
1	IT201G	MIS	Core Course	3			3	60	40			100
2	IT202G	Computer Network	Core Course	3		2	4	60	40	50#	25	175
3	CM202G	Data Structure ^{\$}	Core Course	3	1	2	5	60	40	50#	25	175
4	IT203G	Object Oriented Programming ^{\$}	Core Course	3		2	4	60	40	50#	25	175
5	IT204G	Data Communication**	Core Course	3			3	60	40			100
6	CM204G	Database Management System ^{\$}	Core Course	3		2	4	60	40	50#	50	200
7	IT251G	Web Page Design	Core Course			4	2			50#	25	75
			Total	18	1	12	25	360	240	250	150	1000

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.

Student Centered Activity - Library -1 Hour, Sports- 2 Hours,

Student Creative Activity-2 Hours Self Learning Mode Through MOOCS/NPTEL/ SWAYAM

GOVERNMENT POLYTECHNIC, NAGPUR
DIPLOMA IN INFORMATION TECHNOLOGY
TEACHING AND EXAMINATION SCHEME (CURRICULUM 2021)
FOURTH SEMESTER INFORMATION TECHNOLOGY

Sr. No.	Course Code	Course Title	Course Category	Teaching Scheme (TH,TU,PR Hrs/Week)*			Crediti	Examination Scheme (Max.Marks)				
								Theory Marks		Practical Marks		Total Marks
				TH	TU	PR		TEE	CA	TEE	CA	
1	IT205G	Internetworking with TCP/IP	Core Course	3			3	60	40			100
2	IT206G	Software Engineering ^{\$}	Core Course	3		2	4	60	40	50#	25	175
3	EC216G	DTE and Microprocessor	Engg. Science	3		2	4	60	40	25#	25	150
4	IT207G	Java Programming ^{\$}	Core Course	3		2	4	60	40	50#	25	175
5	AE213G	Industrial Management**	Humanities and Social Science	3			3	60	40			100
Elective –I (Any One)												
6	IT208G	Data Warehouse and Data Mining ^{\$}	Programme Elective	3		2	4	60	40	50#	25	175
	IT209G	AI and its applications ^{\$}										
Elective –II (Any One)												
7	IT210G	Web Programming with Python ^{\$}	Programme Elective	3		2	4	60	40	50#	25	175
	AI203G	Introduction to Machine Learning ^{\$}										
8	IT252G	GUI Programming	Core Course			4	2			50#	25	75
			Total	21		14	28	420	280	275	150	1125

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.

GOVERNMENT POLYTECHNIC, NAGPUR
DIPLOMA IN INFORMATION TECHNOLOGY
TEACHING AND EXAMINATION SCHEME (CURRICULUM 2021)
FIFTH SEMESTER INFORMATION TECHNOLOGY

Sr. No.	Course Code	Course Title	Course Category	Teaching Scheme (TH,TU,PR Hrs/Week)*			Credi t	Examination Scheme (Max.Marks)				
								Theory Marks		Practical Marks		Total Marks
				TH	TU	PR		TEE	CA	TEE	CA	
1	IT301G	Operating System [§]	Core Course	3		2	4	60	40	50#	25	175
2	IT302G	Linux Operating System [§]	Core Course	3		2	4	60	40	50#	25	175
3	IT303G	Multimedia Techniques	Core Course	3		2	4	60	40	50#	25	175
4	IT304G	Network security	Core Course	3		2	4	60	40	50#	25	175
5	ES351G	Entrepreneurship and Start up	Humanities and Social Science	2		2	3				25	25
Elective –III (Any One)												
6	IT305G	Software Testing	Programme Elective	3		2	4	60	40	50#	25	175
	IT306G	Mobile Computing										
7	OE201G TO OE222G	Open Elective**	Open Elective	2			2	30	20			50
8	IT351G	Project [§]	Project and Internship			4	2			100#	100	200
			Total	19		16	27	330	220	350	250	1150

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.

GOVERNMENT POLYTECHNIC, NAGPUR
DIPLOMA IN INFORMATION TECHNOLOGY
TEACHING AND EXAMINATION SCHEME (CURRICULUM 2021)
SIXTH SEMESTER INFORMATION TECHNOLOGY

Sr. No.	Course Code	Course Title	Course Category	Teaching Scheme (TH,TU,PR Hrs /Week)*			Credi t	Examination Scheme (Max.Marks)				
								Theory Marks		Practical Marks		Total Marks
				TH	TU	PR		TEE	CA	TEE	CA	
1	IN351G	Internship ^{\$}	Project and Internship			30	15			100#	100	200
			Total			30	15			100	100	200

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.

Internship practical hours per faculty will be 6 .

AWARD OF CLASS FOR DIPLOMA IN INFORMATION TECHNOLOGY

Sr. No.	Course Code	Course Title	Course Category	Teaching Scheme (TH,TU,PR Hrs/Week)*			Credit	Examination Scheme (Max.Marks)					Marks for Award of Class
				TH	TU	PR		Theory Marks		Practical Marks		Total Marks	
								TEE	CA	TEE	CA		
1	IT203G	Object Oriented Programming ^{\$}	Core Course	3		2	4	60	40	50#	25	175	175
2	CM202G	Data Structure ^{\$}	Core Course	3	1	2	5	60	40	50#	25	175	175
3	CM204G	Database Management System ^{\$}	Core Course	3		2	4	60	40	50#	50	200	200
4	IT206G	Software Engineering ^{\$}	Core Course	3		2	4	60	40	50#	25	175	175
5	IT207G	Java Programming ^{\$}	Core Course	3		2	4	60	40	50#	25	175	175
6	IT208G	Data Warehouse and Data Mining ^{\$}	Programme Elective	3		2	4	60	40	50#	25	175	175
	IT209G	AI and it's applications ^{\$}											
7	IT210G	Web Programming with Python ^{\$}	Programme Elective	3		2	4	60	40	50#	25	175	175
	AI203G	Introduction to Machine Learning ^{\$}											
8	IT301G	Operating System ^{\$}	Core Course	3		2	4	60	40	50#	25	175	175
9	IT302G	Linux Operating System ^{\$}	Core Course	3		2	4	60	40	50#	25	175	175
10	IN351G	Internship ^{\$}	Project and Internship			30	15			100#	100	200	200
11	IT351G	Major Project ^{\$}	Project and Internship			4	2			100#	100	200	100
			Total	27	1	52	54	540	360	650	450	2000	2000

Abbreviations:

• TH – Theory ; PR- Practical; TU- Tutorial; TEE- Term End Examination; CA-Continuous Assessment
 Symbolic Representation\$ Award of Class Course. ^ Converted Marks to be considered for Award of Class

DIPLOMA IN INFORMATION TECHNOLOGY

LIST OF OPEN ELECTIVE

Sr. No.	Course Code	Course Title	Course Category	Teaching Scheme (TH,TU,PR Hrs/Week)*			Credit	Examination Scheme (Max.Marks)				
								Theory Marks		Practical Marks		Total Marks
				TH	TU	PR		TEE	CA	TEE	CA	
01	OE201G	Industry 4.0	Open Elective	2			2	30	20			50
02	OE202G	Disaster Management	Open Elective	2			2	30	20			50
03	OE203G	Introduction to E-Governance	Open Elective	2			2	30	20			50
04	OE204G	Cyber Securities and Laws	Open Elective	2			2	30	20			50
05	OE205G	Project Management	Open Elective	2			2	30	20			50
06	OE206G	Energy Waste Management	Open Elective	2			2	30	20			50
07	OE207G	Total Quality Management	Open Elective	2			2	30	20			50
08	OE208G	Modern Vehicle Selection	Open Elective	2			2	30	20			50
09	OE209G	Sustainable Development	Open Elective	2			2	30	20			50
10	OE210G	Renewable Energy Sources for Mobility	Open Elective	2			2	30	20			50
11	OE211G	Selection of Materials	Open Elective	2			2	30	20			50
12	OE212G	Non Destructive Testing	Open Elective	2			2	30	20			50
13	OE213G	Adventure Tourism	Open Elective	2			2	30	20			50
14	OE214G	Basic Guide Training	Open Elective	2			2	30	20			50
15	OE215G	Renewable Energy Technologies	Open Elective	2			2	30	20			50
16	OE216G	Energy Conservation Opportunities	Open Elective	2			2	30	20			50
17	OE217G	Electric Vehicle	Open Elective	2			2	30	20			50

18	OE218G	Artificial Intelligence	Open Elective	2			2	30	20			50
19	OE219G	Internet of Things	Open Elective	2			2	30	20			50
20	OE220G	Green Building	Open Elective	2			2	30	20			50
21	OE221G	Building Services	Open Elective	2			2	30	20			50
22	OE222G	Mechatronics	Open Elective	2			2	30	20			50

DIPLOMA IN INFORMATION TECHNOLOGY**ABSTRACT OF CURRICULUM TEACHING AND EXAMINATION SCHEME**

Sr. No.	Semester	Teaching Scheme (TH,TU,PR Hrs/Week) Total			Credit Total	Examination Scheme (Total Max.Marks)				
						Theory Marks		Practical Marks		Total Marks
		TH	TU	PR		TEE	CA	TEE	CA	
1	I	12	1	14	21	210	140	150	150	650
2	II	15	1	12	20	240	160	100	125	625
3	III	18	1	12	25	360	240	250	150	1000
4	IV	21		14	28	420	280	275	150	1125
5	V	19		16	27	330	220	350	250	1150
6	VI			30	15			100	100	200
	Total	85	3	98	136	1560	1040	1225	925	4750

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN CE/ME/AE/PK/MT/EE/EC/IT/CM/TX/
MC/AI

COURSE CATEGORY: BASIC SCIENCE COURSE

COURSE CODE : MH101G

COURSE TITLE : BASIC MATHEMATICS

TEACHING SCHEME: TH:03; TU: 01(1TH/TU CREDIT=1CLOCK HRS.)

TOTAL CREDITS : 04

TH. TEE : 03 HRs

PR. TEE : --

PT. : 01 HR

❖ RATIONALE:

The course 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 courses.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Apply laws of logarithm to solve engineering problems.
2. Resolve Proper real fractions into partial fractions.
3. Apply matrix method to solve simultaneous equations in two and three variables.
4. Use concept of allied angle, compound angle, multiple, and sub multiple angle to solve engineering problems.
5. Find principle value of inverse trigonometric functions, use properties to solve the examples of inverse trigonometric functions.
6. Use measures of central tendency and measures of dispersion in decision making.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs.
1. Logarithm	1a. Evaluate the value of given logarithm without using calculator. 1b. Solve the given logarithm by using Laws of logarithm. 1c. Identify natural and common logarithm.	1.1 Logarithm:-Concept of Logarithm 1.2 Rules and Laws of Logarithm; Addition, Subtraction, Multiplication, Division and Change of Base Formula. 1.3 Concept of natural & common logarithm	03
2. Partial Fractions	2a. Identify rational function, proper and improper fraction. 2b. Resolve the given proper fraction into partial fraction. 2c. Resolve the given improper fraction into partial fraction.	2.1 Concept of rational function , proper ,improper fraction and partial fraction 2.2 Resolving proper fraction into partial fraction. Denominator containing non repeated linear factors, Denominator containing repeated linear factors, Denominator containing irreducible non repeated quadratic factors 2.3 Resolving improper fraction into partial fraction.	05
3. Determinant and Matrix	3a. Find the value of given determinant of order 2 and 3. 3b. Solve the given matrix by using Algebra of matrix, transpose of matrix , ad-joint of matrix, singularity of matrix and find inverse of matrix. 3c. Solve the given simultaneous equation in two and three variables.	3.1 Concept of determinant ,order of determinant, Expansion & Evaluation of determinant of order 2 and 3 3.2 Concept of matrix, Types of matrices, Algebra of matrices Transpose of matrix , ad-joint, singularity of matrix and inverse of matrix 3.3 Solution of system of linear equations two and three variables by inverse matrix method	12
4. Trigonometry	4a. Use fundamental identities to solve the given Trigonometric relation. 4b. Apply the concept of allied angle , compound angle, multiple angle (2θ and 3θ) sub-multiple angle ($\frac{\theta}{2}$), to solve the given trigonometric relation. 4c. Apply Factorisation, De-	4.1 Fundamental identities, Trigonometric ratios of any angle. 4.2 Trigonometric ratios of allied angles, compound angles , multiple and sub-multiple angles (without proof) 4.3 Factorization and de-factorization formulae(without proof).	14

	Factorisation formulae to solve the given trigonometric relations.		
5. Inverse Trigonometric Functions	5a. Find the principle value the given Inverse trigonometric functions. 5b. Solve the given inverse trigonometric functions. 5c. Evaluate the value of given inverse trigonometric functions.	5.1 Concept of inverse trigonometric functions, Principle values of inverse trigonometric functions. 5.2 Properties of inverse trigonometric functions. 5.3 Relation between inverse trigonometric functions	05
6. Statistics	6a. Find mean or Combined Mean of given Statistical data. 6b. Find the Range, Co-efficient of Range, Mean Deviation, Standard Deviation of given Statistical data. 6c. Find variances, coefficient of variation of given Statistical data. 6d. Compare the given Two sets and Check the Consistency & Reliability OR Interpret the result by co-efficient of variations.	6.1 Measures of central tendency Mean (only), & Combined mean 6.2 Measures of dispersion:- Range, mean deviation, standard deviation of Discrete, Grouped & Ungrouped Data. 6.3 Variance and coefficient of variation, of Discrete, Grouped & Ungrouped Data. 6.4 Comparison of two sets of observations, Consistency & Reliability	09
		Total Hrs.	48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Assignments	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 of two sets of data.	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	
1	Logarithm	04(00)	00(00)	00(03)	04(03)
2	Partial Fraction	00(04)	03(00)	03(00)	06(04)
3	Determinant and Matrix	02(02)	06(03)	06(03)	14(08)
4	Trigonometry	02(00)	12(06)	06(06)	20(12)
5	Inverse Trigonometric Functions	02(00)	00(03)	03(00)	05(03)
6	Statistics	02(00)	03(03)	06(03)	11(06)
	Total	12(06)	24(15)	24(15)	60(36)

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	
1	1	R	2	1	R	2	2	R	2	2	R	2	3	R	2	3	R	2	6/9
	4	R	2	5	R	2	6	R	2										
2	2	U	3	3	U	3	3	U	3	1	A	3	2	A	3				3/5
3	3	U	3	4	U	3	4	U	3	4	U	3	3	A	3				3/5
4	4	U	3	4	U	3	4	U	3	4	A	3	4	A	3				3/5
5	5	U	3	6	U	3	6	U	3	5	A	3	6	A	3				3/5
6	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 Who m	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcome s
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Sheets	1, 2, 3, 4,5,6
		Class Room Assignment s		Tutorial Assignments	15	--	Assignme nt Book	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Stude nts	End of the Course	60	24	Theory Answer Sheets	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	--	--	--	--
		Journal Writing		Assignments	--	--	--	--
				Total	--	--		
	TEE (Term End Examination)	End Exam	Stude nts	End of the Course	--	--	--	--
Indirect Assessment	Student Feedback on course		Stude nts	After First PT	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)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	3	-	-	-	-	-	-			
2	3	-	-	-	-	-	-			
3	3	-	-	-	-	-	3			
4	3	-	-	-	-	-	-			
5	3	-	-	-	-	-	-			
6	3	-	-	-	-	1	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, 6 th Edition 2021	9789351762539
2	Plane Trigonometry	S.L.Loney, Publisher: Arihant, 5 th Edition 2015	9352030540
3	Basic Statistics	B.L.Agarwal, Publisher: Anshan	1848290675
4	Basic Mathematics	G.V.Kumbhojkar, P. Jamnadas LLP., 21 st Edition 2017	978-81-934573-5-1
5	Fundamental of Statistics	S.C.Gupta, Himalaya Publishing House, 7 th Edition 2015	9789350517697

❖ **E-REFERENCES:**

- https://econtent.msbte.ac.in/econtent/econtent_home.php
- <https://www.khanacademy.org>
- https://www.youtube.com/watch?v=5_TuK1yCPD4

❖ **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 Sakoli
4	Dr.P.B.Bahatkar	Professor	Y. C. C. E. Nagpur
5	Mr.W.T.Gaidhane	Lecturer	Nagar Parishad Junior College, Arvi

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN ME/AE/CE/EE / ET/PK/ MT/TX/IT/CM / MC / AI
COURSE CATEGORY	: BASIC SCIENCE COURSE
COURSE CODE	: CH101G
COURSE TITLE	: CHEMISTRY
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
PT. EXAM	: 01 HR

❖ RATIONALE:

Chemistry is the basic science which is essential to all engineering courses. For an engineer, the usage of equipment's and instruments would require knowledge of chemical substances, their composition and properties. This course describes the basic facts, concepts & principles for the understanding of basic elementary knowledge related to all engineering fields. 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. This will be gateway for development of reasoning capacity of students and understanding new technology as well.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Predict the valency and application of catalyst in industry.
2. Select metal and nonmetallic materials for industrial application.
3. Select Engineering materials on the basis of properties and application.
4. Apply knowledge related with Electrochemistry, and fuel Cells.
5. Apply the knowledge of preventive measures in Industry.
6. Analyze different type of energy sources for sustainable development.

❖ **COURSE DETAILS:****A. THEORY:**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Chemical Bonding & Catalysis	1a. Predict valence electrons and type valence of elements. 1b. Formulate given molecule on the basis of given type. 1c. Differentiate between electrovalent and covalent compound on basis of given properties. 1d. Describe given type of catalysts, catalysis. 1e. Select the relevant catalyst for given application.	1.1 Valency: Definition & types of valence (Electrovalence & Covalence). Octet Rule, Duplet Rule. 1.2 Formation of Electrovalent e.g., NaCl, CaCl ₂ , MgO. and Formation of Covalent Compounds CO ₂ , NH ₃ , N ₂ . 1.3 Distinction between electrovalent & covalent compounds (formation, M.P. B.P., Type of bond, Solubility, strength of bond) Catalysis: 1.4 Definitions of catalyst Types of Catalyst, Positive Catalyst, Negative Catalyst, Auto - catalyst.: Definitions of catalysis, Types of catalysis. 1.5 Industrial Application of Catalyst.	06
2. Metallurgy, Alloy & Polymer	2a. Describe given terms in metallurgy. 2b. Describe given process of metal extraction. 2c. Select proper alloy for given application or vice versa. 2d. Distinguish between thermo softening and thermosetting plastics on given points. 2e. Select the given Plastic Polymer for Industry application. 2f. Apply given Thermal insulators in industry on their Characteristics.	2.1 Metallurgy: Definitions of terms used in metallurgy like Minerals, Ore, gangue, Flux, slag. Definition of metallurgy. 2.2 Flow chart of extraction process (Crushing, Concentration (physical and chemical), reduction, refining. 2.3 Definition of alloy, purposes of alloy formation, Types of alloys (ferrous alloy and nonferrous alloy) Composition properties and application of High-speed steel, Magnetic steel, Duralumin, Woods metal. 2.4 Polymer (plastic): Definition of polymer, types of polymers and difference of thermo softening and thermosetting plastics. 2.5 Formation of Plastic by Addition polymerization of Polyethylene, polystyrene. Formation of Plastic by Condensation process Bakelite plastic, nylon 6, 6. 2.6 Insulating material: Characteristics	08

		of Thermal insulators. Preparation, Properties & Applications of Thermocol & glass wool.	
3. Engineering Materials	3a. Describe functions & characteristics of given Lubricants. 3b. Select given lubricant on the basis of different types of machines. 3c. Detect the adverse effects of hard water as per given industry. 3d. Describe given type of water treatment process. 3e. Describe the given properties and applications of given construction material.	Lubricant: 3.1 Definition, Types of Lubricants, Functions of Lubricants. Characteristics of Lubricants- Viscosity, Volatility, viscosity Index, oiliness, cloud and pour point, Flash and fire point, Neutralization number. 3.2 Selection of Lubricant for various types of machines such as I.C engine, Gear system, cutting tools delicate and simple machines, tractors and rollers. Water: 3.3 Types of impurities in natural water. Definitions of hard and soft water, types of hardness. Adverse effects of hard water in: Industries- paper industry, textile industry, dyeing industry, sugar industry. 3.4 Potable water treatment: Sedimentation, Coagulation, filtration, sterilization (Chlorination method). Cement & Lime 3.4 Portland cement: Definition, chemical composition. Special Cements: Properties and application of water proofing cement, super sulphate cement. lime: Composition, properties and uses of fat lime, lean lime.	10
4. Electrochemistry	4a. Describe given terms involved in electrochemistry. 4b. Interpret degree of ionization on the basis of given factors. 4c. Describe the electroplating of given metal. 4d. Calculate the pH/POH of solutions with given concentration. 4e. Differentiate Primary and Secondary cells on given points. 4f. Use of Hydrogen-	Basic concepts of electrolysis: 4.1 Atoms, Ions, Electrolyte, conductivity of electrolytes, type of electrolyte- strong and weak electrolyte. 4.2 Ionization and electrolytic dissociation, Arrhenius theory of electrolytic dissociation, degree of ionization, factors affecting degree of ionization. Electrolysis 4.3 Faraday's laws of electrolysis: Faraday's First and Second law (Statement and mathematical expression) Application of electrolysis: Electro Plating of	09

	oxygen fuel cell in Engineering field.	copper and silver. pH and pOH: 4.4 Definition of pH, pOH, pH scale, numerical. Electrochemical cells/ batteries: 4.5 Basic concepts: cell, battery, distinction between Primary and secondary cells. 4.6 Fuel cell: Definition, construction, working, advantages, limitations and applications of Hydrogen-oxygen fuel cell.	
5. Corrosion	5a. Identify the given types of oxide film & its effect on corrosion. 5b. Describe mechanism of given type of corrosion. 5c. Choose different corrosion protection methods of metal and its use in given situation.	5.1 Definition of corrosion, Types of corrosion, mechanism of Atmospheric or chemical corrosion. Effect of oxide film on atmospheric corrosion. Factor effecting atmospheric corrosion. 5.2 Immersed Corrosion or Electrochemical Corrosion, definition, types and mechanism (Hydrogen evolution and oxygen absorption) 5.3 Application of Protective Coatings like metal coating by - Galvanizing, Tinning, Sherardizing, Metal Spraying, Metal Cladding	07
6. Energy & Pollution Control	6a. Compare given types of Fuel on given points. 6b. Analyse components of fuel by proximate analysis. 6c. Describe the properties and uses of given solid, liquid and gaseous fuel. 6d. Select proper pollution control methods for given type of pollution. 6e. Describe the significance of given E- waste Management methods for implementation of sustainable development.	Energy 6.1 Definitions of a fuel, Classification of fuels with suitable examples Characteristics of a good fuel, calorific value and ignition temperature, comparison between solid, liquid, gaseous fuels based on their properties. Classifications of fuel: 6.2 Solid fuels: analysis of solid fuels- Proximate analysis for determination of moisture, volatile matter, ash and fixed carbon, significance of Proximate analysis. 6.3 Liquid fuels: Bio diesel - properties, applications. Gaseous fuels: Composition, properties, applications of LPG, CNG Pollution control 6.4 Definition of pollution – Types of pollution (Air, water pollution) 6.5 3R Concept, recycling of plastic. E -waste management, sustainable development – significance of Wind	08

		Energy, Solar Energy.	
		Total Hrs.	48

B. LIST OF PRACTICALS / LABORATORY EXPERIENCES / ASSIGNMENTS:

Pra cti- cals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Explore the chemistry laboratory.	Chemical Bonding & Catalysis	02
2	Analyse basic and Acidic Radicals of known salt solution-1 (Confirmatory Test) using qualitative analysis method.	Chemical Bonding & Catalysis	02
3	Analyse basic and Acidic Radicals of known salt solution-2 (Confirmatory Test) using qualitative analysis method.		02
4	Analyse basic and Acidic Radicals of known salt solution-3 (Confirmatory Test) using qualitative analysis method.		02
5	Determine the percentage of Iron in given steel sample by redox titration. (OR) Determine the percentage of copper in given alloy sample.	Metallurgy Alloys & Polymer	02
6	Prepare Phenol formaldehyde resin used in manufacturing of Bakelite Plastic.	Metallurgy Alloys & Polymer	02
7	Determine total hardness (permanent and temporary) of given sample of water by EDTA method.	Engineering Materials	04
8	Determine the percentage of calcium content in cement	Engineering Materials	02
9	Determine acid value of lubricant by KOH OR Determine coefficient of viscosity using Ostwald's Viscometer.	Engineering Materials	02
10	Determination of PH value of given solution by using PH meter.	Electrochemistry	02
11	Find the Electrochemical equivalent (ECE) of copper.	Electrochemistry	02
12	Find the relation between loss in weight of aluminium strip in acidic and alkaline medium and rate of corrosion	Corrosion	02
13	Determine the strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution.		02

14	Determine the percentage of moisture and ash content in the given coal sample. by proximate analysis.	Energy & pollution control	04
		Total	32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Chemical Bonding & Catalysis	02(02)	03(03)	03(00)	08(05)
2	Metallurgy, Alloy & Polymer	04(00)	06(00)	00(06)	10(06)
3	Engineering Materials	00(02)	06(06)	06(00)	12(08)
4	Electrochemistry	02(00)	03(06)	06(00)	11(06)
5	Corrosion	02(02)	03(00)	03(03)	08(05)
6	Energy and Pollution control	02(00)	03(06)	06(00)	11(06)
	Total	12(06)	24(21)	24(09)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T-Unit/Topic Number

L- Level of Question

M-Marks

R-Remember

U-Understand

A-Analyze/ Apply

1R2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	2	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	3	R	2	5	R	2										
2	1	U	3	1	A	3	2	U	3	1	U	3	5	A	3				3/5
3	2	U	3	3	U	3	3	U	3	3	U	3	3	U	3				3/5
4	4	U	3	5	U	3	5	A	3	4	U	3	4	U	3				3/5
5	6	U	3	6	A	3	6	A	3	6	U	3	6	U	3				3/5
6	3	A	6	4	A	6	2	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Cours e Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3, 4, 5, 6
		Class Room Assignments		Assignments	15	--	Assignment book	1, 2, 3, 4, 5, 6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1, 2, 3, 4, 5, 6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous assessment of practical	Students	End of every practical	20	--	Journal	1, 2, 3, 4, 5, 6
		Journal Writing		Assignment	05	--	Journal	1, 2, 3, 4, 5, 6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1, 2, 3, 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			

❖ **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)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	3									
2	3			3						
3	3			3	3		3			
4	3			3			3			
5	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	Engineering Chemistry Jain and Jain	Engineering Chemistry Jain and Jain, Dhanpat Rai publishing company(P) ltd.15 edition	10092
2	Engineering Chemistry	Engineering Chemistry S. S. Dara, S. Chand Publication	15 th Edition
3	Engineering Chemistry	R. Sivakumar N. Sivakumar and Tata McGrawHill, edition10.	9780745-328896
4	Polytechnic Chemistry	Vedprakash Mehta, Jain brothers, 6 th Edition	13-9788183600134
5	Industrial Chemistry	Goel Publication, 8 th Edition	81877224002

❖ **E-REFERENCES:**

- http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_polymer_s- , accessed on 10 June 2021
- http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_fluids-, accessed on 10 June 2021
- <http://www.asetute.com.au/corrosion.html>, accessed on 10 June 2021
- http://www.sherardizing.com/resources/files/9_Sherardizing_Corrosion.pdf , accessed on 10 June 2021
- <http://www.galvanizeit.org/aga/animation> , accessed on 10 June 2021
- http://www.ehow.com/list_6725219_different-types-metal-cladding.html , accessed on 10 June 2021

❖ **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 EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM : (786)**

Sr.No.	Name	Designation	Institute / Industry
1	Dr.M.I.Ahmed	Coordinator Sr. Lecturer in Chemistry	Government Polytechnic, Nagpur
2	Dr.S.A.Petkar	Lecturer Chemistry.	Government Polytechnic, Nagpur.
3	Dr.K.A.Nandekar	Lecturer Chemistry	G.H.Raisoni college of Engineering Nagpur
4	Dr.Prashant Zade	Lecturer Chemistry	Dharampeth Polytechnic, Nagpur
5	Prashant B.Chouke	Lecturer Chemistry	Government Polytechnic, Brahmpuri
6	Dr.D.K.Borikar	Lecturer Chemistry	Government Polytechnic, Nagpur
7	Dr.S.L.Sayre	Lecturer Chemistry	Government Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN AI,CE,ME,EE,EC,PK,MC,MT,IT,AU,CM,
TX,TR

COURSE CATEGORY : HUMANITIES & SOCIAL SCIENCE COURSE

COURSE CODE : EN101G

COURSE TITLE : ENGLISH

TEACHING SCHEME : TH: 02 TU: 00; PR: 02 (CLOCK HRs.)

TOTAL CREDITS : 03(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)

TH. TEE : 02 HRs

PR. TEE : 02 HRs

PT. : 01 HR

❖ RATIONALE:

English as a means of communication and interaction is imperative in the holistic development of an individual. While giving a practical view of the world around him it also helps define well their role in the world. While teaching this course, emphasis will be laid on enhancing expression of ideas in English by the students. Excellence in this language enables a professional to develop his career as well as builds a strong standing in society.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Incorporate Grammatically correct structures in usage.
2. Acquire comprehension ability.
3. Assess the idea and information given.
4. Demonstrate usage of language effectively.
5. Formulate language into meaningful structures.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Application of Grammar	1a. Incorporate correct sentence pattern in writing and speaking. 1b. Identify & use tenses in various situation. 1c. Formulate direct and indirect speeches according to the situations. 1d. Draft multiple and meaningful sentences	1.1 Articles & Prepositions 1.2 Tenses: Appropriate uses of tenses in given situations. 1.3 Voice: use of active and passive voice. 1.4 Narration: direct & indirect speech	06
2. Text	2a. Interpret oral summary of topics read or heard. 2b. Adjust speed of reading. 2c. Follow oral instructions and explain them to others. 2d. Comprehend the lecture and make notes while listening. 2e. Inculcate ethical and inspirational values	2.1 Text: Learning to read fluently and to develop insight through. Selected prose prescribed in the text. 1. Dale Carnegie's : Six ways to make people like you 2. When Life gave me Lemons- Rashmi Raj 3. Two Gentlemen of Verona- A.J. Cronin 4. To be a Somebody, Remain a Nobody by K S Ram 5. Brief answers to questions: AI	09
3. Comprehension of Passage	3a. Articulate single or multiple sentences. 3b. Comprehend main ideas and demonstrate them. 3c. Analyze and assess the information and ideas gathered from the given articles.	Articles for reading 3.1 Be Remarkable 3.2 Our Muddled Generation 3.3 Employers look for potential Employees	06
4. Speaking Skills	4a. Apply correct pronunciations. 4b. Compose sentences with correct intentions and sense. 4c. Associate correct accent/stress to the	Sample situations for conversational practice 4.1 Introducing yourself and others. 4.2 Meeting and parting. 4.3 Requesting information 4.4 Inquiries and information. 4.5 Asking, Giving and Refusing	06

	given words.	4.6 Permission. Apologizing to an individual/ office.	
5. Writing Skills	5a. Develop and expand ideas into paragraphs. 5b. Exercise speeches as per given situation.	5.1 Paragraph writing: Elaborate and expand ideas, Types of paragraphs 5.2 Speech writing: Introducing the guests and vote of thanks.	05
Total Hrs.			32

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Perform Tense Busters -All levels(To be performed in language lab)	Application of Grammar	06
2	Transform given sentences into active and passiveVoice	Application of Grammar	02
3	Practice narration(Direct & Indirect Speech)	Application of Grammar	02
4	outline an introduction- for self & others	Speaking Skills	02
5	Build Vocabulary for different situations	Text	04
6	Read and make notes on given topic	Text	02
7	Write a paragraph on given topic	Writing Skills	06
8	Conduct a Book Review	Writing Skills	02
9	Practice Dialogue Writing & presentation	Writing Skills	02
10	Conduct Comprehension of Passage	Comprehension passage	02
11	Prepare Speech and Present: 1) Introduction of guests 2) Vote of thanks	Speaking Skills	02
Total			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Application of Grammar	02(00)	03(00)	00(02)	05(02)
2	Text	04(02)	06(03)	00(00)	10(05)
3	Comprehension of Passage.	02(00)	06(00)	00(00)	08(00)
4	Speaking Skills	00(00)	00(00)	03(04)	03(04)
5	Writing Skills	00(00)	00(00)	04(03)	04(03)
	Total	08(02)	15(03)	07(09)	30(14)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	2	R	2	3	R	2	1	A	2	2	R	2	4/6
2	2	U	3	3	U	3	1	U	3	2	U	3							3/4
3	4	A	3	2	U	3	3	U	3	5	A	3							3/4
4	5	A	4	4	A	4													1/2

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	15	--	Test Answer Scripts	1, 2, 3,4,5
		Class Room Assignments		Assignments	05	--	Assignment Book	1, 2, 3,4,5
	TEE (Term End Examination)	End Exam	Students	End of the Course	30	12	Theory Answer Scripts	1,2,3,4,5
				Total	50	20		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	25	10	Practical Answer Scripts	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	After First PT	Student Feedback Form			1, 2, 3, 4,5
	End of Course Survey			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)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	3	-	-	-	-	-	3			
2	3	-	-	-	3	-	3			
3	-	2	-	-	3	-	-			
4	-	-	-	-	3	-	3			
5	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	How to Win Friends and Influence people: Six ways to make people like you	Dale Carnegie, Rupa; First edition (20 May 2016)	978-8129140173
2	When life gave me lemons	https://storymirror.com/read/english/story/when-life-gave-me-lemons/krd7xe09 ,	
3	Two gentleman of Verona	A.J.Cronin, Oxford University Press 2013	
4.	To be a somebody remain a nobody	K.S.Ram[Author] Times of India [Publisher] 20edition December 2004	
5	Brief answers to questions: Artificial Intelligence	Stephen HawkingHodder&Stoughton, 16 October 2018	9781529345421
6	Our muddled generation.	Dinesh Kumar,Manish Sabharwal,Golden Harvest,	9788125059523

7	High School English Grammar and Composition	Wren and Martin Revised by Dr.N.D.V.PrasadaRao,	High School English Grammar and Composition
8	Contemporary English Grammar-structure and composition	David Green Revised Edition,2004 Himalaya Publication	033392183-6
9.	Interactive English	S.K.Gangal, Revised Edition 1997 Allied Publishers	81-7023-678-9
10	Applied English Grammar and composition.	Dr. P.C. Das, 2013, New Central Book Agency.	978-81-7381-542-3
11	English for Practical Purposes	Z. N. Patil, B.S. Valke	033935098

❖ **E-REFERENCES:**

- <https://storymirror.com/read/english/story/when-life-gave-me-lemons/krd7xe09>, Assessed on 25th July, 2021
- www.talkenglish.com-grammar , Assessed on 12th July, 2021
- www.perfect-english-grammar.com , Assessed on 18th March, 2021

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

S.N.	Name	Designation	Institute / Industry
1	Dr.RupaliLondhe	Lecturer in English & Coordinator	Government Polytechnic, Nagpur.
2	Prof NitinPote	Expert, Lecturer in English	Government Polytechnic, Bramhapuri
3	Prof Ravindra Suryawanshi	Expert, Lecturer in English	NIT Polytechnic, Nagpur
4	Prof NitinPathak	Expert, Lecturer in English	Kamptee Polytechnic, Nagpur
5	Dr.M.M.Machale	Lecturer in English	Government Polytechnic, Nagpur.
6	Mrs. Kamala Grace	Visiting Lecturer in English	Government Polytechnic, Nagpur.
7	Mrs.Swati Mahatme	Visiting Lecturer in English	Government Polytechnic, Nagpur.
8	Ms.Rasika Joshi	Visiting Lecturer in English	Government Polytechnic, Nagpur.
9	Mrs.Barnali Roy	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 AI,CE,ME,EE,EC,PK,MC,MT,IT,AU, CM, TX,TR
COURSE CATEGORY	: HUMANITIES & SOCIAL SCIENCE COURSE
COURSE CODE	: EN101G
COURSE TITLE	: ENGLISH
TEACHING SCHEME	: TH: 02 TU: 00; PR: 02 (CLOCK HRs.)
TOTAL CREDITS	: 03(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	: 02 HRs
PR. TEE	: 02 HRs
PT.	: 01 HR

❖ **RATIONALE:**

English as a means of communication and interaction is imperative in the holistic development of an individual. While giving a practical view of the world around him it also helps define well their role in the world. While teaching this course, emphasis will be laid on enhancing expression of ideas in English by the students. Excellence in this language enables a professional to develop his career as well as builds a strong standing in society.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Incorporate Grammatically correct structures in usage.
2. Acquire comprehension ability.
3. Assess the idea and information given.
4. Demonstrate usage of language effectively.
5. Formulate language into meaningful structures.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Application of Grammar	1a. Incorporate correct sentence pattern in writing and speaking. 1b. Identify & use tenses in various situation. 1c. Formulate direct and indirect speeches according to the situations. 1d. Draft multiple and meaningful sentences.	1.1 Articles & Prepositions 1.2 Tenses: Appropriate uses of tenses in given situations. 1.3 Voice: use of active and passive voice. 1.4 Narration: direct & indirect speech	06
2. Text	2a. Interpret oral summary of topics read or heard. 2b. Adjust speed of reading. 2c. Follow oral instructions and explain them to others. 2d. Comprehend the lecture and make notes while listening. 2e. Inculcate ethical and inspirational values.	2.1 Text: Learning to read fluently and to develop insight through. Selected prose prescribed in the text. 1. Dale Carnegie's : Six ways to make people like you 2. When Life gave me Lemons- Rashmi Raj 3. Two Gentlemen of Verona- A.J. Cronin 4. To be a Somebody, Remain a Nobody by K S Ram 5. Brief answers to questions: AI	09
3. Comprehension of Passage	3a. Articulate single or multiple sentences. 3b. Comprehend main ideas and demonstrate them. 3c. Analyze and assess the information and ideas gathered from the given articles.	Articles for reading 3.1 Be Remarkable 3.2 Our Muddled Generation 3.3 Employers look for potential Employees	06
4. Speaking Skills	4a. Apply correct Pronunciations. 4b. Compose sentences with correct intentions and sense. 4c. Associate correct accent/stress to the given words.	Sample situations for conversational practice 4.1 Introducing yourself and others. 4.2 Meeting and parting. 4.3 Requesting information 4.4 Inquiries and information. 4.5 Asking, Giving and Refusing Permission. 4.6 Apologizing to an individual/ office.	06

5. Writing Skills	5a. Develop and expand ideas into paragraphs. 5b. Exercise speeches as per given situations.	5.1 Paragraph writing: Elaborate and expand ideas, Types of paragraphs 5.2 Speech writing: Introducing the Guests and vote of thanks.	05
Total Hrs.			32

B. LIST OF PRACTICALS / LABORATORY EXPERIENCES / ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Perform Tense Busters -All levels (To be performed in language lab).	Application of Grammar	06
2	Transform given sentences into active and passive Voice.	Application of Grammar	02
3	Practice narration(Direct & Indirect Speech).	Application of Grammar	02
4	Outline an introduction- for self & others.	Speaking Skills	02
5	Build Vocabulary for different situations.	Text	04
6	Read and make notes on given topic.	Text	02
7	Write a paragraph on given topic.	Writing Skills	06
8	Conduct a Book Review.	Writing Skills	02
9	Practice Dialogue Writing & presentation.	Writing Skills	02
10	Conduct Comprehension of Passage.	Comprehension Passage	02
11	Prepare Speech and Present: 1) Introduction of guests 2) Vote of thanks	Speaking Skills	02
Total			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Application of Grammar	02(02)	02(01)	02(02)	06(05)
2	Text	04(02)	04(02)	00(00)	08(04)
3	Short stories	02(02)	04(02)	00(00)	06(04)
4	Conversational Practice	00(00)	03(00)	02(01)	05(01)
5	Writing Techniques	00(00)	03(00)	02(02)	05(02)
	Total	08(12)	16(20)	06(09)	30(16)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L-Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	3	R	2	2	R	2	2	R	2	3	R	2	2	R	2	4/7
	1	R	2																
2	2	U	3	3	U	3	4	A	3	1	U	3							3/4
3	3	U	3	5	U	3	2	U	3	4	U	3							3/4
4	5	A	4	1	A	4													1/2

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Cours e Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3, 4, 5, 6
		Class Room Assignments		Assignments	15	--	Assignment book	1, 2, 3, 4, 5, 6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1, 2, 3, 4, 5, 6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous assessment of practical	Students	End of every practical	20	--	Journal	1, 2, 3, 4, 5, 6
		Journal Writing		Assignment	05	--	Journal	1, 2, 3, 4, 5, 6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1, 2, 3, 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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Performance	10
2	Overall presentation of given assignment	10
3	Viva voce	20
4	Activity	10
	TOTAL	50

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	3	-	-	-	-	-	3			
2	3	-	-	-	3	-	3			
3	-	2	-	-	3	-	-			
4	-	-	-	-	3	-	3			
5	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	How to Win Friends and Influence people: Six ways to make people like you	Dale Carnegie, Rupa; First edition (20 May 2016)	978-8129140173
2	When life gave me lemons	https://storymirror.com/read/english/story/when-life-gave-me-lemons/krd7xe09 ,	
3	Two gentleman of Verona	A.J.Cronin, Oxford University Press 2013	
4	To be a somebody remain a nobody	K.S.Ram[Author] Times of India [Publisher] 20edition December 2004	
5	Brief answers to questions: Artificial Intelligence	Stephen Hawking Hodder & Stoughton, 16 October 2018	9781529345421

6	Our muddled generation.	Dinesh Kumar, Manish Sabharwal, Golden Harvest,	9788125059523
7	High School English Grammar and Composition	Wren and Martin Revised by Dr.N.D.V.PrasadaRao,	High School English Grammar and Composition
8	Contemporary English Grammar-structure and composition	David Green Revised Edition,2004 Himalaya Publication	033392183-6
9	Interactive English	S.K.Gangal, Revised Edition 1997 Allied Publishers	81-7023-678-9
10	Applied English Grammar and composition.	Dr. P.C. Das, 2013, New Central Book Agency.	978-81-7381- 542-3
11	English for Practical Purposes	Z. N. Patil, B.S. Valke	033935098

❖ **E-REFERENCES:**

- <https://storymirror.com/read/english/story/when-life-gave-me-lemons/krd7xe09>, accessed on 25th July, 2021
- www.talkenglish.com-grammar , Accessed on 12th July, 2021
- www.perfect-english-grammar.com , Accessed on 18th March, 2021

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

S.N.	Name	Designation	Institute / Industry
1	Dr.Rupali Londhe	Lecturer in English & Coordinator	Government Polytechnic, Nagpur.
2	Prof. Nitin Pote	Expert, Lecturer in English	Government Polytechnic, Bramhapuri
3	Prof. Ravindra Suryawanshi	Expert, Lecturer in English	NIT Polytechnic, Nagpur
4	Prof. Nitin Pathak	Expert, Lecturer in English	Kamptee Polytechnic, Nagpur
5	Dr.M.M.Machale	Lecturer in English	Government Polytechnic, Nagpur.
6	Mrs.Kamala Grace	Visiting Lecturer in English	Government Polytechnic, Nagpur.
7	Mrs.Swati Mahatme	Visiting Lecturer in English	Government Polytechnic, Nagpur.
8	Ms.Rasika Joshi	Visiting Lecturer in English	Government Polytechnic, Nagpur.
9	Mrs.Barnali Roy	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 COMPUTER ENGINEERING /
INFORMATION TECHNOLOGY /AIML
COURSE CATEGORY: ENGINEERING SCIENCE COURSE
COURSE CODE : EC104G
COURSE TITLE : PRINCIPLES OF ELECTRONICS
TEACHING SCHEME: TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS : 04(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCKHR.)
TH. TEE EXAM : 03 HRs
PR. TEE EXAM : 02 HRs
PT. EXAM : 01 HR

❖ RATIONALE:

Computer engineering and Information Technology students deals with basics of materials and semiconductor components used in electronic circuits and computer systems. This course describes the construction, characteristics, operating principle and applications of electronic devices. It is very useful course for understanding working and applications of some basic electronic circuits

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Describe the working of given electronic component.
2. Plot V-I characteristics of given diode.
3. Develop rectifier and filter circuits.
4. Use transistor as amplifier and switch.
5. Analyze given voltage regulator circuit.
6. Construct oscillator circuit for required frequency output signal.

❖ **COURSE DETAILS:****A. THEORY:**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs.
1. Materials, Components and Circuit Elements	1a. Define active and passive components. 1b. Describe construction and functions of given component. 1c. Identify different resistors, capacitors, inductors, relay, switches, connectors and cables. 1d. Estimate the value of resistor using color coding. 1e. Describe the concept of relay, cables, switches, connectors. 1f. List specifications and applications of different components.	1.1 Definition of Active and Passive components with examples 1.2 Types of passive components:- Resistors (fixed resistor, wire wound resistor and LDR), Classification, functions, specifications, color coding, symbols, unit and applications. Capacitor Classification, functions, specifications, unit and applications. Inductor Classification, functions, specifications, symbol, unit and applications. 1.3 Concept of Relays, specifications, functions and application of relays 1.4 Concept of Switches, specifications functions and applications of switches 1.5 Concept of connectors, specifications functions and applications of connector 1.6 Concept of cables, specifications functions and applications of cables	10
2. Semiconductor Theory and Diodes	2a. State and define different types of semiconductors. 2b. Describe the effect of temperature on conductivity of semiconductor. 2c. Describe crystalline structure of given type of semiconductor. 2d. Describe formation of p-n junction semiconductor. 2e. Plot V-I characteristic of PN junction diode. 2f. Describe working of	Semiconductor theory: 2.1 Definition of semiconductor, Intrinsic Semiconductor and Extrinsic Semiconductor with examples 2.2 Commonly used semiconductors: Germanium, Silicon. 2.3 Effect of temperature on its conductivity on intrinsic semiconductor. 2.4 Types of extrinsic semiconductors: P-type and N-type Pentavalent Impurities, Trivalent Impurities, majority and minority carriers, crystalline structure and conduction in P-type and N-	09

	given diode. 2g. Select diode as per application.	type semiconductor Semiconductor Diodes. 2.5 Formation of P-N junction 2.6 Forward and Reverse biasing V-I characteristics of PN junction diode 2.7 Types of reverse breakdown: Zener and avalanche breakdown, symbol, working and applications of various P N junction diodes: Zener diode, LED, LASER and Photodiode.	
3. Rectifiers and Filter Circuits	3a. Define rectifier and filters. 3b. State the need of rectifiers and filters. 3c. Describe circuit diagram and operation of given rectifier circuits. 3d. Distinguish between given rectifier circuits. 3e. Describe circuit diagram and operation of CLC Filter. 3f. Develop given rectifier and filter circuit and draw input and output waveforms.	Rectifiers 3.1 Definition and types of rectifiers 3.2 Circuit diagram, working, output waveforms, advantages, disadvantages, specifications of half wave rectifiers (HWR), Center-tapped full wave rectifier and Bridge rectifier 3.3 Comparisons of half wave rectifiers (HWR), Center-tapped full wave rectifier and Bridge rectifier 3.4 Definitions of peak inverse voltage, ripple factor, rectification efficiency. Filters 3.5 Necessity and types of filters. 3.6 Circuit diagram, working, output waveforms, advantages, disadvantages of CLC filter	07
4. Bipolar Junction Transistor (BJT)	4a. Describe the constructional details and operating principle of Transistor. 4b. Draw circuit diagram of given type of transistor configuration. 4c. Plot input and output characteristics of CE transistor configuration. 4d. Describe the operating regions of transistor.	4.1 Definition of Transistor, NPN and PNP BJT: symbols, constructions, operating principle 4.2 Circuit diagram of CB, CE and CC transistor configuration 4.3 Input and output characteristic of CE configuration 4.4 Operating Regions of BJT. 4.5 Definitions of parameters:- input resistance, output resistance, current gains (alpha and beta) and their relationship, leakage current 4.6 Application of transistor:- transistor as an switch and transistor as an amplifier	09

	4e. Define different parameters of transistors. 4f. Use transistor as a switch and amplifier. 4g. Describe the need of transistor biasing and stabilization. 4h. Describe the conditions for faithful amplification. 4i. Describe the terms related to transistor biasing.	4.7 Definition of faithful amplification, Transistor biasing and stabilization 4.8 Conditions for faithful amplification. 4.9 Concepts of D.C. load line, Operating points	
5. Voltage Regulators	5a. Describe the block diagram of unregulated and regulated power supply. 5b. Illustrate the need of regulation. 5c. Plot the load and line regulation of given voltage regulator circuit. 5d. Demonstrate Zener diode as a voltage regulator. 5e. Analyze given voltage regulator circuit. 5f. Describe the concept of switched mode power supply (SMPS).	5.1 Definition of voltage regulation, Block diagram, working and demerits of unregulated power supply (URPS) 5.2 Necessity and types of voltage regulation 5.3 Definition of load and line regulation 5.4 Zener diode as voltage Regulator and its merits and demerits 5.5 Circuit diagram, working, merits, demerits, of series and shunt regulators using BJT 5.6 Concept of switched mode power supply (SMPS).	05
6. Oscillators	6a. Compare different types of feedback with block diagram. 6b. Describe the effects and advantages of negative feedback in amplifier 6c. Describe the working of LC tank circuit. 6d. State the Barkhausen criteria for sustained oscillation. 6e. Develop oscillator circuit for required	Feedback circuits 6.1 Definition, types, and comparison of feedbacks, Block diagram of positive feedback and negative feedback 6.2 Effects and advantages of negative feedback in amplifier Oscillators 6.3 LC tank circuit, meaning of damped and undamped oscillation. 6.4 Barkhausen criteria for sustained oscillation. 6.5 Circuit diagram, working, advantages, disadvantages and	08

	output frequency signal.	applications of Hartley oscillator, RC phase shift oscillator and crystal oscillator.	
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Measure Values of resistors using color codes and multimeter.	1. Materials, components, and circuit elements	02
2	Identify various controls of electronics equipment (Digital Multimeter, CRO, Function Generator).		04
3	Plot V-I characteristics of P-N Junction Diode.	2. Semiconductor Theory and Semiconductor Diodes	02
4	Plot V-I characteristics of Zener Diode and Find Zener breakdown voltage.		02
5	Observe and draw the input and output waveforms of Half-wave rectifier with and without CLC filter.	3. Rectifiers and Filter circuits	04
6	Observe and draw the input and output waveforms of Bridge rectifier with and without CLC filter.		04
7	Plot the input and output characteristics of BJT in CE mode.	4. Bipolar junction transistor	04
8	Assemble and analyze the circuit of Zener diode as a voltage regulator.	5. Voltage regulators	04
9	Connect input to SMPS and measure output.		02
10	Construct Hatley oscillator and find output Frequency.	6. Oscillators	02
11	Construct R.C Phase shift oscillator and find output frequency.		02
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Materials, components and circuit elements	02(00)	06(03)	00(00)	08(03)
2	Semiconductor Theory and Semiconductor Diodes	02(02)	06(03)	00(03)	08(08)
3	Rectifiers and Filter Circuits	02(00)	03(03)	06(03)	11(06)
4	Bipolar Junction Transistor	02(02)	06(03)	06(00)	14(05)
5	Voltage Regulators	02(02)	06(03)	00(03)	08(08)
6	Oscillators	02(00)	03(03)	06(03)	11(06)
	Total	12(06)	30(18)	18(12)	60(36)

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	
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	2	R	2	4	R	2	5	R	2										
2	1	U	3	1	U	3	3	U	3	1	U	3	3	U	3				3/5
3	2	U	3	2	U	3	5	U	3	2	U	3	5	U	3				3/5
4	4	U	3	4	U	3	6	U	3	4	U	3	6	U	3				3/5
5	5	U	3	2	A	3	3	A	3	5	A	3	6	A	3				3/5
6	3	A	6	4	A	6	6	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Sheets	1,2,3, 4,5,6
		Assignments		Continuous	15	--	Assignment Book / Sheet	1,2,3, 4,5,6
	TEE	End Exam	Students	End of the Course	60	24	Theory Answer Sheets	1,2,3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous)	Continuous Assessment of Practical	Students	End of Every Practical	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)	End Exam	Students	End Of the Course	25	10	Rubrics & Practical Answer Sheets	1,2,3, 4,5,6
	Indirect	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form		
End of Course		End of The Course	Questionnaires					

❖ **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	-	-	-	-	-	-	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-	-	-
3	3	3	3	-	-	-	-	-	-	-	-	-
4	3	3	-	3	-	1	-	-	-	-	-	-
5	3	3	-	3	-	-	-	-	-	-	-	-
6	3	3	3	3	-	-	-	-	-	-	-	-

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

❖ **REFERENCE & TEXTBOOKS:**

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 McGraw Hill	9780070634329
4	Electronics Devices and circuits	S. Salivahanan, Tata McGraw Hill	9780070660496
5	Electronic Principles	Albert Malvino & David J Bates, Tata McGraw Hill	9780070634244

❖ **E-REFERENCES:**

- www.nptel.ac.in accessed on 13th July 2021
- <http://vlabs.iitkgp.ac.in/be/> accessed on 13th July 2021
- <https://www.learnelectronicsonline.com/> accessed on 13th July 2021

- <http://www.instructables.com/id/Basic-Electronics> accessed on 13th July 2021
- <https://learnabout-electronics.org/> accessed on 13th July 2021
- <http://www.datasheetcafe.com/> accessed on 13th July 2021

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

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

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

S.N.	Name	Designation	Institute / Industry
1	Dr.R.V.Yenkar	Head of Electronics & Telecomm Engineering	Government Polytechnic, Nagpur.
2	Dr.V.H. Mankar	Head of Electronics & Telecomm Engineering	Government Polytechnic, Nagpur.
3	Prof.N.V.Chide	Lecturer in Electronics & Telecomm Engineering	Government Polytechnic, Nagpur.
4	Dr. M. N. Bawane	Lecturer in Electronics & Telecomm Engineering	Government Polytechnic, Nagpur.
5	Mr.Sandip V. Darwhekar	Director	Beta Computronics Pvt. Ltd. Nagpur
6	Mrs. Gazala Ali	HOD, Electronics	Anjuman Polytechnic, Nagpur.
7	Mr. Kapil Pachpor	Lecturer in Electronics & Telecomm Engineering	Government Polytechnic, Amravati.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : **DIPLOMA IN COMPUTER ENGINEERING /
INFORMATION TECHNOLOGY / AIML**

COURSE CATEGORY: **ENGINEERING SCIENCE COURSE**

COURSE CODE : **CM151G**

COURSE TITLE : **COMPUTER WORKSHOP**

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 : **--**

PR. TEE EXAM : **02 Hrs**

PT. EXAM : **--**

❖ **RATIONALE:**

As a Engineering student they have to work with various hardware and software not only during academic but also in work field. Thus, students should know the knowledge of various hardware and networking devices. It introduces basic components of computer and method and means to connect them to the system. Since the dirt can affect reliability and performance of various components, cleaning of components become one of the essential activity of basic maintenance. This course demonstrates steps in cleaning and handling various components, handling problems with component connections. It gives hands-on experience of computer operation to the students.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Assemble/ Disassemble personal computer system.
2. Identify and connect computers peripherals
3. Perform system settings by using BIOS setup.
4. Practice preventive maintenance of computer peripherals
5. Classify and connect different cards /ports on Motherboard
6. Connect personal computer in network using different cable and identify various network environment and its setup.

❖ **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. Identify the front and rear panel controls and ports on a PC (serial, parallel, PS/2, RJ 45, USB ports)	1. Introduction to personal Computer	04
2	Identify all components mounted on Motherboard. RAM ROM Add-on Card HDD, DVD, Flash Memory, Pen drive		04
3	Assemble, Disassemble PC inside of cabinet and on desktop.		04
4	Perform system configuration using BIOS setup.		04
5	Copy data on CD, DVD. Write data on CD/DVD, single session/multisession.	2. Introduction to external peripheral devices.	04
6	Perform different printer settings on different types of printers. Write down the function of each switch. Perform printer's self test.		04
7	Connect scanner, scan documents and pictures on the scanner available in your lab. Sample printout be attached.		04
8	Connect desktop computer and laptop with LCD/DLP Projector		04
9	Identify and connect blue tooth based wireless mouse, keyboard and other devices.		04
10	Identify and distinguish different types of cables in your lab.	3. Introduction to different cables and network devices.	04
11	Make patch cable (UTP) with RJ-45 connector with help of crimping tool and connect to IO box and switches.		8
12	Follow cleaning procedures of Mouse, Keyboard, Motherboard and Slots Motherboard, Cleaning Brush, Cleaning liquid Basic cleaning Hard cleaning	4. Clean inside PC	4
13	Identify and fix different types of cards such as graphics card, LAN card, multimedia cards etc into matching slots on the motherboard.	5. Physical Connection to Motherboard	04

14	Connect power socket and controller socket to disk drives and motherboard. (Motherboard, PATA/ SATA Hard disk, Data cables)		04
15	Identify Wi-Fi and wired network environment and its setup.	6. Networks and Connectivity	04
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)	PT	Students	Two PT (average of two tests will be computed)	--	--		
		Class Room Assignments		Assignments	--	--		
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--		
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	25	10	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Identifying components, assembling/disassembling system, selection of tools and writing procedure etc.	20
2	Performance	10
3	Identify network environment and its setup.	10
4	Viva Voce	10
	TOTAL	50

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

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

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

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

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

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	-	-	-	-	-	3	-	-
2	3	-	-	3	-	-	3	-	3
3	3	-	2	3	-	-	3	2	3
4	3	2	-	-	-	-	3	-	-
5	3	-	-	3	1	-	3	-	-
6	3	2	2	3	-	1	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	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	Peter Norton's New Inside the PC	Peter Norton, Scott Clark, Sams Imprint of Simon and Schuster 201 W. 103 St. Indianapolis, IN United States	978-0-672-32289-1

❖ **E-REFERENCES:**

- <https://www.youtube.com/watch?v=a0rEXzyX0-8> , accessed on 23rd Jun 2021
- <https://www.computernetworkingnotes.com/networking-tutorials/network-cable-crimping-and-testing-tools.html>, accessed on 23rd Jun 2021
- <https://www.partitionwizard.com/partitionmanager/motherboard-components.html>, accessed on 23rd Jun 2021
- <https://www.youtube.com/watch?v=ezubjTO7rRI>, accessed on 23rd Jun 2021

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

1. Operating System(Windows 98/2000/XP/7/8/8.1/10)Voltmeter MI 0-150-300 V
2. CPU Intel core i3/i5/i7Digital Multi-meter
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), LCD/DLP Projector, Scanner(FLAT BED)
7. Crimps, Strips and cut tools(HT-200R, HT-2008R), Basic cable tester

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

S.N.	Name	Designation	Institute / Industry
1	Dr.M.V.Sarode	Head of Computer Engineering	Government Polytechnic, Nagpur.
2	Mrs.S.S.Mete	Lecturer, Computer Engineering	Government Polytechnic, Nagpur.
3	Mr.L.L.Bhadekar	Lecturer, Information Technology	Government Polytechnic, Nagpur.
4	Mr.Dipak Dhote	Operations Manager	IT Networks Infosystem Pvt. Ltd. Nagpur
5	Dr. Rakesh Kadu	Assistant Professor, IT	Ramdeobaba College of Engineering and Management, Nagpur
6	Mrs. V. A. Raje	Lecturer, Computer Engineering	Government Polytechnic, Arvi

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN EE/CM/IT/EC/MT/TX/AI
COURSE CATEGORY	: ENGINEERING SCIENCE COURSE
COURSE CODE	: ME151G
COURSE TITLE	: ENGINEERING GRAPHICS
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	: --
PR. TEE EXAM	: 02 HR
PT. EXAM	: --

❖ RATIONALE:

Engineering graphics is a non-verbal and graphical language to communicate ideas, instructions and facts with each other clearly and without ambiguity while carrying out engineering jobs on the sites, shop floor etc. It describes the fundamentals, facts, concepts, principles and techniques of Engineering Graphics. The course illustrates techniques of drawing in an engineering field. It helps to develop the idea of visualizing the actual object or part on the basis of drawings and blueprints. 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. Apply various drawing codes, conventions and symbols as per IS SP-46 in engineering drawing.
2. Redraw the given drawing by using appropriate geometrical construction.
3. Sketch different types of engineering curve by different methods.
4. Draw isometric projections into orthographic projections.
5. Visualize three dimensional objects and draw isometric projections.
6. Draw freehand sketches of a given engineering element.

❖ **COURSE DETAILS:****A. PRACTICALS :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	PR Hrs
1. Principles of Drawing	1a. Use of instruments for drawing, scales, lines and their applications. 1b. Use of IS:SP-46. 1c. 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.	06
2. Redraw and Loci of Points	2a. Learn different geometrical construction methods. 2b. Drawing locus of point from given data.	2.1 Different geometrical construction Methods and Redrawing. 2.2 Loci of points	06
3. Engineering Curves.	3a Draw an ellipse by given method. 3b Draw parabola by given method. 3c Draw hyperbola by given method. 3d Draw involute, and state their applications. 3e Draw a given cycloid and state its applications .	3.1 To draw an ellipse by- i) Arcs of circles method ii) Concentric circles method 3.2 To draw parabola- i) Rectangle method ii) Directrix- focus method 3.3 To draw hyperbola by- i) Passing through a given point With reference to given asymptotes ii) Directrix- focus method 3.4 To draw involutes of circle and Polygon of maximum six sides 3.5 To draw cycloid, epi-cycloid and hypo-cycloid	12
4. Orthographic Projections.	4a. Visualize, interpret and draw orthographic views from given pictorial views. 4b. Difference between first angle and third angle method of projection. 4c. Use of IS:SP-46 for dimensioning technique.	4.1 Introduction to orthographic Projection. 4.2 First angle and Third angle method of projections. 4.3 Conversion of simple pictorial views into orthographic views and dimensioning techniques as per IS. SP-46	14

5. Isometric Projections	5a. Visualize, interpret and draw Isometric views from given orthographic views.	5.1 Isometric scales 5.2 Isometric views of simple object (plane surfaces, slanting surfaces, and Rectangular, V, Trapezoidal slots)	14
6. Freehand Sketches	6a. Prepare proportionate freehand sketches of given machine elements. 6b. Describe functions and use of machine element.	6.1 Types of screws and threads profile– Vee and square, acme, buttress, seller, BA threads, knuckle threads. 6.2 Bolts–square and hexagonal bolts, eyebolt 6.3 Types of nuts: square, hexagonal, wing 6.4 Foundation bolts: Eye foundation bolt, Rag foundation bolt, Lewis foundation bolt 6.5 Single and double Riveted Lap and Butt joints	12
Total Hrs.			64

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Draw types of lines, lettering, numbers and two problem from sub topics 1.5 of Unit 1 (01 Sheet)	1 Principles of drawing	06
2	Draw two problems each from subtopic 2.2 and 2.3 from Unit 2 (01 Sheet)	2 Redraw and Loci of Points	06
3	Draw Engineering Curves, one problem from each sub topic of Unit 2. (01 Sheet)	3 Engineering Curves	12
4	Draw two problem using first angle method of projection (01 Sheet)	4 Orthographic Projections	14
5	Draw one problem with plane surfaces & other with slot, slanting surfaces (using natural scale and isometric scale) (01 Sheet)	5 Isometric Projections	14
6	Draw Free Hand Sketches–any ten sketches covering all the topics under Unit 6 (01 Sheet)	6 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)	PT	Students	Two PT (average of two tests will be computed)	-	--	-	-
		Class Room Assignments		Continuous	-	--	-	-
	TEE (Term End Examination)	End Exam	Students	End of the Course	-	-	-	-
				Total	-	-		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Drawing Sheets	1, 2, 3,4,5,6
		Drawing Portfolio		Assignments	05	--	Drawing Portfolio	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	25	10	Drawing Answer sheets	1, 2, 3,4,5,6
	Indirect Assessment	Student Feedback on course		Students	After First PT	Student Feedback Form		1, 2, 3, 4,5,6
End of Course		End of The Course	Questionnaires					

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max.Marks
1	Neatness , cleanliness and line work on drawing sheet	10
2	Creation of given drawing with proper dimensioning	20
3	In time submission	10
4	Viva Voice	10
	TOTAL	50

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

Course Outcome s (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	3	2	-	—	—	2	—	—
2	3	3	3	-	—	—	2	—	—
3	3	3	3	-	—	—	3	—	—
4	3	3	3	-	—	—	3	-	—
5	3	3	3	-	—	—	2	-	—
6	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	Engineering Drawing Practice for Schools And Colleges IS:SP-46	Bureau of Indian Standards, Reprint in , 2003	8170610192
2	Engineering Drawing	N.D.Bhatt, Charotar Publishing house 53 rd Edition 2019	9789380358963
3	Geometrical and Machine Drawing	N.D.Bhatt & V.M Panchal, Charotar Publishing house, 20 th Edition 2014	9789380358895
4	Engineering Drawing	D.A.Jolhe, Tata McGraw Hill Edu.2010	978-0-07-064837-1
5	Engineering Drawing	R.K.Dhawan , Published by S.Chand & co. 2012	9788121914314
6	Engineering Drawing	P.J Shaha, S.Chand & co. 2013	8121941822

❖ **E-REFERENCES:**

- <https://www.youtube.com/watch?v=ANEvQyt3PnU> accessed on 30 June 2021
- <https://www.youtube.com/watch?v=-W7tH49dBLw> accessed on 30 June 2021.
- <https://www.youtube.com/watch?v=FXP3tKedM5g> accessed on 30 June 2021.

- <https://www.youtube.com/watch?v=j5nwO-JwVv4&list=PLDN15nk5uLiBpnIOK5r3KXdfFOVzGHJSt> accessed on 30 June 2021.
- [https://www.youtube.com/watch?v=77ufJXvXUk4&list=PLIhUrsYr8yHxVky7bfrnbRcdXcHjT_K83&index=2\(Iso\)](https://www.youtube.com/watch?v=77ufJXvXUk4&list=PLIhUrsYr8yHxVky7bfrnbRcdXcHjT_K83&index=2(Iso)) accessed on 30 June 2021.
- <https://www.youtube.com/watch?v=Jzr5PTbvkVI&list=PL1xA-ZWMKpOMt3ew5vcn3keBxlqHKtlg> accessed on 30 June 2021.

❖ **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	Shri. P.V. Rekhade	HOD, Mechanical Engineering	Government Polytechnic, Nagpur
2	Dr. R. G. Choudhari	HOD, Mechanical Engineering	Government Polytechnic, Nagpur
3	K. S. Thekedar	Course Expert & Lecturer in Mechanical Engineering	Government Polytechnic, Nagpur.
4	Y. K. Gaiki	Course Expert & Lecturer in Mechanical Engineering	Government Polytechnic, Nagpur.
5	Er. A.M.Onkar	PBOS Member & Chief Executive Officer	Onkar Furnitures, MIDC, Nagpur
6	Shri. G.F. Potbhare	PBOS Member & Principal	NIT, Polytechnic, Nagpur
7	Shri. G.H. Dahole	MSBTE Representative & Lecturer in Mechanical	Govt. Polytechnic, Gondia

(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/PK/MT/TX/ TR/MC/AI
COURSE CATEGORY	: ENGINEERING SCIENCE COURSE
COURSE CODE	: IT151G
COURSE TITLE	: INTRODUCTION TO IT SYSTEMS
TEACHING SCHEME	: ONLINE COURSE FOR CREDIT TRANSFER
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: --
PR. TEE EXAM	: --
PT. EXAM	: --

❖ **RATIONALE:**

Information Technology (IT) is an essential tool that we cannot avoid as it plays an important role in our day to day life, especially in the present scenario. Introduction to IT Systems course starts with the basic computer skills, learning basic application software tools, Understanding Computer Hardware, Basic Internet awareness.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Apply the basics of computer fundamentals.
2. Identify Basic Internet skills.
3. Demonstrate the use of different Office Tools.
4. Recognize various computer hardware components.
5. Install, configure and maintain the operating system.
6. Identify and illustrate the use of Digital India portals (state and national portals).

❖ COURSE DETAILS:

Students Can select any ONE from Online Course from A), B) , C) given below. A student must obtain a certificate for passing the examination of selected course.

A) Spoken Tutorial (IIT Mumbai) :-

Module I –Introduction to Computer -- Duration 5 Hrs

Module II - Any two course modules from following

- a) LibreOffice –Writer--10 hours
- b) LibreOffice –Calc -- 12 hours
- c) LibreOffice-Impress --08 hours

Students can register for the above online course modules on Spoken Tutorial Portal in first semester. However institute registration shall be done as per program structure. Program department shall appoint one faculty as mentor to this on line activity.

B) Swayam :-Course Module:- Course in Information Technology—08 Weeks duration

C) Any equivalent course as compared to above from MOOCs available .

❖ 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)	PT	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Class Room Assignments		Assignments	--	--	--	--
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	25	10	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:** Online Examination❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:IT Dept.**

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

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 Fundamentals	R.S. Salaria Khanna Publishing House	ISBN: 9789381068533
2	Computer Course Made Easy	Ramesh Bangia Edition: 1	ISBN 13: 9789382609377
3	Internet Applications	Ikvinderpal Singh	ISBN 10: 9381068399

❖ **E-REFERENCES:**

- <https://www.latex-tutorial.com/tutorials/> accessed on 22/6/2021
- <http://www1.maths.leeds.ac.uk/LaTeX/TableHelp1.pdf> accessed on 22/6/2021
- <https://www.wikihow.com/Create-a-Website-Using-Google-Sites> accessed on 22/6/2021
- <http://www.tutorialsforopenoffice.org/> accessed on 22/6/2021

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

1. Computer System (with latest specifications)
2. MS Office 2007 Professional or latest version
3. PC tools
4. Windows 7

❖ **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. Dipak Dhote	Operations Manager, IT- Network Infosystems Pvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr. M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge
6	Mrs.D.P.Chanmanwar	Lecturer in IT	Member (Internal)
7	Mr.L.D.Vilhekar	Lecturer in IT	Member (Internal), Course Expert
8	Mr. S.J.Pukale	Lecturer in IT	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

**PROGRAMME : DIPLOMA IN EC/IT/MC/EE/CM/CE/ME/AE/PK/
TR/TX/MT/AI**

COURSE CATEGORY: AUDIT COURSE

COURSE CODE : IC151G

COURSE TITLE : INDIAN CONSTITUTION

TEACHING SCHEME: TH:01; TU: 00; PR: 00 (CLOCK HRs.)

TOTAL CREDITS : -

TH. TEE EXAM : -

PR. TEE EXAM :-

PT. EXAM : -

❖ **RATIONALE:**

The Constitution of India is the supreme law of India. The document lays down the framework that demarcates fundamental political code, structure, procedures, powers, and duties of government institutions and sets out fundamental rights, directive principles, and the duties of citizens. Engineer has to perform different works related to project planning, constructing project work, lead a group of workers etc. Engineer must also know about different bodies of administration, fundamental rights of citizen, different levels of Indian Union. Hence every Diploma Holder should have knowledge about Indian Constitution.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Interpret policies of government.
2. Outline structure of Indian Union.
3. Describe functions of State Secretariat and different Ministries .
4. Describe structure of District Administration.
5. Describe role and functions of Chief Election Commissioner.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Topics and Subtopics	Hrs.
1. The Constitution - Introduction	1.1 The History of the Making of the Indian Constitution 1.2 Preamble and the Basic Structure, and its interpretation 1.3 Fundamental Rights and Duties and their interpretation 1.4 State Policy Principles	04
2. Union Government	2.1 Structure of the Indian Union 2.2 President – Role and Power 2.3 Prime Minister and Council of Ministers 2.4 Formation of Lok Sabha and Rajya Sabha and its functions	04
3. State Government	3.1 Role and Power of Governor 3.2 Role and Functions of Chief Minister and Council of Ministers 3.3 Functions and Powers of State Secretariat	03
4. Local Administration	4.1 Structure of District Administration 4.2 Functions of Municipal Corporation 4.3 Functions of Zila Parishad	03
5. Election Commission	5.1 Role and Functions of Chief Election Commissioner 5.2 Role and Functions of State Election Commission	02
	Total	16

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Assignment on each topic (Total 5 Assignments)

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	--	--	--	--
		Class Room Assignments		Assignments	--	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	Theory Answer Scripts	1,2,3,4,5,6
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	--	--	--	--
		Journal Writing		Assignments	--	--	--	--
				Total	--	--		
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	--	--
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			

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	-	-	-	-	3	-	3	-	-	-
2	-	-	-	-	3	-	3	-	-	-
3	-	-	-	-	3	-	3	-	-	-
4	-	-	-	-	3	-	3	-	-	-
5	-	-	-	-	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	Ethics and Politics of the Indian Constitution	Rajeev Bhargava, Oxford University Press, New Delhi, 2008	
2	The Constitution of India	B.L. Fadia, Sahitya Bhawan; New edition (2017)	
3	Introduction to the Constitution of India	DD Basu, Lexis Nexis; Twenty-Third 2018 edition	

❖ **E-REFERENCES:**

- <https://www.constitution.org/cons/india/const.html>
- <http://www.legislative.gov.in/constitution-of-india>
- <https://www.sci.gov.in/constitution>
- <https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/>

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

S.N.	Name	Designation	Institute / Industry
1	Dr.D.D.Lulekar	HoD, Electrical Engg. Deptt.	Government Polytechnic, Nashik.
2	Prof.A.M.Arekar	Lecturer In Electrical Engg.	Government Polytechnic, Nagpur
3	Mr.M.N.Gawande	Lecturer In Electrical Engg.	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/ CM / IT/AE/PK/MT/AI
COURSE CATEGORY	: BASIC SCIENCE COURSE
COURSE CODE	: MH102G
COURSE TITLE	: APPLIED MATHEMATICS
TEACHING SCHEME	: TH:03; TU: 01(1TH/TU CREDIT=1CLOCK Hrs.)
TOTAL CREDITS	: 04
TH. TEE EXAM.	: 03 Hrs.
PR. TEE EXAM	: --
PT. EXAM	: 01 Hrs.

❖ RATIONALE:

Mathematics is the backbone of Technical courses, Understanding of engineering concepts require logical approach and thinking. The course is extension of Basic 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 courses.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Apply the concept of functions to Identify and find the value, Range, Domain ,Co Domain of the given function.
2. Apply methods of evaluation of limit to solve the given examples of limits .
3. Apply the concept of limit, define the first principal of derivatives, notation, understood the Rules to solve the examples of derivatives.
4. Using integral of standard function, rules, and methods to solve indefinite and definite integral problems .
5. Apply the concept of differential equation which helps to solve engineering problems.
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	1a. Find the Range , Domain and Co-Domain of the given function. 1b. Find the value of given function. 1c. Identify the type of given functions. 1d. Check whether the given function is odd or even function	1.1 Concept of function, Domain, Co-Domain, and Range of the Functions. 1.2 Value of a function. 1.3 Types of functions:- Logarithmic, Inverse, Algebraic, Trigonometric,& Inverse(LIATE) 1.4 Even and odd Function , Parametric, Composite Implicit, Explicit Functions.	04
2. Limits	2a. Evaluate given limits by using Algebra of limits . 2b. Solve the limit of given trigonometric function. 2c. Evaluate limits of the given exponential functions. 2d. Evaluate the given logarithmic limit and Exponential limit.	2.1 Concept of limit. 2.2 Algebra of limits.(Addition Subtraction, Multiplication & Division) 2.3 Limits of algebraic functions (By Direct Method, Factorisation, & Rationalisation Method).Limits of Trigonometric function. Limit based on x tends to infinity, 2.4 Exponential Limits & Logarithmic Limits, Use of Logarithmic Limits for Exponential Limits.	08
3. Derivatives and Higher Order Derivatives	3a. Find the derivatives of given function using standard function formulae. 3b. Find the derivatives of given function using Rules of Derivatives. 3c. Find the derivatives of given composite inverse and inverse trigonometric, implicit, explicit, parametric, and exponential functions. 3d. Differentiate the given function w.r.t. x by using logarithmic differentiation.	3.1 First principle of derivatives and Notations(without proof), Derivatives of standard function.(LIATE) 3.2 Rules for differentiation (without proof) 3.3 Derivative of composite, inverse and inverse trigonometric , implicit, explicit, parametric, and exponential functions. 3.4 Logarithmic differentiation. 3.5 Derivatives of one function with respect to another function 3.6 Second order differentiation.	12

	3e. Differentiate the given function w.r.t. another function. 3f. Find the second order derivatives of the given function.		
4. Indefinite and Definite Integration	4a. Integrate the given function w.r.t. x 4b. Evaluate the given integral by substitution method. 4c. Evaluate the integral of given composite or rational function. 4d. Integrate the given Trigonometric function. 4e. Integrate the given 4f. function by, Integration by Parts or Partial Fraction. 4g. Evaluate the given definite integral by using properties.	4.1 Concept of Integration as a anti derivatives, Integral of standard function (LIATE), Rules of integration. 4.2 Integration by substitution method. 4.3 Integration of Algebraic Rational function and composite function. 4.4 Integration of trigonometric function. 4.5 Integration by partial fraction and by parts. 4.6 Definite integral and their properties.	10
5. Differential Equations	5a. Find the order and degree of the given D.E. 5b. Form the differential equation by eliminating arbitrary constant. 5c. Solve given differential equations of first order and first degree by variable separable method. 5d. Reduce the given differential equation to variable separable form and solve it. 5e. Identify the given D.E(Homogeneous, Linear, or Bernoulli's) and find its solution.	5.1 Concept of differential equation, Order and degree of differential equation, Formation of differential Equation. 5.2 Methods of solving Differential equation of first order and first Degree. (a) Variable separable Method. (b) Equation reducible to variable separable form. (c) Exact Differential Equation. 5.3 Linear differential equation 5.4 Homogenous differential equation, 5.5 Bernoulli differential equations.	06

6. Numerical Methods	6a. Identify the interval of root of algebraic equation and Find the approximate root of algebraic equation by using given method. 6b. Solve the system of simultaneous equations containing 3 unknowns by using given method.	6.1 Solution of algebraic equation by, - Bisection method. - Regula-Falsi method. - Newton-Raphson method. 6.2 Solution of Simultaneous Equations containing 3 unknowns by, - Gauss elimination method. - Iterative methods: Gauss-Seidal & Jacobi's method.	08
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Assignments	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Find value of any given function.	1. Functions	01
2	Find limits algebraic functions.	2. Limits	01
3	Find limits trigonometric, exponential functions.		01
4	Solve examples on derivative using algebraic operations.	3. Derivatives and Higher order Derivatives	01
5	To find dy/dx of implicit functions.		01
6	To find dy/dx of parametric functions and inverse trigonometric functions.		01
7	To find the higher order derivatives of the given function.		01
8	Solve examples using rules of integration and substitution method.	4. Integration, Definite integration	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	Solve the examples of Definite integral.(Simple)		01
12	Evaluate definite integral using properties.		01
13	Solve D.E. using variable separable method and reducible to variable separable.	5. Differential Equations	01
14	Solve homogenous, linear and Bernoulli D.E.		01
15	Find the approximate root of algebraic equation.	6. Numerical Methods	01
16	Solve the system of simultaneous equations.		01

❖ SPECIFICATION TABLE FOR THEORY PAPER:

R – Remember

U – Understand

A – Analyze / Apply

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Functions	02(00)	00(03)	03(00)	05(03)
2	Limits	02(00)	06(00)	00(03)	08(03)
3	Derivatives and Higher Order Derivative	02(02)	03(03)	06(03)	11(08)
4	Integration, Definite integration and Applications	02(02)	09(00)	03(06)	14(08)
5	Differential Equations	04(00)	06(03)	00(03)	10(06)
6	Numerical Methods	00(02)	00(06)	12(00)	12(08)
	Total	12(06)	24(15)	24(15)	60(36)

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

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	
1	1	R	2	2	R	2	3	R	2	3	R	2	4	R	2	4	R	2	6/9
	5	R	2	5	R	2	6	R	2										
2	1	U	3	2	U	3	2	U	3	1	A	3	2	A	3				3/5
3	3	U	3	3	U	3	4	U	3	4	U	3	3	A	3				3/5
4	4	U	3	4	A	3	5	U	3	4	A	3	4	A	3				3/5
5	5	U	3	5	U	3	6	U	3	6	U	3	5	A	3				3/5
6	3	A	6	6	A	6	6	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Who m	Frequency	Max Mark s	Min Mar ks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3, 4,5,6
		Class Room Assign ments		Tutorial Assignments	15	--	Assignment Book	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Stud ents	End of the Course	60	24	Theory Answer Scripts	1, 2, 3, 4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Contin uous Assess ment of Practic al	Students	End of Every Practical	--	--	--	--
		Journa l Writin g		Assignments	--	--	--	--
				Total	--	--		
	TEE (Term End Examination)	End Exam	Stud ents	End of the Course	--	--	--	--
Indirect Assessment	Student Feedback on course		Stud ents	After First PT	Student Feedback Form			1, 2, 3, 4,5,6
	End of Course Survey			End of The Course	Questionnaires			

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	3	-	-	-	-	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-
3	3	-	-	-	-	-	-	-	-	-
4	3	-	-	-	-	-	-	-	-	-
5	3	-	-	-	-	-	-	-	-	-
6	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	P N Wartikar, Pune Vidyarthi Griha Prakashan	4567155742
2	Calculus of One Variable	IA Maron, Publisher: Arihant, 5 th Edition 2015	9352030559
3	Engineering Mathematics	S.S .Shastry, 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:**

- <https://msbte.org.in/msbtelectures.html>

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

S.N.	Name	Designation	Institute / Industry
1	Mr. S.M.Sayyed	I/C HOD, Mathematics Deptt.	Govt. Polytechnic, Nagpur
2	Mr.P.T.Khobaragade	Lecturer	Govt. Polytechnic, Nagpur
3	Mr.G R.Dewalkar	Lecturer	Govt. Polytechnic, Nagpur
4	Mr.W.T.Gaidhane	Lecturer	Nagar Parishad Jr. College ,Arvi
5	Dr. P.B.Bahatkar	Professor	Y. C. C. E. 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, MC,IT, CM, MT,PK, AE,TX,AI

COURSE CATEGORY: BASIC SCIENCE COURSE

COURSE CODE : PH101G

COURSE TITLE : PHYSICS

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

PT. EXAM : 01 HR

❖ RATIONALE:

Physics is a fundamental science that endeavors to explain all the natural phenomena that occur in the universe. Studying physics will enable students to become citizens who are better informed about the world around them and who have the critical skills to evaluate and make evidence-based decisions about current scientific issues. The subject will also provide a foundation in physics knowledge, understanding and skills for those students who wish to pursue tertiary study in engineering and technology.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Determine various physical quantities of matter using various measuring instrument.
2. Apply the laws and principles of electricity and magnetism to solve engineering problems.
3. Use the basic principles of heat and optics for engineering applications

4. Apply principles of wave motion, acoustics and radioactivity for engineering problems.
5. Apply the basic physical concepts and terminology used in modern physics.
6. Identify nanotechnology and non-destructive testing for various applications in engineering.

❖ **COURSE DETAILS:**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs .
1. General Properties of Matter	1a. Describe the given types of modules of elasticity. 1b. Identify least count and range of given instruments. 1c. Illustrate the phenomenon of Capillarity and angle of contact of for given liquid . 1d. Find given physical quantities using laws of viscosity .	1.1 Elasticity, Plasticity, Rigidity. Stress and Strain with their types, Elastic Limit, Hook's Law, Types of modulus of Elasticity, Stress-Strain curve, Applications of elasticity, calculation of the value of Young's modulus of elasticity of given wire . 1.2 Least count and range of instruments: Vernier caliper, outside micrometer screw gauge, travelling microscope. 1.3 Surface Tension, Factors affecting surface tension, Molecular force, cohesive and adhesive force, Angle of contact with its significance and capillary action (formula only), Application, determination of rise of liquid in capillary tube and surface tension of liquid. 1.4 Viscous force, Definition of viscosity, Newton's law of viscosity, Stoke's law, statement and formula only, Coefficient of viscosity and S.I. unit. Types of flow of liquid, Application, calculation of Reynold's number, terminal velocity and coefficient of viscosity of given fluids.	06
2. Electricity, Magnetism and	2a. Apply Coulomb's inverse square law for determining the force between different	2.1 Concept of charge, Coulomb's inverse square law, Electric field, Electric field intensity, potential and potential difference.	08

Semiconductors	charges on given data. 2b. Describe given concepts of magnetism. 2c. Determine given parameters in electricity using Ohm's law. 2d. Differentiate materials on the basis of given energy band diagram. 2e. Describe the given biasing and its characteristics of PN junction diode.	2.2 Magnetic field and magnetic field intensity and its units, magnetic lines of force, magnetic flux. 2.3 Electric current, Ohm's law, specific resistance, laws of series and parallel combination of resistance, heating effecting of electric current, calculation of resultant resistance of given resistances in series and parallel combination. 2.4 Conductors, Insulators and Semiconductors, Energy bands, intrinsic and extrinsic semiconductors. 2.5 p-n junction diode, I-V characteristics of p-n junction, applications of p-n junction diode.	
3. Heat and Fiber Optics	3a. Select the modes of transmission of heat for given materials. 3b. Illustrate the given laws related to gas and specific heat. 3c. Describe the given phenomenon of light.	3.1 Heat: Three modes of transmission of heat. Good and bad conductor of heat with examples, Law of thermal conductivity and S.I. units. 3.2 Boyles' law, Charles' law, Gay Lussac's law, absolute zero temperature, General gas equation (statement only), two specific heats of gases, adiabatic index. 3.3 Reflection, Refraction, Snell's law, Optical fiber, Structure of optical fiber. Principle of Optical fiber-total internal reflection. Acceptance angle, Numerical aperture. Applications of Optical Fiber.	10
4. Wave Motion and Radioactivity	4a. Classify the given types of wave by their characteristics. 4b. Calculate velocity of sound with end correction on given data. 4c. Find given terms related to Acoustics. 4d. Calculate half-life period of given radioactive substance.	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. 4.2 Definition of resonance with example. Formula for velocity of sound with end correction, calculation of velocity of sound with the help of resonance tube. 4.3 Echo, Reverberation, Reverberation Time. Absorption coefficient of	08

		material, Sabine's formula, Factors affecting the Reverberation of time and acoustics of building. Sound absorbing materials, calculation of reverberation time by Sabin's formula. 4.4 Radioactivity, α, β and γ rays and their Properties. Radioactive decay law, half- life period, Advantages and disadvantages of Radioactivity.	
5. Modern Physics (Photoelectricity, LASER, X-Rays)	5a. Calculate given parameters of the photo electricity using given wavelength or frequency. 5b. Apply the basic concepts of LASER in given fields. 5c. Describe the production of X-rays of the given materials with properties and applications.	5.1 Photon, properties of photons, Planck's hypothesis, Threshold frequency, threshold wavelength and Stopping potential. 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. Applications of LASER in Engineering and biomedical field. 5.3 Introduction to X-rays, Properties of X-rays, production of X-ray using Coolidge tube. Applications of X-rays in Engineering, medical and scientific field.	12
6. Nanotechnology and Non Destructive Testing.	6a. Calculate surface area per volume ratio of given objects. 6b. Compare DT and NDT methods on the basis of given points.	6.1 Definition of nanoscale, nanometer, nanoparticle, determination of surface area per volume ratio of objects, application of nanotechnology in Engineering and Technology, medical, cosmetics, environmental, space and defence. 6.2 Non Destructive Testing (NDT), comparison of DT and NDT, Various NDT methods used, Criteria for the selection of NDT method, Merits and Demerits of	04

		NDT.	
		Total Hrs.	48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Identify the various instruments used in Physics laboratory and follow precautionary measures.	General Properties of Matter	02
2	Measure the outer diameter of a cylindrical body by Vernier Caliper.		02
3	Calculate the diameter of a small spherical body by Outside micrometer screw gauge.		02
4	Calculate the value of Young's modulus of elasticity of given wire .		02
5	Find rise of liquid in capillary tube and compute surface tension of liquid.		02
6	Determine the coefficient of viscosity of given fluids by Stoke's method		02
7	Calculate mechanical equivalent of heat, J by electrical method.	Electricity, Magnetism and Semiconductor	02
8	Use magnetic compass to draw the magnetic lines of forces of bar magnet		02
9	Calculate the resultant resistance of given resistances in series and parallel combination.		04
10	Analyze the effect of volume on pressure at constant temperature.	Heat, Gas Laws and Fibre Optics	02
11	Determine inner diameter of resonance tube using Vernier Caliper.	Wave Motion and Radioactivity	02
12	Find the velocity of sound with the help of resonance tube.		04
13	Find the divergence of Laser beam.	Modern Physics	02
14	Calculate the surface area (SA), volume (V) and SA/V of an object and measure dimensions required for it.	Nanotechnology and Non Destructive Testing	02
		Total hours	32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	General Properties of Matter	02(04)	06(00)	00(00)	08(04)
2	Electricity, Magnetism and Semiconductor	02(00)	06(06)	03(00)	11(06)
3	Heat, Gas Laws and Fiber Optics	02(00)	06(00)	03(06)	11(06)
4	Wave Motion and Radioactivity	02(02)	03(06)	06(00)	11(08)
5	Modern Physics	02(00)	06(03)	06(06)	14(09)
6	Nanotechnology and Non Destructive Testing	02(00)	03(03)	00(00)	05(03)
	Total	12(06)	30(18)	18(12)	60(36)

A – Analyze / Apply

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

M- Marks

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

[illegible]

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Who m	Frequency	Max Mark s	Min Mark s	Evidence Collected	Course Outcome s
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignment s		Assignment s	15	--	Assignmen t Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5, 6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignment s	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	25	10	Practical Answer Scripts	1,2,3,4,5, 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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, selection of 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)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	3	-	-	3	-	-	3	-	-	-
2	3	-	-	-	2	-	3	-	-	-
3	3	-	-	-	-	-	3	-	-	-
4	3	-	-	3	-	-	3	-	-	-
5	3	-	-	-	2	-	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	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.britannica.com/science/viscosity>, accessed on 21 June 2021.
- <https://www.livescience.com/58816-photoelectric-effect.html>, accessed on 19 June 2021.

- <https://www.livescience.com/58816-photoelectric-effect.html>, accessed on 19 June 2021.
- <https://www2.lbl.gov/abc/wallchart/chapters/03/4.html>, accessed on 19 June 2021.

❖ **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's Modulus- Searle's apparatus 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. Tuning fork -256, 320, 384, 428, 480, 512 Hz.
7. Boyle's apparatus iron base double steel rod, 25 ml fitted with leveling screw on base
8. Stoke's apparatus with glass tube 50 cm.
9. Stop watch GEM 1/10 sec.
10. Ammeter (DC, 0-5 Amp)
11. Millimeter (DC, 0-1 Amp. G.E. type D 50)
12. Voltmeter (DC, 0-3V)
13. Rheostat single tube of 6.5 cm dia., 30 cm length, 5 Amp, 18 ohm, provided with Bakelite solidier with phosphor, bronze contacts.
14. Joule's calorimeter with mass 198 cal/gms.

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

S.N.	Name	Designation	Institute / Industry
1	Dr.S.B.Raut	Lecturer	Government Polytechnic, Nagpur.
2	Mrs.S.B.Adulkar	Lecturer	Government Polytechnic, Nagpur.
3	Dr.A.R.Karule	Lecturer	Government Polytechnic, Nagpur.
4	Dr.N.V.Pradnyakar	Associate Professor	J D College of Engineering and Technology, Nagpur
5	Dr.V.B.Pawade	Assistant Professor	Laxminarayan Institute of Technology, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

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

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN EC, CM, IT,AIML
COURSE CATEGORY	: ENGINEERING SCIENCE COURSE
COURSE CODE	: EE101G
COURSE TITLE	: BASIC OF ELECTRICAL ENGINEERING
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
PT. EXAM	: 01 HR

❖ **RATIONALE:**

Knowledge of electrical engineering is essential for the students of Electronics/ Computer/ Information technology. As they have to work in different engineering fields and deal with various types of electrical machines and equipment. 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 electrical and electronic circuits.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Follow the electrical safety precautions.
2. Use principles of magnetic circuits.
3. Solve the electrical circuits by using principle and basic laws.
4. Select relevant type of transformers and motors for a given application.
5. Connect electrical measuring instruments in the circuit.
6. Use relevant protective devices/switchgear for different requirements.

❖ **COURSE DETAILS:**
A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs.
1. Electrostatics & Electromagnetism	1a. Define terms related to electrostatics. 1b. Observe charging and discharging of capacitor. 1c. Solve series, parallel capacitive circuits. 1d. Apply laws of Electromagnetism. 1e. Apply Fleming's right hand rule and Lenz's law to determine direction of induced EMF in a given circuit.	1.1 Capacitance, dielectric constant, capacitance of parallel plate capacitor, capacitance in series and parallel and source of capacitance in electrical systems. 1.2 Charging & discharging of capacitor, Dielectric loss. Types of capacitors and their application. 1.3 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.	08
2. Fundamentals of Electricity	2a. Define the various electrical Parameters. 2b. State Law of resistance and explain Effect of temperature on resistance. 2c. Calculate the temperature coefficient of resistance. 2d. Solve series, parallel and series- parallel resistive circuits. 2e. State KCL and KVL 2f. Define work, power, and energy. 2g. Connect ammeter, voltmeter and wattmeter in an electric circuit. 2h. Compare between AC and DC supply. 2i. Maintenance of Battery	2.1 Concept of electric charge, current, voltage drop, EMF, potential difference, Direction of current and their SI units. 2.2 Resistance, unit of resistance, Law of resistance (Factors affecting resistance), Effect of temperature on resistance, Ohms law 2.3 Resistance in series and parallel, properties of series circuit and parallel circuit,, voltage distribution in series circuit, Current distribution in parallel circuit equivalent resistance of series circuit, equivalent resistance of parallel circuit Applications of series circuits, and parallel circuits, (Numerical based on 2.2 & 2.3) 2.4 Kirchhoff's current and voltage law (no Numerical) 2.5 Work, power, energy and their SI units, Relation between H.P and watts, Kwh and Kcal. 2.6 Connection of ammeter, voltmeter, and wattmeter in single phase AC circuit. and its measurement. 2.7 Concept of AC and DC supply Comparison between AC and DC supply	12

		2.8 Concept of Battery and Cell , Types of battery and their applications	
3. AC Fundamentals	3a. Describe generation of alternating voltage- single phase and three- phase. 3b. Define terms related to AC fundamentals. 3c. Compare terms time period and frequency, angular velocity and frequency, frequency and speed. 3d. Define Maximum, average and R.M.S. value of sinusoidal waveform, form factor and peak factor. 3e. Explain the response of given purely resistive, inductive and capacitive AC circuit with sketches. 3f. Solve problems related to pure resistive, inductive and capacitive circuit. 3g. Understand the concept of reactance, impedance and power factor. 3h. State 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 3.4). 3.5 Types of loads	08
4. Transformer	4a. Explain the construction and working principle of transformer. 4b. Describe the concept of transformation ratio, KVA rating of transformer. 4c. Classify the different types of transformers. 4d. Explain Auto transformer with diagram. 4e. Solve problems related to voltage ratio, current ratio, and transformation ratio.	4.1 Transformer:-Definition, principle of operation, construction, types of transformer, 4.2 EMF equation (No derivation), voltage ratio, current ratio, and transformation ratio 4.3 KVA rating of transformer, (Simple Numerical problem based on 4.2 and 4.3 topic). 4.4 Auto-transformer –Special features, Schematic diagram and its applications.	05

5. AC and DC Motors	5a. Classify different types of AC & DC motors. 5b. Select relevant type of DC motor for a given application. 5c. Describe construction and working of DC motor. 5d. Select relevant type of AC motor for a given application 5e. State application of universal motor 5f. Explain principle of operation of Stepper motor with application. 5g. Explain the concept of reversal of direction of rotation in AC motor an DC motor.	5.1 Classification of A.C & D.C motors. 5.2 DC Motor-construction, parts its function and material used, working principle of D. C. motor. Types - shunt, series and compound motor. Application of DC shunt, series and compound motor, reversal of rotation. 5.3 AC Motor -Single-phase induction motors, principle of operation and application – Split phase IM, Capacitor star induction run, capacitor start capacitor run . 5.4 Universal motor:- Principle of operation , reversal of direction of rotation and application. 5.5 Principle of operation of Stepper Motor and its application. (No Numerical)	10
6. Electrical Safety and Protective Device	6a. Recall electrical safety rules. 6b. Interpret electrical safety signs and symbols. 6c. State the need of earthing. 6d. Describe the features of the given type of protective device. 6e. Select the relevant protective device for the given application with justification.	6.1 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. 6.2 Earthing- Necessity of earthing, methods of reducing earth resistance. 6.3 Fuse : Operation and types 6.4 MCB, MCCB and ELCB: Operation and general specification.	05
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	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 and Protective device	04
2	Connect voltmeter, ammeter and wattmeter in electrical circuit.	Fundamentals of Electricity	02
3	Measure the current, voltage and resistance with the help of multi-meter or tong tester.		02
4	Calculate the unknown resistance in an electric circuit using ohms law.		02
5	Calculate the temperature coefficient of resistance of conductors.		02
6	Measure the total resistance of series circuit .		02
7	Measure the total resistance of parallel circuit.		02
8	Find the branch current and mesh voltage using Kirchhoff's law (KCL & KVL).		04
9	Use test lamps for testing single-phase and three – phase supply. Use of tester on single-phase supply.		02
10	Operate CRO and Observe the current & voltage wave form for purely R,L& C ac circuit &interpret the phasor relationship.	AC Fundamentals	02
11	Calculate voltage & current ratio of single- phase transformer.	Transformer	04
12	Reverse the direction of rotation of DC shunt motor.	AC and DC Motors	02
13	Reverse the direction of rotation of single-phase capacitor start motor.		02
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Electrostatics& Electromagnetism	02(02)	06(03)	00(00)	08(05)
2	Fundamentals of electricity	05(02)	06(06)	00(00)	11(08)
3	AC Fundamentals	02(00)	09(03)	00(06)	11(09)
4	Transformer	05(02)	03(03)	00(00)	08(05)
5	Drives	04(00)	03(06)	06(00)	13(06)
6	Electrical Safety and Protective device	00(00)	03(03)	06(00)	09(03)
	Total	18(06)	30(24)	12 (06)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

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	
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	5	R	2	6/9
	2	R	2	1	R	2	4	R	2										
2	1	U	3	2	R	3	2	U	3	1	U	3	4	U	3				3/5
3	1	U	3	4	R	3	3	U	3	2	U	3	5	U	3				3/5
4	2	U	3	3	U	3	5	U	3	3	U	3	6	U	3				3/5
5	6	U	3	3	U	3	4	U	3	5	U	3	2	U	3				3/5
6	6	A	6	5	A	6	3	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assign-ments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign-ments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	25	10	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, selection of 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)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	-	-	-	-	-	3	2	2
2	3	-	2	-	-	-	2	-	-
3	3	3	2	-	-	-	2	-	-
4	3	2	2	3	-	-	2	3	3
5	3	-	-	2	-	-	2	3	2
6	3	2	2	-	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	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

❖ **E-REFERENCES:**

- <https://nptel.ac.in/courses/108/108/108108076/> , accessed on 21st June 2021
- <http://www.electrical4u.com> , accessed on 21st June 2021
- <https://www.scribd.com/document/314848295/Lecture-Notes-Basic-Electrical-and-Electronics-Engineering-Notes> accessed on 21st June 2021
- <https://nptel.ac.in/courses/108/108/108108076/> , accessed on 21st June 2021.
- <https://electricalnotes.wordpress.com/articals/> accessed on 21st June 2021.

❖ **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.D.D.Lulekar	Chairman , PBOS & HOD Electrical Engg.Deptt.	Government Polytechnic, Nagpur.
2	Mrs A.A.Alegaonkar	CDC Coordinator & Lecturer , Electrical Engg.Deptt.	Government Polytechnic, Nagpur
3	Ms. P. S. Rithe	Expert & Lecturer in Electrical Engg. Deptt	Government Polytechnic, Nagpur.
4	Shri.M.N.Gawande	Expert & Lecturer in Electrical Engg.Deptt	Government Polytechnic, Nagpur
5	Mrs.A.P.Gandhi	Expert & Lecturer in Electrical Engg.Deptt	Government Polytechnic, Nagpur
6	Mrs.P.M.Sonwane	Expert & Lecturer in Electrical Engg.Deptt	Government Polytechnic, Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

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

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY/AIML/ COMPUTER ENGINEERING
COURSE CATEGORY	: ENGINEERING SCIENCE COURSE
COURSE CODE	: IT101G
COURSE TITLE	: BASICS OF PROGRAMMING
TEACHING SCHEME	: TH: 03; TU: 00; PR: 04(CLOCK Rs.)
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
PT. EXAM	: 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 foundation course for learning advanced object oriented languages.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Design algorithm and draw flowchart by using the basic entities of c language.
2. Use proper format specifiers and operators while designing the programs.
3. Write the program using appropriate branching and looping statements.
4. Apply modular programming by choosing correct type of function while writing the programs.
5. Develop programs that perform operations using arrays, strings and pointers.
6. Design the real world application using user defined data type.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs.
1. Fundamentals of Programming	1a. Use variable and constant in the given program and correct invalid variable names. 1b. Compare high level language and low level language. 1c. Write an algorithm and draw flowchart for the given problem. 1d. Draw structure of C program. 1e. Develop the given C program to show process of creating , compiling and executing a 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 , Develop sample programs based on above concepts.	04
2. Basic I/O, Operators and Expressions in C	2a. Write valid syntax for given Formatted and unformatted I/O functions of C language. 2b. Write valid C expressions using various operators. 2c. Identify and correct the errors in expressions and statements. 2d. Arrange the operators with respect to their precedence and associativity. 2e. Use format specifiers and operators to write given 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 , Symbols, uses and examples of various Arithmetic, Relational, logical, boolean , bitwise , assignment, ternary, increment (++) and decrement (--) operators, rules for ++ , -- operators supported by C. 2.3 Writing and evaluation of arithmetic expression. Precedence of arithmetic operators, rules for evaluation of expression, inbuilt math functions:sin(), cos(), tan(), sqrt(), pow(), log(),log10(), exp().	06

		2.4 Type casting: Implicit and Explicit, Precedence and associativity of operators, their rules. 2.5 Simple C programs using various operators and typecasting.	
3. Decision Making, Branching and Looping	3a. Write Decision making statements with valid syntax supported by C. 3b. Select and apply appropriate Decision making statements, loop statements supported by C for given problem. 3c. Compare break and continue statement. 3d. Write given program using break, continue and exit() statment. 3e. Write given C programs using decision making and loop statements.	3.1 Syntax, working, flowchart and example of if, if- else, nested if- else, 3.3 else- if ladder, switch statement, rules for switch statement, goto statement (forward jump and backward jump). 3.4 Syntax, working, flowchart, comparison and example of for loop, while loop and do while loop. Jumping within loops and jumping out of loop. 3.5 Syntax, working and use of break, continue and exit(); 3.6 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	4a. Use actual and formal parameter in given c program. 4b. Apply given terms Related to function in given program. 4c. Compare between different categories of function. 4d. Write given program using pass by value and pass by reference. 4e. Develop given c programs using recursion.	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, rules for pass by pointers. 4.5 Algorithm, flowchart and programs based on functions, call by value call by reference, recursion.	08

5. Array and Pointers	5a. Find the size of given array and string. 5b. Identify and debug the errors while declaring or initializing the array and string. 5c. Use various input/output string functions depending upon the given problem. 5d. Develop the program using given string functions. 5e. Write pointer variable and perform given arithmetic operations on pointer variables. 5f. Compare array and pointer. 5g. Write given program using 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 for sorting and searching, strings, Pointers, Pointers and arrays.	10
6. Structure and Union	6a. Write the valid syntax to define given structure, union, enum and class. 6b. Compare Structure and Union. 6c. Use nesting of structure in the given Program. 6d. Write the correct syntax for declaration of given array or Structure. 6e. Design real life application using structure for given Problem statement.	6.1 Description of user defined data type, Structure and Union variables, member operator, ENUM, Class. 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, Comparison of array and structure. 6.5 Programs based on Structure, Union, array of Structures, array within structure and structure within structure .	10
Total Hrs.			48

B. LIST OF PRACTICALS / LABORATORY EXPERIENCES / ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Install C and other compilers.	1. Fundamentals of programming	02
2	i) Develop and execute two C programs using standard formatted I/O functions. ii) Develop and execute four C programs using various operators and typecasting.	2. Basic I/O , Operators and Expressions in C	04
3	Develop and execute two programs each using if - else, if - else if ladder.	3. Decision Making and Branching and Looping	02
4	Develop and execute two programs each using nested if- else and switch statement.		02
5	Develop and execute two programs using while Loop.		02
6	Develop and execute two programs using do-while loop.		02
7	Develop and execute two programs each using for loop and nested for loop.		04
8	Develop and execute 2 programs using function based on parameters passing by value.	4. Functions	02
9	Develop and execute 2 programs using function based on parameters passing by reference.		04
10	Develop and execute a programs using function based on recursion.		02
11	Develop and execute two programs each using 1D and 2D arrays.	5. Array and pointers	06
12	Develop and execute a program using character array.		04
13	Develop and execute two programs each using string library functions.		02
14	Develop and execute two programs each using pointers.		04
15	Develop and execute a program using array of pointers.		02
16	Develop and execute a program each using structure and union.	6. Structure and Union	02
17	Develop and execute two programs using array of structures and array within structure.		04
18	Develop and execute a program using structure within structure.		02
19	Develop and execute a program using class.		02
20	Design the project based on function , structure and other concepts of C language.		10
Total Hrs			64

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Fundamentals of programming	02(02)	06(03)	00(00)	08(05)
2	Basic I/O , Operators and Expressions in C	02(02)	03(03)	03(00)	08(05)
3	Decision Making, Branching and Looping	02(00)	03(00)	06(06)	11(06)
4	Functions	02(02)	03(03)	06(03)	11(08)
5	Arrays and Pointers	02(00)	03(00)	06(06)	11(06)
6	Structures and Unions	02(00)	00(03)	09(03)	11(06)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

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	
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	4	R	2										
2	1	U	3	2	U	3	3	U	3	1	U	3	2	U	3				3/5
3	1	U	3	4	U	3	5	U	3	4	U	3	6	U	3				3/5
4	2	A	3	3	A	3	4	A	3	3	A	3	4	A	3				3/5
5	3	A	3	4	A	3	6	A	3	3	A	3	6	A	3				3/5
6	5	A	6	6	A	6	5	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Who m	Frequency	Max Mark s	Min Mark s	Evidence Collected	Course Outcome s
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5, 6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5, 6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

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

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES FOR IT DEPT :**

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

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

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES FOR CM DEPT:**

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	
1	3	1	3	3	--	--	--	3	--	
2	3	--	--	3	--	--	--	3	--	
3	3	--	3	3	--	--	--	3	--	
4	3	--	3	3	--	--	--	3	--	
5	3	--	3	3	--	--	--	3	--	
6	3	--	3	3	1	1	1	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	13, 9781259004612
2	Let us C	Yashwant Kanetkar BPB Publication , 13th Edition	13, 9788183331630
3	Complete Reference to C	Herbert Schildt, Publication Mc graw Hill Education , 4th Edition	13 , 9780070411838
4	C Programming Language	Brian W. Kernighan, Dennis M. Ritchie, Publication Pearson , 2 nd Edition	9789332549449
5	C Projects	Yashwant Kanetkar BPB Publication , 4th Edition	978-8170292562
6	Exploring C	Yashwant Kanetkar BPB Publication , 3rd Edition	978-8176566339

❖ **E-REFERENCES:**

- https://onlinecourses.nptel.ac.in/noc19_cs42/preview, accessed on 21st June 2021
- <https://www.youtube.com/watch?v=0-9mRy5iNug> accessed on 21st June 2021
- <https://www.sanfoundry.com/c-interview-questions-answers/> accessed on 21st June 2021
- <https://phy.ntnu.edu.tw/~cchen/ctutor.pdf> accessed on 21st June 2021

❖ **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	Dr. A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Dr. M.V. Sarode	Head of Department (C.M.Dept.)	Chairman
3	Mr. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
4	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
5	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
6	Mr. L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal), Course Expert
7	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)
8	Mr. M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
9	Mr.S.A.Khatri	Lecturer in Computer Engg.	Course Expert , Reviewer

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN AI,MC,CE,ME,EE,EC,PK,MT, IT,AU,CM,TX,TR
COURSE CATEGORY	: HUMANITIES & SOCIAL SCIENCE COURSE
COURSE CODE	: EN151G
COURSE TITLE	: BUSINESS COMMUNICATION
TEACHING SCHEME	: TH: 01 TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 02(1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE EXAM	: --
PR. TEE EXAM	: 02 HRs
PT. EXAM	: --

❖ RATIONALE:

In this current dynamically evolving scenario, competence in communication skills is one of the requirements of industry from technical students. A diploma holder is expected to interact effectively and efficiently with his peers, superiors, subordinates and clients. Business Communication will prepare him to take on the task of effective communication with ease.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Exhibit appropriate communication skills as required
2. Converse skillfully using modes of communication
3. Prepare and present business communication formats effectively
4. Perform coordinated activities within and outside organization
5. Draft business correspondence with minimal errors

❖ **COURSE DETAILS:****A. THEORY:**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Communication	1a. Apply modern concept of communication. 1b. Identify & Overcome barriers to communicate effectively. 1c. Use appropriate body language.	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.	03
2. Communication in Practice	2a. Identify strengths and weakness of self. 2b. Classify different types of Communication and use it effectively. 2c. Plan & perform effective presentations. 2d. Modify intrinsic qualities.	2.1 Non-verbal communication in detail: Body language, Eye contact, Dress and appearance, color, sound, Gestures, Postures, Pictorial representations. (Maps, Charts, Graphs) 2.2 Nonverbal Codes 2.3 Presentation skills – Parameters, Appearance, use of body language, Eye contact, content preparation, Depiction of interest of audience 2.4 SWOT analysis 2.5 Brain Storming	06
3. Business Correspondence	3a. Identify various types of written communication in business situation. 3b. Apply the appropriate correspondence to the situation.	3.1 Letters: Job application and Resume writing Leave letter, Enquiry letter. 3.2 Circular, Notices, Agenda, Minutes, Email messages.	07
		Total Hrs.	16

B. LIST OF PRACTICALS / LABORATORY EXPERIENCES / ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Describe Types of Communication.	Communication	04
2	Conduct Self SWOT analysis.	Communication in practice.	02
3	Outline an Introduction for Self & others.	Communication	04
4	Practice the art of LSRW (to be performed in Language lab using software).	Communication in practice.	06
5	Exhibit Professional Etiquettes.	Communication in practice.	02
6	Prepare Job Application.	Business Correspondence.	02
7	Prepare Resume.	Business Correspondence.	02
8	Demonstrate various types of Business Letters.	Business Correspondence.	02
9	Participate in Brain Storming.	Communication in practice	02
10	Practice Email Writing.	Business Correspondence.	02
11	Master the skill of oral presentation by presenting a topic through PowerPoint presentation.	Communication in practice.	02
12	Implement the art of writing Formal drafting by preparing resume & letters.	Business Correspondence.	02
Total Hrs.			32

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)			Test Answer Sheet	
		Class Room Assignments		Assignments			Assignment Book	
	TEE (Term End Examination)	End Exam	Students	End of the Course			Theory Answer Sheets	
				Total				
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Practical Answer Sheets	1.2.3.4.5
		Journal Writing		Assignments	05	--	Journal	1.2.3.4.5
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	25	10	Practical Answer Sheets	1.2.3.4.5
Indirect Assessment	Student Feedback on Course		Students	After First PT	Student Feedback Form		1, 2, 3, 4,5	
	End of Course			End of the Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Performance	10
2	Overall presentation of given assignment	10
3	Viva voce	20
4	Activity	10
	TOTAL	50

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	3	-	-	-	3	-				
2	3	-	-	-	3	-	2			
3	-	-	-	-	-	3	-			
4	-	-	-	-	-	3	2			
5	-	-	-	-	-	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 Babu Rao, 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 Mc Graw Hills,	13978-0-19-566804-9
7	Modern Commercial Correspondence	R.S.Pillai, Bhagwati, S.Chand & Co.	812190519-2

❖ **E-REFERENCES:**

1. https://en.wikipedia.org/wiki/Business_communication, accessed on 29th July 2021
2. <https://www.indeed.com/career-advice/career-development/types-of-business-letters> , accessed on 29th July 2021
3. <https://in.indeed.com/career-advice/resumes-cover-letters/communication-skills> , accessed on 29th July 2021
4. <https://www.youtube.com/watch?v=jaxgeXPgAz0> , accessed on 29th July 2021

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

S.N.	Name	Designation	Institute / Industry
1	Dr.Rupali Londhe	Lecturer in English & Coordinator	Government Polytechnic, Nagpur.
2	Prof. Nitin Pote	Expert, Lecturer in English	Government Polytechnic, Bramhapuri
3	Prof. Ravindra Suryawanshi	Expert, Lecturer in English	NIT Polytechnic, Nagpur
4	Prof.Nitin Pathak	Expert, Lecturer in English	Kamptee Polytechnic, Nagpur
5	Dr.M.M.Machale	Lecturer in English	Government Polytechnic, Nagpur.
6	Mrs.Kamala Grace	Visiting Lecturer in English	Government Polytechnic, Nagpur.
7	Mrs.Swati Mahatme	Visiting Lecturer in English	Government Polytechnic, Nagpur.
8	Ms.Rasika Joshi	Visiting Lecturer in English	Government Polytechnic, Nagpur.
9	Mrs.Barnali Roy	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 CE/ME/EE/EC/CM/IT/MT/PK/AE/TR/
TX/MK

COURSE CATEGORY : HUMANITIES & SCIENCE COURSE

COURSE CODE : LS151G

COURSE TITLE : LIFE SKILLS

TEACHING SCHEME : TH:00; TU:00;PR: 02 (CLOCK Hrs.)

TOTAL CREDITS : 01(TH/TU CREDIT = 0 , 1 PR CREDIT = 2 CLOCK HR.)

TH. TEE EXAM : --

PR. TEE EXAM : --

PT. EXAM : --

❖ RATIONALE:

According to NASSCOM and other agency surveys conducted, suggests that today's Diploma engineers are technically solid, can do linear programming problems, solve issues quickly but lack in Interpersonal and Communication skills. The list of required life skills include communication, leadership, team work, public speaking, attitude, ethics, professional etiquettes etc. This 'disconnect' between the desired skills and the qualifications and skills obtained needs to be addressed. Bridging the gap between Formal technical education and Industry's requirements, an interface between Industry and Institute is very essential. A pre-employment training in these life skills therefore becomes the essential part of the curriculum of Diploma programmes. to prepare job ready students for industries. This will enhance the employability and the industry connect for the students and will reduce the gestation period of students in Corporate world.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Acquire knowledge of Self discovery.
2. Build essential soft skills.
3. Enhance professional competencies

4. Adapt ethics and values.
5. Develop interpersonal skills.
6. Maintain physical and mental fitness.

❖ **COURSE DETAILS:**

A. THEORY :

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

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

S.No.	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	1. Prepare a draft of personal information. 2. Practice and perform self introduction. 3. Demonstrate appropriate body language during self intro and introducing others.	A. Soft Skills Understanding self & Others a. Self Introduction b. Introducing others	2 hrs
2	1. Practice Yoga Asanas recommended in AYUSH Common Yoga Protocol (Tadasana, Vrikshasana, Pada-hastasana, Trikonasana, Ardha-Chakrasana etc) for good health and fitness. 2. Prepare a diet chart for - Teenagers/Old age people/Diseased person etc. 3. Prepare a table of Do's and Don'ts of Habit formation.	B. Life Skills Mental & Physical Health a. Warm up b. Yoga c. Habit formation- Do's & Don'ts d. Diet Pyramid	4 hrs
3	1. Practice Pranayamas recommended in AYUSH Protocol (Anulom vilom, Kapalbhathi, Bhramari Pranayama, Bhastrika, Surya Bhedan etc) for good health and fitness. 2. Practice different types of meditation -Mindfulness meditation, Loving Kindness Meditation, Yoga Meditation.	B. Life Skills Mental & Physical Health a. Pranayam b. Meditation	4 hrs
4	1. Practice and perform Group Discussions on topics/ issues of	A. Soft Skills Personality	2 hrs

	relevance. 2. Demonstrate appropriate dress and appearance for formal conversation. 3. Exhibit suitable non verbal codes of communication.	Development a. Group Discussion b. Personal grooming c. Verbal-Non Verbal communication	
5	1. Draft pros and cons on given topic of Debate. 2. Practice sessions on Debate on current affairs.	C. Employability Skills Interpersonal Skills a. Public Speaking b. Analytical thinking	2 hrs
6	1. Prepare draft for seeking permission to organize academic activity/event/visit etc. 2. Prepare checklist of things to do and schedule for organizing academic activity/event/visit etc. 3. Exercise activities (2 to 3) based on confidence building- such as Interviewing of field experts, organizing industrial visits and submitting reports etc.	C. Employability Skills Effective Management a. Planning b. Motivating self & others	4hrs
7	1. Jot down the qualities and skills of successful entrepreneur to prepare presentation on his/her achievements and contribution. 2. Prepare and present presentation on Learning lessons from Biographies of industrialists (like Rusy Modi, Dhirubhai Ambani, Ratan Tata, Narayana Murthy etc.	D. Presentation Skills - Corporate Culture a. Attitude b. Creativity & Innovation	4hrs
8	1. Investigate and examine industry related issues and prepare a case study on it. 2. Present case studies based on industry related issues like-indefinite labour strike, accidents , customer complaints, employees' career requirements.	D. Presentation Skills - Problem Solving a. Critical Thinking b. Problem Analysis	2 hrs
9	1. Jot down the lacunas of the entrepreneur which caused fall in business. 2. Prepare and present presentations on Learning lessons from failure business stories.	D. Presentation Skills - Learning Attitude a. Adaptability b. Persistence	2 hrs

10	1. Participate and practice in basket exercises / Games related to Team Working & Leadership. 2. Exhibit leadership qualities in group task.	A. Soft Skills Interpersonal Skills a. Working in a team b. Leadership	2hrs
11	1. Demonstrate exercises on Problem solving in Assertive communication (Role Play). 2. Incorporate assertive communication in given situation.	A. Soft Skills Interpersonal Skills a. Positive Thinking b. Assertiveness	2 hrs
12	1. Set short term and long term career goals. 2. Practice sessions on Time management (Prepare schedule to achieve short term and long term goals).	A. Soft Skills Effective Time Management a. Goal Setting b. Time Management	2 hrs
Total Hrs.			32

❖ **SPECIFICATION TABLE FOR THEORY PAPER:** Nil

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



❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Who m	Frequency	Max Mark s	Min Mark s	Evidence Collected	Course Outcome s
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)		--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments		--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course			Theory Answer Scripts	1,2,3,4,5, 6
				Total				
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course			Practical Answer Scripts	1,2,3,4,5, 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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Presentation Skills	10
2	Communication	10
3	Motivation	10
4	Confidence/Enthusiasm	05
5	Interpersonal Skills	10
6	Viva voce	05
Total		50

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	-	-	-	-	-	2	3	-	-	-
2	-	-	-	-	-	2	3	-	-	-
3	-	-	-	-	-	3	3	-	-	-
4	-	-	-	1	1	3	3	-	-	-
5	-	-	-	-	-	3	3	-	-	-
6	-	-	-	-	-	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	Yoga Therapy	Angarai, G. M. and Indra Mohan, Shambhala Publications, 2 nd Edition, January 1, 2014.	ISBN-13 9781590301319
2	The ACE of Soft Skills: Attitude, Communication and Etiquette for Success	Gopalaswamy R. and Mahadevan Pearson Publication, 1 st Edition, 13 May 2010.	ISBN-13 978-8131732854
3	Simple Art of Business Etiquette: How to Rise to the Top by Playing Nice	Jeffrey L Seglin, Tycho Pr Publication, 12 January 2016	ISBN-13 978-1623156886
4	The Big Book of Team-Motivating Games	Edward Scannell and Mary Scannell, McGraw-Hill Education, 7 October 2009	-----

5	Team Building: Proven Strategies for Improving Team Performance	W. Gibb Dyer , Jeffrey H. Dyer , and William G. Dyer, 5th Edition, Jossey-Bass, 3 January 2013	ISBN-13 978-1118105139
6	How to Win Friends & Influence People	Dale Carnegie, Pocket Books October 1, 1998	ISBN-10 0671027034
7	Famous Industrialists: Famous Biographies for Young People	Sigmund A. Lavine, Literary Licensing, LLC, 13 October 2012	ISBN-13 978-1258497026
8	Why Entrepreneurs Really Fail	Buchia Nozer, Bloomsbury, October 1, 1998	ISBN-13 9789382951605

❖ **E-REFERENCES:**

- <http://ihmshimla.org/wp-content/uploads/2013/05/Industrial-Training-Rule-Book.pdf>, accessed on 25th July, 2021
- <https://www.oliveboard.in/blog/from-rags-to-riches-indias-most-inspiring-success-stories>, accessed on 23rd May, 2021
- <https://coach.basketball.net.au/10-simple-team-building-activities-for-your-under-14s>, accessed on 14th June, 2021

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

Nil

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

S.N.	Name	Designation	Institute / Industry
1	Prof. Deepak Kulkarni	Soft Skills Trainer & Councilor	Consultant, Nagpur
2	Dr. Shabbir Zukerya	Director	Learner's Academy for Skill Development, Nagpur
3	Mr. Anand Toal	Director	International Placements, Nagpur
4	Dr. Megha Machale (Bhelande)	Lecturer in English	Government Polytechnic, Nagpur.
5	Prof. Yogesh Chandarana	In-Charge, Curriculum Development Cell	Government Polytechnic, Nagpur.
6	Mr. Manish Gawande	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/PK/MT/TX/**
TR/MC/AI

COURSE CATEGORY: **AUDIT COURSE**

COURSE CODE : **EV151G**

COURSE TITLE : **ENVIRONMENTAL SCIENCE**

TEACHING SCHEME: **TH: 02; TU: 00; PR: 00 (CLOCK HRs.)**

TOTAL CREDITS : **02 (1 TH CREDIT = 1 CLOCK HR.)**

TH. TEE : --

PR. TEE : --

PT : --

❖ **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. Acquire the knowledge of 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 reduce various types of pollution.

5. Analyze key issues about environment and create public awareness about those environmental issues.
6. Acquire formal & non formal environmental education.

❖ **COURSE DETAILS:**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Earth System and Resources	1a. Prepare list of historical events of earthquakes, volcanoes, Tsunami, cyclone & landslides in the world. 1b. Identify problems associated with soil, water. 1c. Differentiate weather and climate. 1d. 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	04
2. Concept of Biodiversity	2a. Describe Biodiversity. 2b. Identify Levels of Biodiversity. 2c. Prepare a list of biodiversity hotspots 2d. List the endangered species. 2e. Prepare a report on value of Biodiversity. 2f. 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)	04
3. Energy Resources and Consumption	3a. Match the energy forms projects. 3b. Describe various forms of energy. 3c. Describe advantages and disadvantages of forms of energy. 3d. Select appropriate solutions of Efficient use of energy. 3e. 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	06

4. Pollution	4a. Define pollution and pollutants. 4b. Classify various types of pollutants. 4c. Identify the Pollutants and their sources. 4d. Develop habits to reduce pollution. 4e. State the standard / limiting/ controlling values of various type of pollution.	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. 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.	08
5. Social issues and Environment	5a. Describe sustainable development. 5b. Evaluate sources of Green house effect, acid rains, Global warming. 5c. Describe 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	05
6. Environmental Education	6a. Differentiate formal and non formal education. 6b. Describe various acts and their provisions. 6c. 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 Concepts EIA and environmental Ethics	05
Total Hrs.			32

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

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

❖ **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)	PT	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Class Room Assignments		Assignments	--	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	Theory Answer Scripts	1,2,3,4,5,6
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	--	--	--	--
		Journal Writing		Assignments	--	--	--	--
				Total	--	--		
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	--	--
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

Nil

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

Course Outcomes (COs)	Program Outcomes (POs)							PSO	
	1	2	3	4	5	6	7	9	10
1	3	-	-	-	2	-	-	-	-
2	3	-	-	-	2	-	2	-	-
3	3	-	-	-	2	-	2	-	-
4	2	-	-	-	2	-	-	-	-
5	3	-	-	-	2	-	2	-	-
6	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	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
6	Environmental studies	Erach Bharucha	UGC , New Delhi

❖ **E-REFERENCES:**

1. https://en.wikipedia.org/wiki/Lists_of_nuclear_disasters_and_radioactive_incidents, accessed on 20 January 2021
2. www.legalserviceindia.com/articles/noip.htm accessed on 18 March 2021
3. <https://prezi.com/8mnz--ldkybc/apes-unit-1-earth-systems-resources/> accessed on 23 March 2021
4. <http://www.conserve-energy-future.com/AlternativeEnergySources.php>, 18 March 2021

❖ **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.N.V Raut	Head of Civil Engineering, (I)	Government Polytechnic, Nagpur.
2	Dr.S.R.Kukdapwar	Head of Civil Engineering, (II)	Government Polytechnic, Nagpur.
3	Dr.Mrs.R.A.Wankhade	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
4	Mr. A.J.Fulzele	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.
5	Mr.V.B. Dhait	Lecturer in Civil Engineering	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY: PROGRAMME CORE COURSE
COURSE CODE : IT201G
COURSE TITLE : MANAGEMENT INFORMATION SYSTEM
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 EXAM : 03 HRs
PR. TEE EXAM : --
PT. EXAM : 01 HR

❖ RATIONALE:

Management Information Systems (MIS) is a discipline and a profession that brings information and communication technologies to businesses and society. By applying information and communications technologies and systems, MIS solves real business problems and gives competitive advantage to firms. MIS focuses on the concepts and tools necessary for analyzing, designing, planning, developing, and managing organizational information resources. Also it is the power of computers which makes MIS feasible.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify the role of MIS in various functional areas of management.
2. Identify different types of information system and their functions.
3. Illustrate the supporting role of MIS in decision making.
4. Analyze the important aspect of Information system that is information and related concepts.
5. Apply database concepts to build an Information System.
6. Use implementation and evaluation concepts while developing an Information System.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Management Information System: A Framework	1a. Describe Management Information System for the given organization and its requirements. 1b. Compare the performance of given organization with MIS implementation and without MIS implementation with justification. 1c. Identify nature and scope of MIS for the given organization. 1d. Describe MIS characteristics and its functions by considering given organization.	1.1 Importance of MIS, Management Information System :A concept 1.2 Management, Information System, MIS: Definition 1.3 Nature and scope of MIS 1.4 MIS characteristics, IS functions	06
2. Structure and Classification Of MIS	2a. Describe the structure of MIS based on Physical Components by considering the given organization. 2b. Describe levels of management activities by considering the given organization. 2c. Identify the amount of support given by IS for the given type of decision. 2d. Identify Information system processing functions for the given organization. 2e. Identify the activities which are automated with implementation of TPS for the given organization with justification. 2f. Classify the given	2.1 Structure of MIS,MIS structure based on physical components 2.2 Information system processing functions 2.3 Decision support 2.4 Levels of Management activities 2.5 IS Classification :Transaction processing system 2.6 Management information system(MIS) 2.7 Decision support system(DSS) 2.8 Executive support system 2.9 Office automation system(OASs) 2.10 Business expert system(BESs)	10

	information systems as per given requirements of an organization . 2g. Identify the activities carried out by DSS for the given organization. 2h. Compare the given information systems on given points with justification. 2i. Select the activities of an organization which are automated with implementation of OAS for the given organization with justification. 2j. Design appropriate type of Information System for the given requirements of an organization.		
3. Decision – Making and MIS	3a. Describe Simon’s Model of Decision – Making by considering the given organization. 3b. Compare components of DSS and given information system on given points with justification. 3c. Describe Phases of decisions making process by considering the given organization. 3d. Compare given types of DSSs on given points with justification. 3e. Select Level of Programmability for the given type of decisions with justification. 3f. Describe the importance of knowledge of outcomes by considering the given organization.	3.1 Simon’s Model of Decision – Making 3.2 Components of DSS 3.3 Phases of decisions making process 3.4 Types of DSS 3.5 Purpose of Decision Making, Level of programmability 3.6 Knowledge of Outcomes 3.7 Methods for Choosing Among alternatives 3.8 Decision Theory and Decision Analysis 3.9 Decision Tree, Optimization Techniques	10

	3g. Compare methods for choosing among alternatives on given points with justification. 3h. Select which type of decision support system is suitable for the given requirements (support for decision making) of an organization. 3i. Design decision tree for the given situations and related parameters.		
4. Information And System Concepts	4a. Define information, data and system by considering the given organization. 4b. Compare types of information on given points with justification. 4c. Identify the quality of information of given information / parameters with justification. 4d. Describe the characteristics of given dimension of information. 4e. Select suitable type of Management Information System for given organization with justification.	4.1 Information : Definition, Types of Information, strategic Information 4.2 Tactical Information, Operational Information 4.3 Information quality 4.4 Dimensions of Information : Economic dimensions, Business dimensions, Technical dimensions 4.5 System :A Definition	06
5. Database Management Systems (DBMS)	5a. Compare Database Management System with file system on given points with justification. 5b. Describe given database system characteristics using given data. 5c. Describe implementation of MIS with database	5.1 Introduction, Database hierarchy, Files-the traditional approach 5.2 Data duplication, Data inconsistency, Lack of data integration, Data Dependence, Program Dependence 5.3 Objective of Database 5.4 Advantage of Database System 5.5 Disadvantage of a Database System 5.6 Database Structure 5.7 Types of Database Structure	08

	and without database by considering the given organization. 5d. Describe advantages of database system using given data and organization. 5e. Describe disadvantages of database system using given data and organization. 5f. Compare given types of database structure on given points with justification. 5g. Design database for the given system.		
6. Implementation and Evaluation of MIS	6a. Describe steps of Implementation Process for the given organization and type of system. 6b. Describe acquisition of facilities and space planning for the given organization and type of system. 6c. Describe IS organization and procedure development for the given organization and type of system. 6d. Describe the importance of user training, Changeover, requirement analysis. 6e. Describe acquisition of facilities and space planning for the given organization and type of system. 6e. Write step for Creation of forms and Database. 6f. Describe the use of IS organization and Procedure Development,	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	08

	acquisition of facilities and space planning, hardware and software selection. 6g. Select appropriate hardware and software for the said organization and type of information system. 6h. Identify the requirements for the said organization for the implementation process.		
Total			48

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



❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Management Information System: A Framework	02(04)	03(00)	03(00)	08(04)
2	Structure And Classification Of MIS	02(02)	03(03)	09(03)	14(08)
3	Decision –Making And MIS	02(00)	03(03)	09(03)	14(06)
4	Information And System Concepts	02(00)	03(03)	03(03)	08(06)
5	Database Management Systems (DBMS)	02(00)	03(03)	03(03)	08(06)
6	Implementation And Evaluation Of MIS	02(00)	03(00)	03(06)	08(06)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	1	R	2	2	R	2										
2	1	U	3	2	U	3	3	U	3	2	U	3	3	U	3				3/5
3	4	U	3	5	U	3	6	U	3	4	U	3	5	U	3				3/5
4	1	A	3	2	A	3	3	A	3	2	A	3	3	A	3				3/5
5	4	A	3	5	A	3	6	A	3	4	A	3	5	A	3				3/5
6	2	A	6	3	A	6	6	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:Nil**❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	--	--	--	--	3	--	--	3
2	3	--	--	--	--	--	--	--	3
3	3	1	2	--	--	3	--	--	3
4	3	--	--	--	--	--	--	--	3
5	3	--	--	--	--	3	--	--	3
6	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	Fundamentals of Information Systems	Ralph M. Stair, George W. Reynolds, Course Technology Ptr , 7th edition 1 January 2013	:13978-1133629627
2	Management Information System–The Managers View	Robert Schultheis, Mary Summer, Tata McGraw Hill, 2008.	13: 9780256251951
3	Management Information Systems	Jane P. Laudon, Kenneth C. Laudon Pearson Education, Sixteenth edition 10 September 2019	13: 978-9389552447

❖ **E-REFERENCES:**

- https://www.researchgate.net/publication/32955774_Tutorial_on_management_information_systems, accessed on 27th January 2021
- https://www.academia.edu/25576684/Mis_tutorial, accessed on 27th January 2021
- <https://uotechnology.edu.iq/dep-cs/mypdf/subjects/4is/4mis.pdf>, accessed on 27th January 2021

❖ **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 Department (I.T.Dept.)	Chairman
2	Mr. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
3	Dr.Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg. and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr.L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)), Course Expert
7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mrs.Isha Sangolkar	Lecturer in Information Tech.	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

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COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN IT/AIML
COURSE CATEGORY:	PROGRAMME CORE COURSE
COURSE CODE	: IT202G
COURSE TITLE	: COMPUTER NETWORK
TEACHING SCHEME:	TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04(1 TH/TU CREDIT = 01 CLOCK HR., 01 PR CREDIT = 02 CLOCK HR.)
TH. TEE EXAM	: 03 HRs
PR. TEE EXAM	: 02 HRs
PT. EXAM	: 01 HR

❖ RATIONALE:

One of the major components of computer based information systems is computer networks. Through computer networks we can share hardware, Software, Processing, Data and Applications besides getting global connectivity for internet based communication and services. The objectives of this course are to make students learn the technology of establishing, commissioning (making operational) and maintaining computer networks.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Illustrate various protocols, models and servers in networks.
2. Design physical and logical topology to connect computers in network.
3. Identify the layers, principles of operations and operating characteristics of the ISO OSI model and TCP/IP model.
4. Design network system planning by selecting cables, connectors and wireless media.
5. Select networking devices for network system planning and illustrate the use of Network management software.
6. Configure Ipv4 and Ipv6 in computer networks by identifying subnet mask.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs.
1. Basics of Computer Network	1a. Describe given computer network application on given example. 1b. Compare network connection based on scope and based on connection on given parameter. 1c. Describe network architecture on given example. 1d. Compare various servers on given parameters.	1.1 Introduction to Computer Network: Computer network, sharing information, sharing resources, file sharing 1.2 Categories of network: Based on scope Based on Connection 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	2a. Design a network using given line configuration. 2b. Design a network plan considering a given topology. 2c. Compare various IEEE standards on given parameters.	2.1 Line Configuration 2.2 Types of topology: Bus topology, Ring topology, Star topology, Mesh topology, Tree topology, Hybrid topology 2.3 IEEE Networking Standards: 802.2, 802.3, 802.5, 802.11 Standard	06
3. The Reference Model	3a. Compare various OSI reference model layers on given parameters. 3b. Compare various TCP/IP model layers on given parameters. 3c. Compare various OSI reference model layers and TCP/IP model layers on given parameters. 3d. Compare connection oriented and connectionless services on given parameters.	3.1 OSI Reference Model: Physical Layer, Data link layer, Network layer, Transport Layer, Session Layer, Presentation layer, Application Layer. 3.2 TCP/IP Reference Model: Link, Internet, Transport, Application layer 3.3 Connection oriented v/s Connectionless approach 3.4 Comparisons of OSI and TCP/IP reference model	12

4. Transmissi on Media	4a. Choose the relevant transmission media on given system with justification. 4b. Choose the relevant connectors for given cables as per construction with justification. 4c. Design a network plan by using given cable and connector as per construction. 4d. Design a wireless network plan by given wireless media.	4.1 Types of Transmission media 4.2 Guided Media: Twisted pair wire, Coaxial cable, Fiber optic cable 4.3 Connectors: BNC Connectors, RJ45 Connectors, AUI Connectors, Fiber Connectors 4.4 Unguided Media: Electromagnetic spectrum, Radio transmission, Microwave Transmission, Infrared Transmission, Satellite Communication	08
5. Network Devices	5a. Compare various networking devices with given parameters. 5b. Select the relevant networking device for given application. 5c. Compare networking devices with inter-networking devices on given parameters. 5d. Compare Layer2 and Layer3 Switches with given parameters. 5e. Write installation steps for the given Network Management Software.	5.1 Internetworking devices: i) Hubs ii) Repeaters iii) Switches iv) Routers 5.2 Networking devices i) Bridges ii) Gateways 5.3 Access Points and Modems 5.4 Difference between Layer 2 and layer 3 Switches 5.5 Introduction of Network management software	08
6. IP Protocol and Network Applicatio ns	6a. Compare IPV4 and IPV6 on given parameters. 6b. Select appropriate class for given network size. 6c. Calculate subnet mask on given IP address. 6d. Compare DNS, SMTP, FTP, HTTP on given parameters.	6.1 IP Protocol – IP v4, IP v6 6.2 Addressing Schemes 6.3 Subnet and Masking 6.4 DNS, STMP, FTP, HTTP	06
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Install and configure network interface card.	1.Basics of Computer Network	02
2	Connect computers in Local Area Network in college lab.		02
3	Install and configure print server.		02
4	Design a network system planning by choosing network topology suitable for college lab.	2.Network Topologies and Networking Standard	04
5	Configure a Network Topology using Packet Tracer Software.		02
6	Prepare an abstract on comparison of OSI ISO reference model and TCP/IP model on sender and receiver model.	3.The Reference Model	04
7	Prepare and test straight and cross UTP cables	4.Transmission Media	2
8	Install a small wireless network using Wireless access points for college lab.		04
9	Install and test router.	5.Network Devices	04
10	Configure, monitor and maintain computer network by using network management software.		02
11	Configure IPV4 and IPV6 on windows.	6.IP Protocol and Network Applications	02
12	Configure & Test Internet using different commands for network (like ping, ipconfig etc.)		02
		Total Hrs	32

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

R – Remember

U – Understand

A – Analyze / Apply

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Basics of Computer Network	02(02)	06(00)	00(03)	08(05)
2	Network Topologies and Networking Standard	02(02)	06(03)	03(00)	11(05)
3	The Reference Model	02(00)	03(03)	09(03)	14(06)
4	Transmission Media	02(00)	03(03)	03(06)	08(09)
5	Network Devices	02(02)	03(03)	06(00)	11(05)
6	IP Protocol and Network Applications	02(00)	03(06)	03(00)	08(06)
	Total	12(06)	24(18)	24(12)	60(36)

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

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	5	R	2										
2	1	U	3	2	U	3	3	U	3	2	U	3	3	U	3				3/5
3	1	U	3	2	U	3	4	U	3	4	U	3	5	U	3				3/5
4	5	U	3	6	U	3	2	A	3	6	U	3	6	U	3				3/5
5	3	A	3	4	A	3	6	A	3	1	A	3	3	A	3				3/5
6	3	A	6	5	A	6	4	A	6										2/3

T- Unit/Topic Number
R-RememberL- Level of Question
U-UnderstandM- Marks
A-Analyze/ Apply

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	What		To Who m	Frequency	Max Mark s	Min Mark s	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignment s		Assign- ments	15	--	Assignmen t Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5, 6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign- ments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5, 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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Installation and Configuration	20
2	Testing	10
3	Performance/Result	10
4	Viva Voce	10
	TOTAL	50

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

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

❖ **E-REFERENCES:**

- <http://www.nptelvideos.in/2022/computer-networks.html?m=1>, accessed on 25th Jan 2022

- https://www.cisco.com/c/en_in/solutions/enterprise-networks/what-is-computer-networking.html , accessed on 25th Jan 2022.
- https://onlinecourses.nptel.ac.in/noc20_cs23/preview , accessed on 25th Jan 2022.

❖ **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	Dr. A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Mr.Dipak Dhote	Operations Manager, IT-Network InfosystemsPvt LTD	Industry Expert
3	Dr.Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr. L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)
7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mrs. Shifa Mohd Azharuddin	Lecturer in Information Tech.	Course expert
9	Mr. L L Bhadekar	Lecturer in Information Tech.	Course expert

(Member Secretary PBOS)

(Chairman PBOS)

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

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN COMPUTER ENGINEERING / INFORMATION TECHNOLOGY / ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
COURSE CATEGORY	: PROGRAMME CORE COURSE
COURSE CODE	: CM202G^{\$}
COURSE TITLE	: DATA STRUCTURES
TEACHING SCHEME	: TH:03; TU: 01;PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HRs.)
TH. TEE EXAM	: 03 HRs
PR. TEE EXAM	: 02 HRs
PT. EXAM	: 01 HR

❖ **RATIONALE:**

Data Structure is an important aspect for Computer Engineering and Information Technology. Data Structures is a logical & mathematical model of storing and organizing the data in a particular way in computers. The methods and techniques of Data Structures are widely used in industries. After learning this course students will be able to identify the problem, analyze different algorithms to solve the problem and choose most appropriate data structure to represent the data.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Use the concepts of data structures to solve computing problem.
2. Apply sorting and searching algorithms to the small and large data sets.
3. Develop and execute the program for stacks and queues.
4. Construct the algorithm for different types of linked list.
5. Implement different operations on binary trees.
6. Develop the program for performing operations on graph .

❖ **COURSE DETAILS:****A.THEORY :-**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs.
1. Introduction to data structure	1a. Describe the given data structure terminologies. 1b. Illustrate the concept and needs of data structure for the given problem. 1c. Classify the given type of data structures based on their characteristics. 1d. Compute complexity of given algorithm in terms of time and space. 1e. Apply given operations on different data structures.	1.1 Definition of data structure. Basic Terminology: Elementary Data Organization 1.2 Concept and Need of data structure. 1.3 Types of data structure :- (i) Linear Data Structures (ii) Non-Linear Data Structures 1.4 Algorithm complexity :- (i) Time Complexity (ii) Space Complexity 1.5 Operations on data structures :- (i) Traversing (ii) Inserting (iii) Deleting (iv) Searching (v) Sorting (vi) Merging	03
2. Searching and Sorting	2a. Apply the algorithm of given searching and sorting methods on the given data sets. 2b. Write the programs for given searching and sorting methods.	2.1 Searching : Searching an item in data set using following methods: (i) Linear Search (ii) Binary Search 2.2 Sorting—sorting of data set in an order using following methods : (i) Selection (ii) Bubble (iii) Insertion (iv) Merge (v) Radix	06
3. Stacks and Queues	3a. Describe the given terminologies of stacks and its representation. 3b. Write the programs for given operations on stack. 3c. Analyse the results of given applications of stack. 3d. Construct given types of polish expression. 3e. Illustrate the concept	3.1 Introduction to Stack-Stack Definition, basic terminologies, examples. Stack as ADT, Stack representation in memory using array and linked list. 3.2 Operation on Stack-PUSH,POP-Stack operation conditions-Stack Full / Stack Overflow, Stack Empty/Stack Underflow 3.3 Application of Stack - Reversing a list - Polish Notation 3.4 Polish Notation:-Infix, Postfix, Prefix -Conversion of infix to postfix expression,	12

	of queue and its given representation forms. 3f. Compare the working of given types of queues based on the given parameters. 3g. Develop the program for given operation of queue.	-Conversion of infix to prefix expression, -Evaluation of postfix expression, -Evaluation of prefix expression, -Recursion, Tower of Hanoi 3.5 Introduction to Queue Queue Definition, basic terminologies, examples. Queue as ADT, Array representation and linked representation of queue. 3.6 Types of Queue :-Linear Queue, Circular Queue ,Concept of Priority queue 3.7 Queue Operations – INSERT,DELETE Queue Operations conditions –Queue Full, Queue Empty, Application of Queue	
4. Linked List	4a. Describe the given linked list terminologies. 4b. Differentiate between the working of types of linked list on given points. 4c. Construct the algorithm for given operations on linked list.	4.1 Introduction to linked list Terminologies : node, Address, Pointer, Information field/Data field, Next pointer, Null Pointer, Empty list, Dynamic memory Allocation, 4.2 Types of list :- Linear list, Circular list 4.3 Operation on singly linked list :- Traversing a singly linked list, Searching a key in linked list, Inserting a new node in linked list, Deleting a node from linked list, Counting number of nodes in a Linked List, Reversing a linked list.	08
5. Tree	5a. Describe the given concepts of trees with related terminologies. 5b. Represent the binary tree in given forms. 5c. Obtain output of given graph for given traversal method. 5d. Construct the tree using given operations on trees.	5.1 Introduction to Trees Terminologies:- tree, degree of node, degree of a tree, level of a node, leaf node, Depth / Height of a tree, In-degree and Out Degree, Path, Ancestor, descendant nodes. 5.2 Binary tree representation:- Sequential representation, Linked representation of tree 5.3 Tree types and traversal methods Types of trees :- General tree, Binary tree, Binary search tree (BST), Expression Trees Binary tree traversal :- In-order Traversal Pre- order Traversal, Post-order Traversal 5.4 Binary Search Tree Operations:- Searching a node in a BST	09

		Inserting a new node in BST Deleting a node from BST	
6. Graph	6a. Describe given graph terminologies. 6b. Represent the given graph in given forms. 6c. Interpret list and matrix for given type of graph 6d. Design the graph traversal techniques for the given graph.	6.1 Introduction to graph terminologies :- graph, node (vertices), arcs (edges), directed graph, undirected graph, in-degree, out degree, adjacent, successor, predecessor, relation, path, articulation point. 6.2 Representation of Graph:- Sequential representation, Linked representation of graph. 6.3 Adjacency Lists, Adjacency Matrix of directed and undirected graph. 6.4 Traversal used for Graph Breadth First Search Depth First Search	10

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

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Develop and execute a 'C' program to traverse and display the elements from given array.	1. Introduction to data structure	02
2	Develop and execute a 'C' program to search a particular data from the given array using Linear search.	2. Searching and Sorting	02
3	Develop and execute a 'C' program to search a particular data from the given array using Binary search.		02
4	Develop and execute a 'C' program to sort an array using Bubble Sort .		02
5	Develop and execute a 'C' program to sort an array using Selection Sort.		02
6	Develop and execute a 'C' program to sort an array using Insertion Sort .		02
7	Develop and execute a 'C' program to perform PUSH and POP operations on stack using array.	3. Stacks and Queues	02
8	Develop and execute a program for Implementation of Recursion using Stack.		02
9	Develop and execute a 'C' program to perform INSERT and DELETE operations on queue using array.		02
10	Develop and execute a 'C' program to perform INSERT and DELETE operations on circular queue using array.	4. Linked list	02
11	Develop and execute a 'C' program for Inserting, Deleting, Traversing, Searching a node in Singly Linked List.		02
12	Develop and execute a program for inserting and deleting a node from Binary tree.	5. Tree	02

13	Develop and execute a program to traverse the tree (Inorder, Preorder, Postorder).		04
14	Develop and execute a program for traversal of graph.	6.Graph	04
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Introduction to data Structures	02(02)	00(00)	00(00)	02(02)
2	Searching and Sorting	02(02)	03(03)	06(00)	11(05)
3	Stacks and Queues	02(02)	06(00)	06(06)	14(08)
4	Linked List	02(00)	03(03)	06(03)	11(06)
5	Trees	02(00)	03(03)	06(06)	11(09)
6	Graphs	02(00)	03(03)	06(03)	11(06)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

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	
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	3	R	2										
2	2	U	3	2	A	3	2	A	3	2	U	3	3	A	3				3/5
3	3	U	3	3	U	3	4	U	3	4	A	3	3	A	3				3/5
4	5	U	3	4	A	3	4	A	3	4	U	3	5	U	3				3/5
5	6	U	3	5	A	3	5	A	3	6	U	3	6	A	3				3/5
6	3	A	6	6	A	6	5	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Correctness of algorithm	10
2	Designing the program	10
3	Debugging Ability	10
4	Appropriateness of output displayed	10
5	Viva voce	10
	TOTAL	50

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

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

❖ **Information Technology**

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

❖ **Artificial Intelligence and Machine learning**

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

❖ **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:**

- <https://nptel.ac.in/courses/106/102/106102064/>, accessed on 12th December 2021
- <https://www.w3schools.in/data-structures-tutorial>, accessed on 12th December 2021
- <https://www.geeksforgeeks.org/data-structures/>, accessed on 12th December 2021
- https://www.tutorialspoint.com/data_structures_algorithms/index.htm, accessed on 12th December 2021

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

1. Computer system (Any computer system which is available in laboratory)
2. 'C' Compiler / GCC Compiler

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

S.N.	Name	Designation	Institute / Industry
1	Dr.M.V.Sarode	HOD,Computer Engineering	G.P.Nagpur
2	Dr.A.R.Mahajan	HOD, Information Technology/AIML	G.P.Nagpur
3	Mrs.D.S.Nalinde	Lecturer in CM	Course Expert G.P.Nagpur
4	Mrs.C.R.Chaudhari	Lecturer in CM	Course Reviewer G.P.Nagpur
5	Mr.S.A.Khatri	Lecturer in CM	Course Reviewer G.P.Nagpur
6	Dr.Rakesh Kadu	Assistant Professor, I.T	Ramdeobaba College of Engg, and Management, Nagpur
7	Mr.Dipak Dhote	Operations Manager,	IT-Network Infosystems Pvt LTD,Nagpur
8	Mrs.V.A.Raje	System Analyst ,	MSBTE ,RO,Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY/AIML
COURSE CATEGORY:	PROGRAMME CORE COURSE
COURSE CODE	: IT203G^{\$}
COURSE TITLE	: OBJECT ORIENTED PROGRAMMING
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
PT. EXAM	: 01 HR

❖ **RATIONALE:**

Engineering students should know the objected oriented concepts of programming in open source environment. This course describes the basics and application of object oriented approach towards problem solving and logic development. It describes object oriented features using C++ programming language. C++ is the most commonly used object oriented language. It is very useful course for understanding the object oriented knowledge in the field of software engineering and core course for learning object oriented languages.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Use the object oriented concepts in programming.
2. Create classes, instantiate objects and invoke methods.
3. Apply the concepts of constructor, destructor, and inheritance to develop programs.
4. Develop programs to show use of pointer and polymorphism.
5. Develop C++ programs to implement real life application using file operations
6. Use concepts of namespace and exception handling to write programs.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Fundamentals of Programming	1a. Differentiate between OOP and POP 1b. Choose the correct features of OOP from the given list of features. 1c. Sort the keywords, variables and constants from the given list of tokens. 1d. Develop a given program using scope resolution and memory management operators. 1e. Use program structure of C++ to develop the program.	1.1 Its need & requirement, Procedure Oriented Programming (POP) versus Object Oriented Programming (OOP), 1.2 Basic concepts of Object Oriented Programming, Object Oriented Languages, Applications of OOP. Beginning with C++: What is C++? , Tokens, keywords, variables, constants, basic data types, 1.3 Operators, scope resolution operator, memory management operators, console input/output 1.4 Structure of C++ program.	06
2. Basic of Classes & Objects	2a. Create class and objects for the given problem statement. 2b. Draw the structure to show memory allocation for given objects. 2c. Develop programs on given array of objects 2d. Write the syntax to declare and define given static data member and static member function 2e. Develop programs using friend function for given problem statement.	2.1 Class & Object: Introduction, specifying a class, access specifier, defining member functions, creating Objects 2.2 Memory Allocation for objects. 2.3 Array of Objects, Object as function Arguments. 2.4 Static data members, static member function, 2.5 Friend Function	08
3. Constructor ,	3a. Apply the concept of constructors and destructors to	3.1 Concepts of Constructors, Types of constructors: Default, Parameterized, Copy constructor.	12

Destructor, Inheritance	implement the given program. 3b. Use correct types of constructors in given problem definition. 3c. Develop programs based on destructors for given problem. 3d. Choose correct type of visibility mode based on given problem. 3e. Develop given program using correct type of inheritance. 3f. Use the concept of passing parameter from derived class constructor to base class constructor for the given type of inheritance.	3.2 Overloaded Constructors: Multiple Constructors in a Class, Constructors with default arguments. 3.3 Destructors. 3.4 Inheritance : Introduction to derived class, visibility modes & effects 3.5 Types of Inheritance : single, multilevel, multiple, hierarchical , hybrid 3.6 Constructors in derived class : Passing parameters from derived class constructor to base class constructor using various types of inheritance.	
4. Pointers and Polymorphism in C++	4a. Choose the correct pointer arithmetic statements from given list of expressions. 4b. Write the given program to implement the concept of this pointer or pointer to object. 4c. Compare between compile time polymorphism and run time polymorphism 4d. Use concept of operator overloading for given program. 4e. Develop programs based on virtual function for given problem statement.	4.1 Concepts of Pointer: Pointer declaration, Pointer operator, address operator, Pointer arithmetic. 4.2 Pointer to Object: Pointer to Object, this pointer, Pointer to derived class. 4.3 Polymorphism : Introduction, Types of polymorphism: Compile time, Run time 4.4 Compile time Polymorphism: Function overloading, operator overloading: Overloading unary and binary operators, Rules for Operator overloading. 4.5 Run time polymorphism: Virtual functions, rules for virtual Functions, pure virtual function.	10
5. Working With Files	5a. Compare between given classes for file stream operations. 5b. Choose the correct file opening modes based on given problem. 5c. Use the file pointer in given program to move	5.1 Introduction : Classes for File Stream Operations 5.2 Opening and closing a file, detecting end of file and various File opening Modes 5.3 File pointers and their manipulations 5.4 Sequential input and output operation 5.5 Error handling during file operations	07

	its location throughout the file. 5d. Write given program to show sequential input and output operations over file. 5e. Develop program to show use error handling functions and random access to file for given problem statement. 5f. Develop program over files using command line arguments for given problem statement.	and Updating a File: Random Access 5.6 Command Line Arguments	
6. Name Spaces, Exception Handling	6a. Declare syntax to create namespace for given problem. 6b. Develop given program to show use of nesting of namespaces. 6c. Choose correct type of throwing mechanism with respect to given problem definition of exception handling. 6d. Use throwing, catching and rethrowing mechanism in given problem statement.	6.1 Namespaces : Defining namespaces 6.2 Discontiguous namespaces, Nesting of Namespaces. 6.3 Exception handling : Introduction, Exception handling mechanism, 6.4 Throwing mechanism, catching Mechanism, rethrowing an exception.	05
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Develop & Execute four programs based on variable, constant and different type of operators.	1.Fundamentals of programming	02
2	Develop & Execute two C++ programs i) Based on object and classes. ii) Based on default argument concept in function.	2.Basic of Classes & Objects	02
3	Develop & Execute two programs each on function overloading and on static member function.		02
4	Develop & Execute two programs using friend function		02
5	Develop two programs based on constructor, destructor and dynamic constructor.	3.Constructor , Destructor, Inheritance	02
6	Develop & Execute two programs over constructor overloading		02
7	Develop & Execute five programs for all types inheritance		04
8	Develop & Execute a program to pass parameters from derived class constructor to base class constructor		02
9	Develop & Execute two programs to create a pointer for object and array of objects.	4.Pointers and Polymorphshism in C++	02
10	Develop & Execute program for virtual function.		02
11	Develop & Execute two programs each on unary operator overloading and binary operator overloading		02
12	Develop & Execute two programs each to perform various operations over files	5.Working with files	02
13	Develop & Execute a program i) to randomly access contents of file ii) using command line argument		02
14	Develop & Execute a program using namespace	6.Name spaces, Exception Handling	02
15	Develop & Execute a program using exception handling		02
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Fundamentals of programming	02(02)	06(03)	00(00)	08(05)
2	Basic of Classes & Objects	02(02)	03(03)	06(03)	11(08)
3	Constructor , Destructor, Inheritance	02(00)	03(00)	06(06)	11(06)
4	Pointers and Polymorphism in C++	02(02)	03(03)	06(03)	11(08)
5	Working with files	02(00)	03(00)	06(06)	11(06)
6	Name spaces, Exception Handling	02(00)	00(03)	06(00)	08(03)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M-Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

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	
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	4	R	2										
2	1	U	3	2	U	3	3	U	3	1	U	3	2	U	3				3/5
3	1	U	3	4	U	3	5	U	3	4	U	3	6	U	3				3/5
4	2	A	3	5	A	3	6	A	3	2	A	3	3	A	3				3/5
5	2	A	3	5	A	3	6	A	3	3	A	3	4	A	3				3/5
6	3	A	6	4	A	6	5	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

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

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES FOR IT DEPT :**

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	1	3	--	--	--	--	--	3
2	3	--	3	3	--	--	--	--	3
3	3	--	3	3	--	--	--	--	3
4	3	--	3	3	--	--	--	--	3
5	3	--	3	3	1	1	1	--	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	Object oriented programming with C++:	E. Balagurusamy , McGraw Hill Education , 4 th Edition, 2008	13: 9789383286508
2	C++: The Complete reference	Herbert Schildt , McGraw Hill Education , 4 th Edition , 2017	10: 0072226803
3	Let us C++	Yashwant Kanetkar , BPB , 2 th Edition, 2003	13: 9788183331630
4	Object oriented programming in C++:	Robert Lafore, SAMS, 4 th Edition, 2008	13: 9788131722824
5	Object oriented programming in C++:	Lekhraj Vilhekar, Icebreakers, 1 st Edition, 2015	---

❖ **E-REFERENCES:**

- https://onlinecourses.nptel.ac.in/noc22_cs43/preview Accessed on 21 Jan. 2022
- www.cprogramming.com/tutorial/c++-tutorial.html Accessed on 21 Jan. 2022
- https://www.w3schools.com/cpp/cpp_oop.asp Accessed on 21 Jan. 2022
- https://www.tutorialspoint.com/cplusplus/cpp_tutorial.pdf Accessed on 21 Jan. 2022
- <https://www.udemy.com/course/c-programming-oops-concepts/> Accessed on 21 Jan. 2022
- <https://www.coursera.org/learn/object-orient-programming> Accessed on 21 Jan. 2022

❖ **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	Dr. A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Mr. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg. and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr. L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal), Course Expert
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)
7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mr.S.J.Pukale	Lecturer in Information Tech.	Course Expert , Reviewer

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY: PROGRAMME CORE COURSE
COURSE CODE : IT204G
COURSE TITLE : DATA COMMUNICATION**
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 EXAM : 01 HRs
PR. TEE EXAM : --
PT. EXAM : 30 MINUTES

❖ RATIONALE:

Data communications is the exchange information between user's/devices (computers, terminals and applications programs) connected in a network. Main objective of data communication and networking is to enable seamless exchange of data between any two points in the world. By considering need of time in current IT era, this course provides knowledge and techniques of exchange and transmission of data between users/devices in a network, which will helpful to students for handling, managing and in decision making related with data communication

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify components and process of data communication.
2. Identify Multiplexing and switching techniques in data communication.
3. Identify transmission error correction and detection techniques in data communication.
4. Analyze problems related with Flow Control, Error Control and to select require protocol.
5. Analyze problems related to congestion control and to select required protocol.
6. Identify multiple accesses, random access protocols.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Introduction	1a. Identify the role of given component of data communication. 1b. Select exact meaning of given term (Bandwidth, Data Transmission Rate, Baud Rate, Bits per second). 1c. Choose mode of communication in given situation. 1d. Identify required type of signal in given situation.	1.1 Introduction- Data, Process of Data communication, Components of Data Communication (Transmitter, receiver, medium), Protocols, Standards, Standards organizations 1.2 Bandwidth, Data Transmission Rate, Baud Rate and Bits per second 1.3 Modes of communication(Simplex, duplex, half duplex) Types of data communication(Serial, Parallel) 1.4 Analog Signal, Digital Signal, Analog Transmission and Digital transmission	08
2. Multiplexing and Modulation	2a. Select required type of communication media in given scenario. 2b. Analyse given statement and identify required type of multiplexing. 2c. Choose type of Modulation to be use in given statement. 2d. Identify Procedure of Pulse code modulation from given options.	2.1 Communication Media- Guided Media, Unguided Media 2.2 Multiplexing – Meaning of multiplexing, Process of multiplexing, frequency division Multiplexing, Time division Multiplexing, wavelength Division Multiplexing 2.3 De multiplexing- Meaning of De Multiplexing and Types. 2.4 Modulation(Analog to analog conversion)–Meaning of Modulation, Amplitude Modulation, Frequency Modulation, Phase Modulation 2.5 Digital to Analog conversion- Amplitude shift keying, Frequency shift keying, Phase Shift keying.	08
3. Error Detection and Correction	3a. Select function of Data Communication model from given statements. 3b. Identify the type of Error in given scenario.	3.1 Function of Data Communication Model, Line configuration Data Communication. 3.2 Types of Errors, Error detection technique in Data Communication 3.3 Redundancy, Vertical Redundancy	08

	3c. Choose correct option, after Performing error detection technique for given data. 3d. Select correct option, after Performing hamming code for given data. 3e. Identify functions relevant with “Checksum” by analysing given statements.	Check(VRC), Cyclic Redundancy Check (CRC) 3.4 Hamming Code in data communication 3.5 Checksum in data communication	
4. Flow Control and Error Control	4a. Select types of flow control protocols from given options. 4b. Identify required, Flow control Protocol in given scenario. 4c. Choose feature of given error control techniques. 4d. Analyze given scenario and select required ARQ error control technique.	4.1 Line Discipline:- ENQ/ACK, 4.2 Flow Control: Stop-and –Wait protocol, Sliding Window flow control protocol. 4.3 Error Control :- Automatic Repeat Request(ARQ) Stop-and Wait ARQ, Sliding Window ARQ 4.4 Go-Back-n-ARQ, Selective-Rject ARQ	08
5. Congestion Control	5a. Choose from given Statement, which indicates feature of given congestion control technique. 5b. Select option which denotes the role of given Packets in congestion control. 5c. Identify type of congestion notification technique from given options. 5d. Analyse and select from given statements that shows process of Leaky Bucket Algorithm.	5.1 Introduction: Congestion control, General Principles of Congestion Control, Congestion Prevention Policies 5.2 Choke Packets in congestion control Hop-by-Hop Choke Packets congestion control 5.3 Congestion notification techniques BECN(Backward Explicit Congestion Control ,FECN(Forward Explicion congestion Control) 5.4 Leaky Bucket Algorithm	08
6. Multiple Access	6a. Select application of given term in data communication .	6.1 Random Access, Multiple Access, Channel Allocation problem, static and dynamic Channel allocation.	08

Protocol	6b. Choose from given options that identifies feature of given Aloha Protocols. 6c. Identify use / application of CSMA from given option. 6d. Identify Process of Token passing mechanism from given statements.	6.2 Pure ALOHA, Slotted ALOHA, FDMA, TDMA Comparison of FDMA and TDMA 6.3 Carrier Sense Multiple Access(CSMA):CSMA/CD,CSMA/CA, Controlled Access 6.4 Token passing mechanism.	
		TOTAL	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	
1	Introduction	04(02)	04(00)	02(00)	10(02)
2	Multiplexing and Modulation	02(00)	04(00)	04(02)	10(02)
3	Error Detection and Correction	02(00)	02(00)	06(02)	10(02)
4	Flow Control and Error Control	02(00)	02(00)	06(02)	10(02)
5	Congestion Control	04(00)	02(02)	04(00)	10(02)
6	Multiple Access Protocols	02(00)	04(00)	04(00)	10(00)
	Total	16(02)	18(02)	26(06)	60(10)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
Q.NO.01- Q.NO.35	1	R	2	1	R	2	1	U	2	1	U	2	1	A	2	1	R	2	30/35
	2	R	2	2	U	2	2	U	2	2	A	2	2	A	2	2	A	2	
	3	R	2	3	U	2	3	A	2	3	A	2	3	A	2	3	A	2	
	4	R	2	4	U	2	4	A	2	4	A	2	4	A	2	4	A	2	
	5	R	2	5	R	2	5	U	2	5	A	2	5	A	2	5	U	2	
	6	R	2	6	U	2	6	U	2	6	A	2	6	A	2				

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assign-ments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	-	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign-ments	-	--	Journal	1, 2, 3,4,5,6
				Total	-	-		
	TEE (Term End Examination)	End Exam	Students	End of the Course	-	-	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
	Nil	

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	-	-	1	2	-	--	--	-
2	3	-	-	1	2	-	--	--	-
3	3	-	-	1	2	-	--	--	-
4	3	3	-	1	2	-	--	--	-
5	3	3	-	1	2	-	--	--	-
6	3	3	-	1	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	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:**

- https://www.youtube.com/watch?v=swtH_okidQc&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN, accessed on 30th Jan 2022
- http://www.tutorialspoint.com/data_communication_computer_network/, accessed on 30th Jan 2022
- <http://www.freotechbooks.com/data-communication-andnetworks-f31.html>, accessed on 30th Jan 2022
- <https://www.youtube.com/watch?v=sG6WGvzmVaw>, accessed on 30th Jan 2022

❖ **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 Department (I.T.Dept.).	Government Polytechnic, Nagpur.
2	Mr. L L Bhadekar	Lecturer in IT	Government Polytechnic, Nagpur.
3	Mrs.Shifa Mohammad Azharuddin	Lecturer in IT	Government Polytechnic, Nagpur.
4	Mr. Dipak Dhote, Industry Expert	Operations Manager, IT-Network Infosystems Pvt LTD	IT-Network Infosystems Pvt LTD
5	Dr. Rakesh Kadu, Member from Academics(External)	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Ramdeobaba College of Engg, and Management, Nagpur.
6	Mrs.V.A.Raje, MSBTE Nominee	Lecturer in C.O., G.P.Arvi	G.P.Arvi
7	Mr. L.D.Vilhekar, Member (Internal)	Lecturer in Information Tech.	Government Polytechnic, Nagpur.
8	Mrs.D.P.Chanmanwar, Member (Internal)	Lecturer in Information Tech.	Government Polytechnic, Nagpur.
9	Mr. M.N.Gawande, CDC In Charge and Member Secretary	Lecturer in Electrical Engg.	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN COMPUTER ENGINEERING / INFORMATION TECHNOLOGY /AIML
COURSE CATEGORY	: PROGRAMME CORE COURSE
COURSE CODE	: CM204G^{\$}
COURSE TITLE	: DATABASE MANAGEMNT SYSTEM
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
PT. EXAM	: 01 HR

❖ **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. Use fundamentals of database management system.
2. Design database by using different models.
3. Design the normalized relational database for system.
4. Execute SQL commands for database operations.
5. Build PL/SQL code for database application.
6. Use concept of NOSQL database system.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Database System Concept	1a. Compare systems based on given parameters. 1b. Compare given data management system based on various attributes. 1c. Determine the level of data independence achieved based on given situation with justification. 1d. Describe given function of database administrator. 1e. Describe architecture of Client/ Server system. 1f. State given Codd's law with justification.	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 Definition of 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 Models and Constraints	2a. Compare given data models based on given parameters. 2b. Predict the suitable key required in given scenario. 2c. Design E-R Model for given system. 2d. Apply the constraint to given schema.	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.	08
3. Relational	3a. Illustrate the significance of	3.1 Purpose of normalization, Data Redundancy, insert, update, delete	08

Database Normalization	Normalization. 3b. Identify functional dependency based on given situation. 3c. Apply normalization rule to given schema.	anomalies, Decomposition properties 1. Lossless Decomposition, 2. Dependency Preservation 3.2 Functional dependency (FD), Classification of Functional dependency, properties of FD. 3.3 Normalization using: 1NF, 2NF, 3NF and BCNF.	
4. SQL and Database Languages	4a. Use data types for database design. 4b. Design SQL queries to create Relational database. 4c. Apply clauses to given database for data retrieval. 4d. Apply various operators & functions to retrieve data from database. 4e. Design the database report from given key terms. 4f. Apply join concept to retrieve data from more than one object/schema. 4g. Apply index method to database for data retrieval.	4.1 Data Types in SQL 4.2 Components of SQL: DDL- create, alter, rename, drop, truncate, DESC, DML- insert, update, delete, 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 & 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.	10
5. PL/SQL	5a. Identify various components of the PL/SQL. 5b. Use control structure to write PL/SQL Code. 5c. Distinguish between exception handling based on given situation. 5d. Create different cursor to store more than one record. 5e. Design package to store different procedure. 5f. Create PL/SQL function for given problem statement.	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 &	10

	5g. Create database trigger using PL/SQL for given problem statement.	Deleting a Function, use of Package 5.7 Database Triggers: Use of Database Triggers, Types of Triggers, Syntax for Creating Trigger, Deleting Trigger.	
6. Introduction to NOSQL Database	6a. Describe NOSQL database model & define given type of NOSQL database. 6b. Explain given terminology in context with NOSQL database. 6c. Compare given databases.	6.1 Overview and History of NoSQL Databases. Definition of the Four Types of NoSQL Database 6.2 The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases 6.3 Comparison of relational databases to new NoSQL stores, MongoDB, Cassandra, HBASE, Neo4j use and deployment, NoSQL approach, Key-Value and Document Data Models, NoSQL Key/Value databases using MongoDB	06
Total Hrs.			48

B. LIST OF PRACTICALS / LABORATORY EXPERIENCES / ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Install & configure Database product (such as MYSQL, ORACLE or any other relational product)	1. Database System Concept	02
2	Design database by using Network Model, Hierarchical Model, Relational Model.	2. Relational Models and constraints	02#
3	Design Entity Relationship model for any one of the given databases (School, Banking, Hostel, Hospital)		02
4	Design a Normalized Database. Identify available dependencies in created database. Identify types of used normal form.	3. Relational Database Normalization	02
5	Create & Execute DDL commands in SQL & Apply various Integrity constraints on created table.	4. SQL and	02
6	Create & Execute DML commands in SQL.		02
7	Execute Queries using Arithmetic operators, Set operator, Relational operator and Comparison Operator to retrieve data.		02

8	Execute queries using Aggregate functions- Min, Max, Sum, Count, Avg.	Database Languages	02
9	Execute query using String functions, Data Conversion functions such as To char(), To Number() and To date().		02#
10	Execute query using select command with – Where, having, group by , order by		02#
11	Execute sub query & Nested Sub queries to retrieve data from more than one table. Use break & compute command, apply different compute functions.		02
12	Execute the queries for implementation of Inner, Outer and Cross Join.		02
13	1.Execute DCL and TCL commands in SQL 2.Execute Views & Indexes in SQL.		02
14	1.Write the basic PL/SQL Programs. 2.Write a PL/SQL programs using control statements.	5.PL/SQL	02
15	Write PL/SQL Programs using Iterative Control Statements.		02
16	Write a PL/SQL code to implement implicit and explicit cursors.		02#
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	Install & configure MangoDb & Run basic MangoDb commands	6.Introduction to NOSQL database	02
21	Store a data as documents in mangoDB and execute basic command on it. Like db.find(),db.aggregate()		02
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Database System Concept	02(02)	03(03)	00(00)	05(05)
2	Relational Models and constraints	02(02)	06(03)	06(00)	14(05)
3	Relational Database Normalization	02(02)	03(03)	06(03)	11(05)
4	SQL and Database Languages	02(00)	06(03)	06(03)	14(09)
5	PL/SQL	02(00)	03(03)	06(06)	11(11)
6	Introduction to NOSQL database	02(00)	03(03)	00(00)	05(03)
	Total	12(06)	24(18)	24(12)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	3	R	2										
2	1	U	3	2	U	3	3	U	3	1	U	3	2	U	3				3/5
3	2	U	3	4	U	3	5	U	3	3	U	3	4	U	3				3/5
4	4	U	3	2	A	3	6	U	3	5	U	3	6	U	3				3/5
5	2	A	3	3	A	3	3	A	3	4	A	3	3	A	3				3/5
6	4	A	6	5	A	6	5	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	40	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	10	--	Journal	1, 2, 3,4,5,6
				Total	50	20		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Correctness of logic of a program	20
2	Debugging ability	10
3	Quality of input and output displayed (messaging and formatting)	10
4	Submit report in time /Viva Voce	10
	TOTAL	50

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

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

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

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

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

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

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

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 McGrawHill Education, 2005.	9780070591196
3	An Introduction to Database System	Bipin Desai, West Publishing Company, 1997	13: 9780314667717
4	Database Systems TheComplete Book	Hector Garcia-Molina Jeffrey D.Ullman Jennifer Widom, PearsonEducation Inc, 2,2002	0-13-606701-8 978-0-13-606701-6

❖ **E-REFERENCES:**

- <http://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm> , accessed on 29th January 2022
- <http://www.studytonight.com/dbms/rdbms-concept.php>, accessed on 29th January 2022
- <https://www.youtube.com/watch?v=0mn7wIAdu98>, accessed on 29th January 2022

❖ **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	Dr.M.V.Sarode	Head of Department (Computer Engg.Dept.)	Government Polytechnic Nagpur
2	Mr.A.A.Uike	Lecturer in Computer Engineering	Government Polytechnic Nagpur
3	Mr.M.A.Rahman	Lecturer in Computer Engineering	Government Polytechnic Nagpur
4	Mr.P.S.Thakre	Lecturer in Computer Engineering	Government Polytechnic Nagpur
5	Mr.Dipak Dhote	Operations Manager,	IT-Network Infosystems Pvt LTD, Nagpur
6	Dr. Rakesh Kadu	Assistant Professor, I.T.	Ramdeobaba College of Engg, and Management, Nagpur.
7	Mrs. V .A. Raje	System Analyst	MSBTE,RO Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN INFORMATION TECHNOLOGY/
COMPUTER ENGINEERING

COURSE CATEGORY: PROGRAMME CORE COURSE

COURSE CODE : IT251G

COURSE TITLE : WEB PAGE DESIGN

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 : --

PR. TEE EXAM : 02 HRs

PT. EXAM : --

❖ 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. 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, CSS and JavaScript.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Design the web page using basic tags of HTML.
2. Use HTML tags for linking HTML documents.
3. Use table tag and formatting table tags to organize information in tabular form.
4. Design input forms using HTML form tag and different form controls.
5. Use Style sheets to gain full control of formatting within web pages.
6. Write and implement JavaScript in HTML documents. Develop the static website.

❖ **COURSE DETAILS:****A. THEORY : Nil****B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:**

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Design Web page with HTML using basic tags - <HTML>, <HEAD>, <TITLE>, <BODY> elements	1.Basic HTML Tags	02
2	Design Web page and apply some block level tags and some text level tags.		04
3	Design Web page using font Color, font face, font size, background color.		02
4	Write a code to create a web page including i) Ordered lists ii) Unordered list iii) Nesting list		02
5	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.HTML Image tags and Hyper linking of text and images	04
6	Write a code to create a web page using Image tags with height and width and also Used for background image.		04
7	Design Web page Include images with different alignments and wrapped text in and also link the image in web page		04
8	Design table in web page using basic tables tags- <table>, <tr>, <td>, <th>.	3.HTML table tags	02
9	Write a code to create a web page using Table tags a)Using rowspan and colspan b)Background Image in a table		04
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.		04
11	Write a code to create a web page using Form tag. Example:- Admission Form	4.HTML Forms	06
12	Apply in-line CSS to change colors of certain text portion, bold, underline and italics certain words in your HTML web page. Also change background color of each paragraph using in-line CSS.	5.HTML and Cascaded Style Sheets	04
13	Write a program to create menu using HTML and CSS.		04
14	Develop a simple JavaScript in HTML.	6 HTML and JavaScript	02
15	Write a program to print date using JavaScript.		02
16	Write a program to Sum and Multiply two numbers using JavaScript.		04

17	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).		04
18	Design a website of minimum 6 pages using HTML,CSS and JavaScript.		06
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)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Activities / Writing program	20
2	Performance / Execution of program	20
3	Viva Voce	10
	TOTAL	50

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

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

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

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

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

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year of Publication	ISBN Number
1	HTML & CSS: The Complete Reference	Thomas Powell, McGraw Hill Publisher, Fifth Edition, 2010	13:9780070701946
2	HTML, CSS, and JavaScript All in One: Teach Yourself	Julie C. Meloni, Jennifer Kyrnin, 3 rd edition, Pearson Publisher, 2018	13: 9780672338083
3	Web Design	G.S. Baluja Tata McGraw Hill, New Delhi	10: 81-87522-178 13: 9788187522171

❖ **E-REFERENCES:**

1. <https://www.w3schools.com/html/> , accessed on 18th January 2021
2. <https://www.codecademy.com/learn/learn-html> , accessed on 18th January 2021
3. <https://www.learn-html.org/en/Links> , accessed on 18th January 2021

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

1. Computer (Dual CORE and above) with Internet connection.
2. Windows 7 or 8 or latest (Professional Edition/Academic edition)
3. Network printer.

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

S.N.	Name	Designation	Institute / Industry
1	Dr. A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Dr.M.V.Sarode	HOD, Computer Engineering	G.P.Nagpur
3	Mr. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
4	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg. and Management, Nagpur.	Member from Academics(External)
5	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
6	Mr.L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
7	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal) , Course Expert
8	Mr. M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
9	Mrs.Isha Sangolkar	Lecturer in Information Tech.	Course Expert
10	Mrs.D.S.Nalinde	Lecturer in CM	Course Expert G.P.Nagpur

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY:	PROGRAMME CORE COURSE
COURSE CODE	: IT205G
COURSE TITLE	: INTERNETWORKING WITH TCP/IP
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 EXAM	: 03 HRs
PR. TEE EXAM	: --
PT. EXAM	: 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. Identify the protocols of TCP/IP Suite used to transport data over the Internet.
2. Identify the services that TCP/IP applications provide
3. Illustrate the types of casting using IP addresses

4. Illustrate the operation of protocols - such as IP, TCP, UDP and application layer protocols.
5. Apply the concept of TCP/IP address structure and its related terminologies
6. Install, maintain and troubleshoot a TCP/IP Network

❖ **COURSE DETAILS:**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Introduction to Network Protocols	1a. Draw neat sketch of TCP/IP protocol suite for the given protocols. 1b. Select network model for the given network requirements and specification. 1c. Compare TCP/IP and OSI model based on given networking features with justification. 1d. Choose type of networking (sub-netting and super-netting) for given network structure.	1.1 TCP/IP protocol suite:-IP, ARP, RARP, ICMP, IGMP, UDP, TCP, SCTP 1.2 IPX/SPX, Apple Talk 1.3 Comparing features of TCP/IP model and OSI Model 1.4 Sub-netting and super-netting	06
2. Introduction to TCP/IP Suite	2a. Describe with neat sketch TCP/IP architecture mapping with the given protocol suite. 2b. Draw header format of Transmission control protocol as per the given field size count. 2c. Select transport layer service for the given application to transmit data with justification. 2d. Draw header format of ICMP protocol to inform given network error. 2e. Compare BOOTP and	2.1 TCP/IP architecture, TCP/IP DoD model 2.2 Different protocols in TCP/IP and their header formats : TCP-connection oriented services 2.3 UDP- Connectionless services 2.4 Internet Control Message Protocol (ICMP) 2.5 Bootstrap Protocol – BOOTP 2.6 DHCP 2.7 IP – ICMP, ARP and RARP	12

	DHCP based on given networking features with justification. 2f. Describe header format of DHCP protocol as per the given field size count. 2g. Choose suitable protocol for address resolution for the given network structure with justification.		
3. TCP/IP Addresses	3a. Identify type of casting of the given IP address. 3b. Compare Multicast IP and multicast streaming based on given networking features with justification. 3c. Select broadcast IP for the given IP address with justification. 3d. Compare Multicasting and Multiple unicasting and other casting methods based on the given networking features with justification. 3e. Identify port numbers and transport layer service for the given protocols with justification.	4.1 Unicast IP 4.2 Multicast IP and multicast streaming 4.3 Broadcast IP 4.4 Multicasting verses Multiple unicasting 4.5 TCP/IP port numbers	06

4. TCP/IP Applications and Utilities	4a. Describe application layer protocol for the given network function. 4b. Select network layer service along with IP for the given network structure with justification. 4c. Compare IPv6 and IPv4 based on different networking features with justification. 4d. Choose IP and ICMP protocol version for the given network structure with justification.	4.1 Application layer protocols : FTP, TFTP, TELNET,SMTP, POP3, IMAP, HTTP, HTTPS 4.2 Working of BOOTP, DHCP, WINS,DNS, NAT, SNMP,NTP 4.3 Next generation IPv6 & ICMPv6 4.4 Comparison of IP46 and ICMPv4 with IPv6 and ICMPv6	08
5. IP Addresses	5a. Describe IP address structure as per the given IP address and its class type. 5b. Compare given IP address classes for the given networking features with justification. 5c. Identify reserved IP address and its range for the given network function with justification. 5d. Identify network and host component for the given IP address with justification. 5e. Select subnet mask for the given IP address and network structure with justification(e.g. If an allocated class B network address is 135.1.0.0 and need to create 4 subnets each with around 200 hosts what is the easiest mask to use to satisfy the criteria?). 5f. Compare classful 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 Introduction to sub-netting , Subnet mask assignment 5.6 Classless addressing 5.7 IPv6 addresses - structure 5.8 Address space	08

	based on different networking measures with justification. 5g. Select IP protocol version based on the network structure and number of network address requirement with justification. 5h. Identify complete address space for the given IP protocol version.		
6. Troubleshooting TCP/IP Related Problems	6a. Identify network troubleshooting tool for the given problem. 6b. Select given troubleshooting tool for the given symptoms with justification. 6c. Describe given troubleshooting tool to fix the given technical issue. 6d. Write the steps to solve following troubleshooting problems: - Local Host cannot access remote access - Routing not functioning properly on new interface - Host connection fail using certain applications	6.1 Commands and Utilities used for troubleshooting 6.2 NSlookup, ping, ipconfig 6.3 DIG (domain information groper) 6.4 Troubleshooting TCP/IP:- - Local host cannot access remote host - Routing not functioning properly on new interface - Host connection fail using certain applications	08
Total			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS: 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)	06(03)	00(03)	08(06)
2	Introduction To TCP/IP Suite	04(00)	00(00)	06(06)	10(06)
3	TCP/IP Addresses	02(00)	03(03)	06(03)	11(06)
4	TCP/IP Applications and Utilities	02(02)	06(03)	03(00)	11(05)
5	IP Addresses	02(02)	03(00)	06(06)	11(08)
6	Troubleshooting TCP/IP Related Problems	00(02)	03(03)	06(00)	09(05)
	Total	12(06)	21(12)	27(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6/9
	4	R	2	5	R	2	6	R	2										
2	1	U	3	1	U	3	3	U	3	1	U	3	1	A	3				3/5
3	3	A	3	3	A	3	4	U	3	2	A	3	2	A	3				3/5
4	4	U	3	4	A	3	5	U	3	3	U	3	3	A	3				3/5
5	5	A	3	5	A	3	6	U	3	4	U	3	6	U	3				3/5
6	2	A	6	6	A	6	5	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assign-ments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign-ments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:Nil**❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	--	--	--	--	--	--	3	--
2	3	3	--	3	--	--	--	3	--
3	3	3	--	3	--	--	--	3	--
4	3	--	--	--	--	--	--	3	--
5	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	TCP/IP Protocol Suite	Behrouz A. Forouzan, 1st Edition, Tata McGraw Hill, 2010	13:978-0-07-070652-1
2	Internetworking with TCP/IP	Douglas Comer, Pearson Education India; 6th edition, 1 January 2015	13: 978-9332550100
3	Networking A beginners guide	Bruce Hallberg, Sixth edition, Tata McGraw Hill, 2008	13:978-93-5143-472-8

❖ **E-REFERENCES:**

1. <https://www.redbooks.ibm.com/redbooks/pdfs/gg243376.pdf> accessed on 17th Jan 2022
2. <https://sourcedaddy.com/networking/tcpip-protocol-suite.html> accessed on 17th Jan 2022
3. <https://datatracker.ietf.org/doc/html/rfc1180> accessed on 17th Jan 2022

❖ **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 Department (I.T.Dept.)	Chairman
2	Mr. DipakDhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert

3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr. L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)), Course Expert
7	Mr. M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mrs. Shifa Mohd.	Lecturer in Information Tech.	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN IT/CM/AIML
COURSE CATEGORY:	PROGRAMME CORE COURSE
COURSE CODE	: IT206G^{\$}
COURSE TITLE	: SOFTWARE ENGINEERING^{\$}
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
PT. EXAM	: 01 HR

❖ **RATIONALE:**

Software engineering is the foundation for professional processes to be followed involving principles, techniques and practices for software development. The course provides a framework for software professionals for building quality assured software products. It enables students to blend the domain specific knowledge with the programming skills to create quality software products also it is to develop methods and procedures for software development that can scale up for large systems and that can be used consistently to produce high-quality software efficiently

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Select suitable software model/process for software development.
2. Prepare software requirement specifications.
3. Develop Software schedule and model with realistic constraints.
4. Use concept of software modeling and data design in software development.
5. Estimate time, size and cost for software product.
6. Identify project management and quality assurance techniques in software development.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Software and Its Development Process	1a. State features of given Software process model. 1b. Describe Software process framework activity. 1c. Apply Selection criterion for software process model. 1d. Apply concepts of Agile Model for given scenario 1e. Select criterion for given software process.	1.1 Software Engineering – Definition of Software, Types of software, Nature of Software, Software engineering, software engineering as layered approach, Software Myth 1.2 General process Model- Software process framework Activity 1.3 Process Model- Waterfall Model, Incremental Model Spiral Model, Prototype Model, RAD Model 1.4 Agile Software Development: Agility, cost of change, Principles, Human Factors 1.5 Selection criterion for software process model, Project Management Concepts :4P's, W5HH principles,	08
2. Requirement Engineering	2a. Describe given term. 2b. Apply suitable software process for given scenario. 2c. Apply Requirement engineering technique for given scenario. 2d. Prepare SRS document for given scenario.	2.1 Software engineering practices, Core Principles , Software crisis, Software Process, 2.2 Software Process- Communication Practice, Planning Practice, Modeling Practice, Construction Practice, Deployment Practice (Statement and the meaning of each principle) 2.3 Requirement Engineering- Requirement gathering and analysis, Types of requirements (Functional Products, organizational, External Requirements) Eliciting requirements 2.4 SRS- Software Requirement Specification, Needs of SRS, Format , Characteristics	08
3. Scheduling and Modeling	3a. Solve given scheduling Problem. 3b. Develop given diagram related with requirement modeling for given scenario. 3c. Develop given diagram related with Flow Oriented Modeling for given scenario. 3d. Describe given term. 3e. Develop given diagram	3.1 Project Scheduling, Task set and Task network, Project Tracking- GANTT chart, Scheduling Techniques- PERT(Project Evaluation review Technique) CPM 3.2 Requirement Modeling Strategies, Data Modeling, Entity Relationship Diagrams (ER Diagram) 3.3 Flow Oriented Modeling – Data Flow Diagrams (DFD), Behavioral Modeling- Use case diagram, State Transition	10

	for given scenario.	Diagram. 3.4 Patterns - Patterns of requirement Modeling, Discovering analysis pattern, Requirement Pattern Example: Actuator-Sensor 3.5 Sequence Diagram, Activity Diagrams	
4. Modeling and Design	4a. Describe given terms. 4b. Identify design modeling concepts for given scenario. 4c. Identify Object Oriented Design Concepts for Given Scenario. 4d. Use given design element to design software for given Problem statement.	4.1 Design Process, Software quality guidelines for design, Software quality attributes, Evolution of software design, Design concepts 4.2 Design Modeling: Fundamental Design concepts (Abstraction, Information hiding, Structure, Modularity, Functional Independence, Architecture) 4.3 Object Oriented Design Concepts- Design Classes and Characteristics of design classes, Design Model, 4.4 Data design elements: Architectural Design Elements, Interface Design Elements, Component-Level Design Elements, Deployment- Level Design Elements	08
5. Project Metrics and Estimation	5a. Describe given terms. 5b. Compare given Metrics. 5c. Identify Metrics for given given scenario. 5d. Apply given Risk concept for given problem statement. 5e. Use given estimation techniques in given situation.	5.1 Metrics –Process Metrics, Project Metric 5.2 Software Measurements- Size oriented Metric, Function oriented Metric, 5.3 Metric for software quality, Metrics for small organizations 5.4 Software Risks-Risk Identification, Risk Projection, Risk Refinement, RMMM (Mitigation Monitoring, Management) 5.5 Estimation – Software scope, software feasibility, Resources, Software projects estimation, Decomposition techniques	08
6. Software Quality Assurance	6a. State given quality dimensions. 6b. Describe given term related with a Software quality Assurance. 6c. Identify need of given term for given scenario 6d. Identify the role of given phases of Software Quality	6.1 Quality Dimensions-Garvin's Quality Dimensions, Quality Factors-McCall's Quality Factors, ISO 9126 QUALITY FACTORS 6.2 Software quality Assurance (SQA)- Elements of SQA, Tasks of SQA, Goals of SQA, Formal Approach, Statistical Software quality assurance 6.3 Six Sigma For software engineering, Software reliability, Software safety,	06

	Assurance in given scenario.	THE ISO 9000 QUALITY STANDARDS 6.4 Phases of Software Quality Assurance- Planning, Phase, Activities Phase, Audit phase, review phase	
		Total Hrs.	48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Select suitable software development model for the given scenario.	1. Software and Its Development process	04
2	Identify functional and non-functional requirements for given scenario.	2. Requirement Engineering	02
3	Prepare 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	Develop USE case diagrams for given scenario.	3. Scheduling and Modeling	04
5	Develop E-R (Entity Relationship) diagram, DFD (Data Flow Diagram) for given system.		04
6	Develop a Sequence diagram for given problem statement.		04
7	Use Data Design Elements to develop design for given scenario. (Give any scenario).	4. Modeling and Design	02
8	Estimate time, size and cost for given software product.	5. Project Metrics and Estimation	04
9	Perform RMMM (Risk Monitoring Mitigation and Management) for given scenario.		02
10	Mini project to perform a case study on Software Quality Assurance techniques performed during different phases of a project for given scenario.	6. Software Quality Assurance	02
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Software and Its Development process	02(02)	03(00)	06(03)	11(05)
2	Requirement Engineering	02(00)	03(03)	06(06)	11(09)
3	Scheduling and Modeling	02(00)	03(03)	09(06)	14(09)
4	Modeling and Design	02(02)	03(03)	03(00)	08(05)
5	Project Metrics and Estimation	02(00)	03(00)	06(06)	11(06)
6	Software Quality Assurance	02(02)	03(00)	00(00)	05(02)
	Total	12(06)	18(09)	30(21)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	4	R	2	6	R	2										
2	1	U	3	2	U	3	3	U	3	1	A	3	2	U	3				3/5
3	6	U	3	1	A	3	1	A	3	2	A	3	2	A	3				3/5
4	4	U	3	3	A	3	3	A	3	3	U	3	3	A	3				3/5
5	5	U	3	3	A	3	4	A	3	3	A	3	4	U	3				3/5
6	2	A	6	5	A	6	5	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assign-ments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign-ments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing needful diagram, selection of suitable development model. writing procedure etc.	10
2	Performance	20
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:
INFORMATION TECHNOLOGY**

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

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

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

❖ **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:**

- https://www.youtube.com/watch?v=Ln_LP7c23WM&list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt as accessed on 28th January 2022
- http://www.tutorialspoint.com/software_engineering/software_engineering_tutorial.pdf, accessed on 28th January 2022
- http://www.resource.mitfiles.com/IT/II%20year/IV%20sem/Software%20Engineering/books/Pressman__Software_Engineering.pdf, accessed on 28th January 2022
- https://www.tutorialspoint.com/software_engineering/software_project_management.html, accessed on 28th January 2022

❖ **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 Department (I.T.Dept.)	Government Polytechnic, Nagpur.
2	Dr.M.V.Sarode	Head of Department (CM DEPT)	Government Polytechnic, Nagpur
3	Mr.L.L.Bhadekar	Lecturer in IT	Government Polytechnic, Nagpur.
4	Mr.M.A.Rahman	Lecturer in CM	Government Polytechnic, Nagpur.
5	Mr. Dipak Dhote, Industry Expert	Operations Manager, IT-Network InfosystemsPvt LTD	IT-Network InfosystemsPvt LTD
6	Dr. Rakesh Kadu, Member from Academics(External)	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Ramdeobaba College of Engg, and Management, Nagpur.
7	Mrs.V.A.Raje, MSBTE Nominee	Lecturer in C.O., G.P.Arvi	G.P.Arvi
8	Mr. L.D.Vilhekar, Member (Internal)	Lecturer in Information Tech.	Government Polytechnic, Nagpur.
9	Mrs.D.P.Chanmanwar, Member (Internal)	Lecturer in Information Tech.	Government Polytechnic, Nagpur.
10	Mr. M.N.Gawande, CDC In Charge and Member Secretary	Lecturer in Electrical Engg.	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY:	ENGINEERING SCIENCE COURSE
COURSE CODE	: EC216G
COURSE TITLE	: DIGITAL TECHNIQUES AND MICROPROCESSOR
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
PT. EXAM	: 01 HR

❖ **RATIONALE:**

It is essential to know fundamentals of digital electronics to understand the concept of digital electronics and microprocessors. Digital electronic and microprocessor benefits to meet challenges of growing applications of advanced microprocessor-based technologies, hence students are expected to be conversant with components of microprocessor and microprocessor-based programming. This course is designed to help the students to design logic circuits and to understand the architecture of 8086 microprocessor. The course also enables students to develop assembly language programs using instruction set of 8086 microprocessors.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to—

1. Identify digital logic circuits, conversion of different number system and logic gates.
2. Construct combinational logical circuit.
3. Construct sequential logical circuit.
4. Design asynchronous counters.
5. Identify different pins of 8086 microprocessor.
6. Develop assembly language programs using 8086.

❖ **COURSE DETAILS:****A. THEORY:**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Number System and Logic Gates.	1a. Define the terms analog and digital system. 1b. Describe various logic levels. 1c. Solve numerical on conversion of number system 1d. Perform binary addition and subtraction. 1e. Define logic gates. 1f. Describe various logic gates. 1g. Draw various logic gates using universal gates. 1h. Solve various Boolean expressions. 1i. State and prove De-Morgans Theorem.	1.1 Comparison of analog and digital system 1.2 Terms: Bit ,Byte, Nibble 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 1.7 Definition and types of logic gates 1.8 Operating principle, truth table, 2.3 Boolean equation and symbol of NOT, OR, AND, NAND, NOR, EX-OR and EX-NOR gates. 1.9 Universal logic gates. Design of other logic gates using universal gates. 1.10 Basic laws of Boolean algebra. 1.11 De-Morgan's theorem.	08
2. Combinational Circuits	2a. Define min term and max term. 2b. Describe K-map method of simplification 2c. Design adder and subtractor using logic gates. 2d. Design binary to gray and gray to binary converter. 2e. State the need of multiplexers and demultiplexers. 2f. Illustrate principle of Multiplexer and demultiplexers. 2g. Operation of Multiplexer and demultiplexers. 2h. Compare multiplexers and demultiplexers.	2.1 Min-term and Max-term, SOP and POS term representation of logical function. 2.2 K-map minimization up to 4 variables. Don't care condition. 2.3 Binary half & full adder and binary half and full subtractor. 2.4 Binary to gray and gray to binary conversion. 2.5 Necessity, Principle, types and difference of Multiplexer and Demultiplexer.	08

3. Sequential Circuits	3a. Compare combinational and sequential systems. 3b. Compare latch and flip flop. 3c. Design of various flip flops. 3d. Describe Race around condition. 3e. List various applications of flip flops.	3.1 Combinational and sequential logic systems. 3.2 Triggering Methods. 3.3 RS latch using NOR gates and NAND gates. 3.4 Clocked RS flip flop, J-K flipflop, D and T Flip Flop. 3.5 Propagation delay time and race-around condition. 3.6 MS J-K flip-flop. 3.7 Applications of flip flops	08
4. Counters & Shift Registers	4a. Compare Asynchronous and Synchronous Counters. 4b. Design of asynchronous counter up to 3 bit. 4c. Define MOD N Counter. 4d. State various shift registers. 4e. List various applications of shift registers.	4.1 Counters– Asynchronous (ripple) and synchronous counters. (Definition) 4.2 Design of asynchronous counter (UP and DOWN) using JK or T flip flop (up to 3 bit) Introduction to: - 4.3 MOD – N Counter, Ring Counter, Johnson Counter, Decade counter. 4.4 Definition and types of shift registers (SISO, SIPO, PISO, PIPO) 4.5 Application of shift register	08
5. Microprocessor: 8086 and Modern Microprocessors	5a. Identify the Pins of 8086 microprocessor. 5b. List features of 8086 5c. List and state different registers of 8086. 5d. Compare Min and Max mode. 5e. State Segmentation and pipelining concept in 8086. 5f. Mention the Pentium family. 5g. Compare RISC and CISC processors.	5.1 Evolution of microprocessor and types, 16-bit microprocessor-8086. 5.2 Features of 8086, pin diagram and architecture of 8086. Flag register and segment registers of 8086. 5.3 8086 Minimum and Maximum Mode of operation. Timing diagram, concept of segmentation and pipelining, physical address generation. 5.4 Overview of Pentium family and processors. 5.5 Introduction to RISC and CISC Processor and its comparison.	08
6. Assembly Language Programming Using 8086	6a. State programming model of 8086. 6b. Identify the addressing modes of different instruction. 6c. Choose relevant instruction to perform the given operation from the instruction set of 8086.	6.1 Programming model of 8086 6.2 Addressing modes of 8086 with examples. 6.3 Group of instruction set data transfer, arithmetic and logical, branch and loop, flag manipulation, shift and rotate and string instructions (only format and examples).	08

	6d. Develop assembly language program to solve the given expression. 6e. Develop the assembly language program to solve the given problem using decision making and looping structure.	6.4 Assembly language programs for (8-bit and 16-bit) addition, subtraction, multiplication, division, decision making and looping.	
Total Hrs.			48

B.LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	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 different logic gates for verification of Boolean expression.		02
4	Assemble the logic circuit using AND/OR/NOT logic gates and NAND gates for verification of De Morgan's Theorem		02
5	Assemble the logic circuit for half adder and full adder using logic gates and verify its truth table.	Combinational Circuits	02
6	Identify different pins of 1: 8 de multiplexer IC, apply input, measure output and relate it with the truth table.		02
7	Identify different pins of S R flip flop IC, apply input, measure output and relate it with the truth table.	Sequential Circuits	02
8	Identify different pins of JK flip flop IC, apply input, measure output and relate it with the truth table.		02
9	Identify different pins of D flip flop IC, apply input, measure output and relate it with the truth table.		02
10	Identify different pins of T flip flop IC, apply input, measure output and relate it with the truth table.		02
11	Assemble 3-bit asynchronous ripple counter using Flip Flop, show its output on LED and relate it with the truth table.	Counters & shift registers	04
12	Assemble decade counter using IC 7490, show its output on LED and relate it with the truth table.		04
13	Write and execute various arithmetic operation Assembly language programs for 8086	Assembly language	02

	microprocessors	programming using 8086	
14	Write and execute various logical operation Assembly language programs for 8086 microprocessors		02
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Number System and Logic Gates	02(02)	06(03)	00(00)	08(05)
2	Combinational Circuits	02(02)	03(03)	03(00)	08(05)
3	Sequential Circuits	02(00)	03(00)	06(06)	11(06)
4	Counters & Shift registers	02(02)	03(03)	06(03)	11(08)
5	Microprocessor:8086 and modern microprocessors	02(00)	03(00)	06(06)	11(06)
6	Assembly language programming using 8086	02(00)	00(03)	09(03)	11(06)
	Total	12(06)	18(12)	30(18)	60(36)

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	
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	4	R	2										
2	1	U	3	2	A	3	3	U	3	1	U	3	2	U	3				3/5
3	4	U	3	5	U	3	1	U	3	4	U	3	6	U	3				3/5
4	2	U	3	6	A	3	2	A	3	4	A	3	5	A	3				3/5
5	5	A	3	6	A	3	6	A	3	5	A	3	5	A	3				3/5
6	3	A	6	4	A	6	3	A	6										2/3

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	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)	25	--	Test Answer sheet	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Sheet	1, 2, 3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous assessment of Practical's	Students	End every Practical	20	--	Practical Answer Sheet	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	25	10	Practical Answer Sheet	1, 2, 3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Drawing circuit diagram, writing Programs truth table, writing procedure etc.	20
2	Performance on bread board/Board/PC	20
3	Viva voce	10
	TOTAL	50

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

Course Outcomes (COs)	Program Outcomes (POs)										PSO	
	1	2	3	4	5	6	7				1	2
1	-	3	2	3	-	-	-				3	3
2	-	2	3	2	-	-	-				3	3
3	-	2	3	3	-	-	-				3	3
4	-	2	3	3	-	-	-				3	3
5	1	3	3		-	-	1				3	3
6	1	2	3	2			1				3	3

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

❖ **REFERENCE & TEXTBOOKS:**

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	Microprocessors and Interfacing	Douglas V Hall Tata McGraw-Hill, Revised Second Edition,	ISBN: 9780070601673
5	The 8088 and 8086 Microprocessors	Trieble, Walter A Sigh, Avtar Pearson Publications, New Delhi 2015	ISBN13: 9780130930811

6	Digital Logic Application and Design	John M Yarbrough Thomson Learning Vikas Publication House	ISBN 9812400621
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❖ **E-REFERENCES:**

1. www.intel.com
2. www.techsource.com/engineering-parts/microprocessor.intel
3. www.cse.yorku.ca/~mack/1011/01.NumberSystems.ppt
4. www.people.sju.edu/~ggrevera/arch/slides/binary-arithmetic.ppt
5. www.mathsisfun.com/binary-number-system.html
6. www.codesandtutorial.com/hardware/electronics/digital_codes-types.php

❖ **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	Dr.R.V.Yenkar	HOD in Electronics and Telecommunication Engg.	Government Polytechnic, Nagpur
2	Dr.V.H.Mankar	HOD in Electronics and Telecommunication Engg.	Government Polytechnic, Nagpur
3	Mr.D.B.Alaspure	Lecturer in Electronics and Telecommunication Engg.	Government Polytechnic, Nagpur
4	Ms.S.S.Pampattiwar	Lecturer in Electronics and Telecommunication Engg.	Government Polytechnic, Nagpur
5	Mr. Sandip V.Darwhekar	Director	Beta computronics Pvt Ltd, Nagpur
6	Mrs Gajala Ali	Head of in Electronics and Telecommunication Engg.	Anjuman Polytechnic, Nagpur
7	Mr.Kapil Pachpor	Lecturer, in Electronics and Telecommunication Engg..	Government Polytechnic, Amravati.

 (Member Secretary PBOS)

 (Chairman PBOS)

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

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY	: PROGRAMME CORE COURSE
COURSE CODE	: IT207G^{\$}
COURSE TITLE	: JAVA PROGRAMMING
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
PT. EXAM	: 01 HR

❖ **RATIONALE:**

With the enormous growth of Information and Communication Technology, there is a need to develop large and complex software. Further, those software should be platform independent, Internet enabled, easy to modify, secure, and robust. To meet this requirement object-oriented paradigm has been developed and based on this paradigm the Java programming language emerges as the best programming environment. 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. Identify the necessity for Object Oriented Programming paradigm over structured programming.
2. Use Java SDK environment to create, debug and run Java programs.
3. Apply concept of defining classes, invoking methods, using class libraries, etc.
4. Develop program in java using Classes, Inheritance, Interfaces and Packages.
5. Develop java programs on Exception handling, multithreaded programming and Files.
6. 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	1a. Find Output of Java Code given below. 1b. Use suitable control statements to solve the given problem. 1c. Implement the programs for Arrays, String Handling and Command line argument for given scenarios. 1d. Develop programs to demonstrate the use of different operator. 1e. Build the expressions using different type conversions to solve the given problem.	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, String Buffer class, Command line argument, Wrapper Classes, Vector Class	06
2. Classes, Objects And Methods In Java	2a. Develop program with class and objects based on any given real world entity. 2b. Demonstrate the use of given access Control with suitable example. 2c. Illustrate the use of reference variable in given problem. 2d. Describe constructor and its types. 2e. Apply static, this and final Keywords in given programming problem. 2f. Describe Garbage collection in java. 2g. Develop java programs with nested and inner classes based on problem statement.	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 Nested and inner classes	08
3. Inheritance, Interfaces and Packages	3a. Develop java program with different forms of inheritance for given problem statement. 3b. Identify suitable form of inheritance for given	3.1 Inheritance: Introduction, Types of Inheritance, Member access and inheritance, Super class variable can reference the subclass object, uses of super keyword, method	08

	problem. 3c. Describe abstract classes and methods. 3d. Develop program to implement specified interface. 3e. Create and import user defined Package for given problem statement. 3f. Develop programs based on Inheritance, Interfaces and Packages to solve given real world problem.	overriding, Using final keyword within heritage, 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	4a. Differentiate between Error and Exception on the basis of given points. 4b. Illustrate Exception Handling concept in given program. 4c. Describe Exception. 4d. Apply try, catch, finally, throw and throws clauses in given programming problem. 4e. Create own exception for given scenario. 4f. Create threads to run the given multiple processes in the given program. 4g. Describe life cycle of Thread. 4h. Apply inter-Thread communication in given program statement.	4.1 Exception Handling : Fundamentals types of exceptions, Uncaught Exceptions Using try and catch, Multiple catch clauses, Nested try Statements throw, throws, finallyJava'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 is Alive() and join()Inter-thread Communication	08
5. Applet Programming & Useful Classes	5a. Differentiate between Applet and Application on the basis of given points. 5b. Describe Applet life cycle. 5c. Create simple Applet for specified problem statement. 5d. Apply various methods of Graphics Class for given shape. 5e. Describe the steps to implement AWT Event Handler. 5f. Develop program to demonstrate use of primitive	5.1 Applet fundamentals-How Applets differ from Applications, Writing and Building Applet Code 5.2 Applet Life Cycle,Creating simple applets,Applet and AWT package,Moving banner applet using thread,Parameterized applet Graphics class and use of various shapes and colors, Mouse clicks, movements, keyboard events 5.3 The AWT event handler	10

	Data types with the specified stream. 5g. Demonstrate object serialization. 5h. Develop java code with I/O stream classes to solve the given problem. 5i. Implement programs for reading and writing bytes to and from the given files.	5.4 Introduction to Swing package 5.5 Introduction: Concept of Stream & stream classes. 5.6 Use of File class: reading/writing characters/bytes in a file, reading and writing primitive data type, concatenating and buffering files, Other Stream Classes 5.7 Concatenating and buffering files 5.8 Input/ Output Exceptions 5.9 Object serialization	
6. Interacting With Database & Java Server Technologies -Servlet	6a. Differentiate between JDBC and ODBC on the basis of given points. 6b. Describe JDBC Architecture. 6c. Elaborate steps to establish connectivity with Database in relation to problem statement. 6d. Use relevant type of JDBC Driver for given environment. 6e. Describe function of given method of Servlet life cycle. 6f. Use Relevant HTTP Servlet to develop web application. 6g. Develop servlet for Cookies & Session Tracking in programming problem statement.	6.1 Introduction to JDB ,ODBC 6.2 JDBC Architecture-Two / Three Tier 6.3 Using the Driver- Importing JDBC Loading the Driver, Connecting to the Database, Closing the Connection 6.4 JDBC Driver ,Driver Interfaces & Driver Manager class: Connection Interface n statement interface ,prepared statement Interface, Result Set Interface 6.5 Web Application Basics 6.6 Introduction to ServletServlet life cycle 6.7 Developing and Deploying Servlets 6.8 Handling HTTP Request and Response-GET,POST 6.9 Cookies & Session Tracking.	08
		Total Hrs.	48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Build Java Programming Development Environment by using a) Command Prompt(Class path & path setup) b) Any IDE Tool and test JDE Set up by using simple program	1.Java Basics	02

2	Develop a program to demonstrate the use of Looping, Decision Making and branching and its different forms.		02
3	Develop a program to demonstrate the use of a) String, String Buffer b) Wrapper class and Vectors.		02
4	Develop a program to demonstrate the use of a) Classes with objects b) Method overloading c) Constructor overloading d) Nested and inner classes	2. Classes, Objects And Methods In Java	04
5	Develop a program to demonstrate the use of a) Inheritance and its Types b) Interfaces c) Package	3. Inheritance, Interfaces and Packages	04
6	Develop a program to demonstrate the use of Exception handling. a) User defined Exception b) Threads by implementing Runnable interface c) Threads by extending Thread class	4.Exception Handling, Multithreaded Programming	04
7	Develop a program to demonstrate the use of a) Applets-Display Output with applet viewer & browser b) Graphics to draw, fill, different shapes c) Mouse events and keyboard events	5.Applet Programming & Useful Classes	04
8	Develop a program to demonstrate the use of a) Read &write characters from a file using input/output stream b) I/O stream and file stream classes c) Object Serialization		04
9	Develop a program to demonstrate the Successful Connection to database.	6.Interacting with Database & Java Server Technologies - Servlet	02
10	Develop a program to demonstrate a) Servlet (Procedure client side)-to display username and password accepted from the client b) Servlet (Procedure Server side)-to display username and password accepted from the client		04
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Java Basics	02(00)	03(03)	00(00)	05(03)
2	Classes, Objects and Methods In Java	02(02)	03(03)	03(00)	08(05)
3	Inheritance, Interfaces and Packages	02(02)	03(00)	03(03)	08(05)
4	Exception Handling, Multithreaded Programming	02(00)	03(03)	06(03)	11(06)
5	Applet Programming & Useful Classes	02(00)	03(03)	09(06)	14(09)
6	Interacting with Database & Java Server Technologies -Servlet	02(02)	03(00)	09(06)	14(08)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M-Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	2	R	2	3	R	2	6	R	2										
2	1	U	3	2	U	3	3	U	3	4	U	3	5	U	3				3/5
3	4	U	3	5	U	3	6	U	3	1	U	3	2	U	3				3/5
4	2	A	3	3	A	3	4	A	3	3	A	3	4	A	3				3/5
5	4	A	3	5	A	3	6	A	3	5	A	3	5	A	3				3/5
6	5	A	6	6	A	6	6	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Logic Building and Coding	10
2	Testing & Debugging of Program	20
3	Evaluation and Results , Implementation of algorithm	10
4	Viva Voce	10
	TOTAL	50

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	--	--	3	--	--	--	--	3
2	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	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, Fourth Edition, reprint 2011	13:9780070141698
3	Core Java: An Integrated Approach, New: Includes All Versions upto Java 8	Dr.NageshwaraRao, Imprint Wiley Publication, Dreamtech Press, 2016	13:9789351199250
4	Advance JAVA	Devraj Publications (1 January 2018)	ISBN-13 978-8193355183

❖ **E-REFERENCES:**

- <https://www.learnjavaonline.org/> accessed on 20/01/2022
- <https://www.w3schools.com/java/> accessed on 20/01/2022
- <https://www.javatpoint.com/java-tutorial> accessed on 20/01/2022
- <https://docs.oracle.com/javase/tutorial/> accessed on 20/01/2022
- <https://beginnersbook.com/> accessed on 20/01/2022

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

1. Computer with JDK 1.5 and above
2. Any IDE-Eclipse, Net Beans
3. Apache Tomcat web server 7 and above

❖ **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. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg. and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr. M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
6	Mrs.D.P.Chanmanwar	Lecturer in IT	Member (Internal)
7	Mr.L D Vilhekar	Lecturer in IT	Member (Internal), Course Reviewer
8	Mr. S J Pukale	Lecturer in IT	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)

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

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN AE/ME/PK/EC/MC/CM/IT/AI/MT/TX/EE
COURSE CATEGORY:	HUMANITIES AND SOCIAL SCIENCE COURSE
COURSE CODE	: AE213G
COURSE TITLE	: INDUSTRIAL MANAGEMENT **
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. TEEEXAM	: 01 Hr.(Online Examination)
PR. TEEEXAM	: --
PT. EXAM	: 30 Minutes (MCQ)

❖ **RATIONALE:**

Diploma graduate works at middle management level in the industries / engineering organizations. Therefore he has to be proficient in planning, organizing & coordinating various activities of industries s/ organizations or when he is required to work in different types of projects.

They are also expected to deal with workforce and management problems. In the present era of competition, optimum utilization of the resources with achieving higher productivity is essential for any industry to survive. Quality and cost controls are also other important factors which contribute to the day to day supervision issues. This course aims to deal effectively with such issues along with familiarization of acts and laws applied to industries.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to

1. Use basic management principles to explore financial resources and management.
2. Use basic management principles to execute daily activities.
3. Use principles of planning and organizing for accomplishment of task .
4. Use principles of directing and controlling for implementing the plans.
5. Apply principles of safety management in all activities.
6. Apply various provisions of Industrial Acts.

❖ **COURSE DETAILS:****A. THEORY :**

Unit	Specific Learning Outcome(SLO) (Cognitive domain)	Topics and Sub-Topics	Hrs
1. Financial Management	1a. Describe given types of Ownership. 1b. Select suitable forms of ownership for given situations. 1c. Select suitable finance mode for a given venture. 1d. Compare share and debentures on given factors.	1.1 Forms of ownership Proprietorship, Partnership, Joint Stock. 1.2 Co-operative sector public sector, Govt. Undertaking Advantages Limitations & Application of each type comparison between different forms 1.3 Need of finance & sources of finance 1.4 Shares, debentures, types of shares, & comparison between shares & debentures, Break even analysis.	10
2. Introduction to Management Concepts and Managerial Skills	2a. Differentiate the concept and principles of management for the given situation. 2b. Describe functions of management for given situation. 2c. Compare the features of the given types of planning 2d. Suggest the steps in organizing in the given situation. 2e. Suggest suitable type of organization for the given example. 2f. Identify the functional areas of management for the given situation. 2g. Suggest suitable managerial skills for given situation with justification .	2.1 Definitions of management, role and importance of management. 2.2 Management characteristics and principles, levels of management and their functions; management, administration and organization, relation between management and administration. 2.3 Functions of management; planning, organizing, leading/directing, staffing and controlling. 2.4 Types of planning and steps in planning 2.5 Types of organization, Steps in organizing 2.6 Functional areas of management. 2.7 Managerial skill : Planning, decision making, problem solving and delegation	10
3. Planning & Organising	3a. Differentiate the nature of planning and planning activities for the given situation. 3b. Suggest the step wise procedure to complete the given activity in the shop floor. 3c. Select suitable forms for given activities. 3d. Prepare materials and	Planning at supervisory level 3.1 Planning by supervisor. 3.2 Planning activities, detailing and following of each step. 3.3 Prescribing standard forms for various activities. 3.4 Budgeting for materials and manpower Organizing at supervisory level 3.5 Organizing the physical resources.	08

	manpower budget for the given production activity. 3e. Describe with block diagrams the organization of the physical resources required for the given situation. 3f. Describe the human needs to satisfy the job needs for the given situation. 3g. Explain various tasks to be done by the concerned individuals for completing the given activity .	3.6 Matching human need with job needs 3.7 Allotment of tasks to individuals and establishing relationship among persons working in a group	
4. Directing and Controlling	4a. Justify the chosen need of directions and instructions to the subordinates to complete the given task. 4b. Select the feasible of instructions. to complete the given simple task, with justification 4c. Predict the possible mistakes for completing the given simple activity. 4d. Describe the managerial control actions and remedial measures required to be taken for completing the given task successfully with justification. 4e. Describe suitable control methods for given factor.	Directing at supervisory level 4.1 Needs for directions and instructions to subordinates; Completeness and feasibilities of instructions. 4.2 Personal counseling advanced predictions of possible mistakes. 4.3 Elaborating decisions, laying disciplinary standards in overall working. Controlling at supervisory level 4.4 Managerial control; understanding team and link between various departments in respect of process and quality standards; Steps in control process. 4.5 Controlling methods; Control over the performance in respect of quality, quantity of production, time and cost. Measuring performance, comparing with standards, correcting unfavorable deviations.	06
5. Safety Management	5a. Describe the general safety norms required to be taken in the given case. 5b. Suggest preventive measures of plant activities in the given situation. 5c. Describe the safe procedural steps required to be taken to prevent the given the type of accident. 5d. Prepare a work permit in to conduct the given maintenance activity.	5.1 Need for safety management measures 5.2 General safety norms for an industrial unit; Preventive measures. 5.3 Definition of accident, types of industrial accident, Causes of accidents 5.4 Fire hazards; Fire drill: Procedure and frequency 5.5 Safety procedure: Hazard occupational movement related to process, equipment	08

	5e. Describe the causes of the specified type of accident in the given situation. 5f. Prepare the specification of the firefighting equipment required for the given type of fire.	5.6 Work permits: Source countries migrants eligibility, age, maximum period of employment	
6. Legislative Acts	6a. Describe the purpose of the act . 6b. Describe the main provisions of the given acts and important definition.	6.1 Necessity of acts, Important definition and Main provisions of acts. 6.2 Industrial Acts : a. Indian Factory Act b. Industrial Dispute Act c. Workman Compensation Act d. Minimum Wages Act	06
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	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	Financial Management	02(00)	06(00)	04(02)	12(02)
2	Introduction to Management Concepts and Managerial Skills	02(00)	04(00)	04(02)	10(02)
3	Planning & Organising	02(00)	02(02)	06(00)	10(02)
4	Directing and Controlling	02(00)	04(02)	04(00)	10(02)
5	Safety Management	02(00)	04(00)	04(00)	10(00)
6	Legislative Acts	02(00)	02(02)	04(00)	08(02)
	Total	12(00)	22(06)	26(04)	60(10)

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			Options
Q 01 To Q 35	1	R	2	1	U	2	1	U	2	1	U	2	1	A	2	30/35
	1	A	2	1	A	2	2	R	2	2	U	2	2	U	2	
	2	A	2	2	A	2	2	A	2	3	R	2	3	U	2	
	3	U	2	3	A	2	3	A	2	3	A	2	4	R	2	
	4	U	2	4	U	2	4	U	2	4	A	2	4	A	2	
	5	R	2	5	U	2	5	U	2	5	A	2	5	A	2	
	6	R	2	6	U	2	6	U	2	6	A	2	6	A	2	

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Cours e Outco mes
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3, 4, 5, 6
		Class Room Assignments		Assignments	15	--	Assignment book	1, 2, 3, 4, 5, 6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1, 2, 3, 4, 5, 6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous assessment of practical	Students	End of every practical	--	--	Journal	1, 2, 3, 4, 5, 6
		Journal Writing		Assignment	--	--	Journal	1, 2, 3, 4, 5, 6
				Total	--	--		
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	Practical Answer Scripts	1, 2, 3, 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			

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

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

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

❖ **REFERENCE & TEXTBOOKS:**

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, 2014	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. Khanna, S. Chand & Co. Ltd, Delhi, 1 st , 1999, reprint 2006	81-219-1801-4

❖ **E-REFERENCES:**

- <http://www.free-management-ebooks.com/index.htm>, accessed on 18th Feb 2022
- https://www.youtube.com/watch?v=3VReVbsmjKI&ab_channel=NPTEL-NOCIITM accessed on 18th Feb 2022
- [https://www.youtube.com/watch?v=2Ie9uH9ySpo&ab_channel=Management study Guide](https://www.youtube.com/watch?v=2Ie9uH9ySpo&ab_channel=Management%20study%20Guide) accessed on 18th Feb 2022
- [youtube.com/watch?v=9QM-3LMeBQA](https://www.youtube.com/watch?v=9QM-3LMeBQA) accessed on 18th Feb 2022

❖ **LIST OF MAJOR EQUIPMENTS WITH SPECIFICATION:**

Nil

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

S.N.	Name	Designation	Institute/Industry
1	Dr.G.K.Awari	Head of the Department, Automobile Engineering Deptt.	Government Polytechnic, Nagpur.
2	Dr.R.G.Choudhary	Head of the Department, Mechanical Engineering Deptt.	Government Polytechnic, Nagpur.
3	Dr.K.S.Dixit	Sr.Lecturer in Automobile Engineering Deptt.	Government Polytechnic, Nagpur.
4	Dr.S.A.Telang	Sr.Lecturer in Automobile Engineering Deptt.	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

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

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY	: PROGRAM ELECTIVE COURSE
COURSE CODE	: IT208G^{\$}
COURSE TITLE	: DATA WAREHOUSE AND DATA MINING
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
PT. EXAM	: 01 HR

❖ **RATIONALE:**

The course introduces the elements of the data warehouse development and Mining methodology (design, acquisition, management, analysis, query, mining, and visualization), focusing on serving the informational and analytical needs of an enterprise. The objective of this course is to illustrate Machine Learning methods, algorithms and techniques in data mining and warehousing and their applications. Learning these course students will be able to use Data Mining techniques for data analysis to maintain data warehouse.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Design a data warehouse solution that serves informational and analytical needs of an enterprise.
2. Establish Scope and Necessity of Data Mining for various enterprise applications.
3. Build data warehouse to populate with data, and extract useful information.
4. Use the data warehouse solution to perform simple data mining tasks.
5. Apply one or more basic data mining techniques to identify frequent patterns, associations, and correlations in the data.
6. Implement well-known data mining techniques for obtaining interesting knowledge from data.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Introduction to Data Warehouse and Data Mining	1a. Identify Need of Given Data Warehouse. 1b. Analyse the benefits of designing data warehouse solution for given enterprise. 1c. Describe the various functionalities of Data warehouse. 1d. Differences between operational database and data warehouse in relation to given points. 1e. Evaluate the Issues in Data Warehouse designed for given scenario. 1f. Describe benefits of designing Data Warehouse for given application.	1.1 Concepts of Data warehouse and Data mining, Social impacts of data, Data Mining from a Database Perspective 1.2 The Need for Data Warehousing Increasing Demand for Strategic Information ,Inability of Past Decision Support System 1.3 List Features of a Data Warehouse and Data Mining. 1.4 Functionalities of Data warehouse 1.5 Differences between operational database and data warehouse 1.6 Issues in Data Warehouse and Data Mining 1.7 Application of Data Warehouse and Data Mining.	06
2. Data Warehouse and OLAP Technology-I	2a. Differentiate between DBMS vs. Data Warehouse on the basis of given points. 2b. Identify types Data Mart in given application. 2c. Design Multidimensional data model for given problem statement. 2d. Describe Data Cube for given application. 2e. Describe metadata repository for given application. 2f. Design Data Warehouse Architecture for given enterprise. 2g. Make use of Distributed and Virtual Data Warehouse for given application.	2.1 Data Warehouse and DBMS 2.2 Data marts, types ,Steps in Implementing a Datamart 2.3 Multidimensional data model 2.4 Data Cube and its significance 2.5 Types of data, Role of Metadata Classification of Metadata 2.6 Data Warehouse Architecture Schemas for Multidimensional Database: Stars, Snowflakes and Fact Constellations. Fact Tables and Dimension Tables 2.7 Dimensional Model Vs. ER Model 2.8 Distributed and Virtual Data Warehouse 2.9 Need for Online Analytical Processing OLTP V/s OLAP ,OLAP and Multidimensional Analysis, OLAP Operations in Multidimensional Data Model 2.10 OLAP Multidimensional OLAP	10

	2h. Compare OLTP, OLAP on the basis of given criteria.	Hybrid OLAP	
3. Data Warehouse and OLAP Technology-II	3a. Illustrate Design process for given Data Warehouse Design. 3b. Describe given OLAP Operation. 3c. Analyze the benefits of using OLAP tool for given scenario. 3d. Design Data Cube for given application. 3e. Use Bitmap and Join Index for OLAP in given problem statement.	3.1 Data Warehouse Design & usage, Design Approaches-Inmon's approach & Kimball's approach, Data Warehouse Implementation, Need of metadata in data warehouse, Concept Hierarchy 3.2 From Online Analytical Processing to Multidimensional Data Mining, 3.3 Data Warehouse Implementation - Efficient Data Cube Computation: An Overview. 3.4 Indexing OLAP Data: Bitmap Index and Join Index, Efficient Processing of OLAP Queries.	08
4. Data Mining	4a. Identify Need of Data mining in given application areas. 4b. Distinguish between KDD versus Data mining on the basis of given criteria. 4c. Analyze major issues in data mining solution designed for given business. 4d. Illustrate methods of Data preprocessing for given data. 4e. Demonstrate Data mining knowledge representation in selected scenario. 4f. Describe the Data mining Techniques for given application area. 4g. Analyze the need of Data cleaning for given dataset.	4.1 Data Mining definition and Task 4.2 KDD versus Data Mining, KDD Steps 4.3 What Kind of data can be mined, issues in data mining 4.4 Data Objects and Attributes types 4.5 Data Preprocessing need and methods Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies 4.6 Task relevant data, Interestingness measures, Visualization techniques 4.7 Describe the Data mining Techniques, tools 4.8 Noisy Data, Missing Values, Data Cleaning as process.	08
5. Mining Frequent Patterns and Classification	5a. Describe Association Rule mining for given application domain. 5b. State why Association Mining is necessary in given application domain.	5.1 Association Rule Mining-Basics Frequent Item set, Market Basket Analysis. 5.2 Need of Association Rule Mining Algorithm examples, characteristics 5.3 Pros and Cons of Association Rules	08

	5c. Formulate the Association Rule obtained from given sample data set. 5d. Apply Apriori Algorithm on given suitable dataset. 5e. Compare classification & prediction on the basis of given points. 5f. Apply Classification algorithms- Decision Tree on suitable dataset given. 5g. Analyze Issues in Classification and Prediction for given dataset.	5.4 Apriori Algorithm-Finding frequent item set using candidate generation. 5.5 Classification & Prediction 5.6 Decision Tree Algorithm-ID3 , Attribute Selection Measures Entropy(H) and Information gain(IG), Construction of Decision Tree 5.7 Issues in Classification and Prediction	
6. Clustering And Trends Data Mining	6a. Apply K-Means Clustering analysis on a given dataset. 6b. Identify different clustering Methods to perform clustering on given dataset. 6c. Illustrate k-mean Clustering method on given dataset. 6d. Differentiate between different methods of clustering on the basis of given points. 6e. Identify what are the current Trends of Data Mining in given application domains.	6.1 Cluster, Clustering, Cluster Analysis 6.2 Categorization of Major Clustering Methods 6.3 K-Means Clustering Algorithm 6.4 Methods of clustering -Based Method , Hierarchical Method, Constraint-Based Method, Grid-Based Method, Partitioning Method Density-Based Method 6.5 Web Mining, Visual Data Mining , Biological data mining, Distributed data mining.	08
		Total Hrs.	48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Design simple data warehouse using SQL Server.	2.Datawarehouse and OLAP Technology-I	04
2	Execute OLAP operations such as Roll Up, Drill Down, Slice, and Dice through SQL- Server.		04
3	Apply 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.	4. Data Mining	04
4	Implement Data Cleaning (Data Transformation-Transforming data from one format to. another format) on sample data set in WEKA.		04
5	Apply various types of pre-processing on dataset Customer.arff and draw various graph using WEKA.		02
6	Apply Pre-processing, Classification and Visualization techniques on Agriculture dataset.	5.Mining Frequent Patterns and Classification	04
7	Apply Association rule based on (Apriori algorithm) on Dataset using WEKA.(Select suitable dataset)		04
8	Apply Association technique on Agriculture dataset		02
9	Apply Clustering technique on Customer dataset (Use K-means)	6. Clustering And Applications And Trends In Data Mining	04
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Introduction to data warehouse & Data mining	02(00)	03(03)	00(00)	05(03)
2	Data warehouse and OLAP Technology-I	02(02)	03(03)	03(00)	08(05)
3	Data warehouse and OLAP Technology-II	02(00)	03(03)	06(03)	11(06)
4	Data Mining	02(00)	03(03)	06(03)	11(06)
5	Mining Frequent Patterns & Classification	02(02)	03(00)	09(06)	14(08)
6	Clustering And Trends In Data Mining	02(02)	03(00)	06(06)	11(08)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	2	R	2	5	R	2	6	R	2										
2	1	U	3	2	U	3	3	U	3	1	U	3	2	U	3				3/5
3	4	U	3	5	U	3	6	U	3	3	U	3	4	U	3				3/5
4	2	A	3	3	A	3	4	A	3	3	A	3	5	A	3				3/5
5	3	A	3	4	A	3	5	A	3	5	A	3	4	A	3				3/5
6	5	A	6	6	A	6	6	A	6										2/3

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Identification of problem statement	10
2	Selection of Tool –SQL Server, WEKA	20
3	Evaluation and Results ,Implementation of algorithm	10
4	Viva Voce	10
	TOTAL	50

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	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	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 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, accessed on 20/01/2022
- <https://www.oracle.com/in/database/what-is-a-data-warehouse/> accessed on 20/01/2022
- <https://towardsdatascience.com/data-warehouse-68ec63eecf78> accessed on 20/01/2022
- <https://www.ibm.com/cloud/learn/data-warehouse> accessed on 20/01/2022
- <https://sites.pitt.edu/~hirtle/DataMineRefs.html> accessed on 20/01/2022

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

1. SQL Server version 2012 and above
2. Data Mining Tool: Weka3.8

❖ **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. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
6	Mrs.D.P.Chanmanwar	Lecturer in IT	Member (Internal)
7	Mr.L.D.Vilhekar	Lecturer in IT	Member (Internal), Course Reviewer
8	Mr.S.J.Pukale	Lecturer in IT	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY	: PROGRAMME ELECTIVE COURSE
COURSE CODE	: IT209G ^{\$}
COURSE TITLE	: AI AND ITS APPLICATIONS ^{\$}
TEACHING SCHEME	: TH: 03; TU: 00; PR: 02 (CLOCK HRS.)
TOTAL CREDITS	: 04 (1TH/TUCREDIT=1CLOCK HR. 1 PR CREDIT=2 CLOCK HR.)
TH. TEE EXAM	: 03 HRS
PR. TEE EXAM	: 02 HRS
PT. EXAM	: 01 HR

❖ RATIONALE:

This course will introduce and define the meaning of Intelligence and explore various paradigms for knowledge encoding in computer systems. The objective of the course is to present an overview of artificial intelligence (AI) principles and approaches. Develop a basic understanding of the building blocks of AI as presented in terms problem, problem space: Search, Knowledge representation, inference, logic, and learning.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify the need of AI and its applications in real life.
2. Solve search algorithms which play vital role in problem solving.
3. Develop a program using knowledge of reasoning and knowledge representation for solving real world problems.
4. Analyze knowledge representation in various facts and logic for game playing.
5. Identify various types of learning of AI.
6. Analyze the expert system tools and applications.

❖ **COURSE DETAILS:****A. THEORY:**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs.
1. Introduction	1a. Classify artificial intelligence on basis of given point. 1b. Compare AI model on basis of given level. 1c. Describe components of given types of production system on basis of given point.	1.1 Definitions – Artificial Intelligence History of AI, Evolution of AI - Applications of AI , Classification of AI systems with respect to environment 1.2 AI Technique, Level of the Model, Problem Spaces, and Search: Defining the Problem as a State Space Search 1.3 Production Systems, Problem Characteristics, Production System, Characteristics, Issues in the Design of Search Programs.	08
2. Problem Solving	2a. Describe given search techniques on basis of given point. 2b. Solve constraint propagation problem for given problem. 2c. Select most straightforward approach for planning given algorithm. 2d. Choose a suitable function for solving given problem. 2e. Classify given search algorithm on basis of given point.	2.1 Heuristic Search Techniques: Generate-and-Test, Hill Climbing, Best-first Search, Problem Reduction, 2.2 Constraint Satisfaction, Means-ends Analysis, 2.3 Knowledge Representation: Representations and Mappings 2.4 Approaches to Knowledge, Representation, Using Predicate Logic: Representing Simple Facts in Logic 2.5 Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.	10
3. Knowledge Representation Using Rules	3a. Describe issues and approaches related to given knowledge representation. 3b. Select appropriate knowledge representation technique to represent given fact. 3c. Compare weak and	3.1 Representing Knowledge using Rules: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning, Matching, Control Knowledge. 3.2 Symbolic Reasoning Under Uncertainty: Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting	08

	strong structures on basis of given point.	a Problem-solver, Depth-first Search, Breadthfirst Search. 3.3 Weak and Strong Slot-and-Filler Structures: Semantic Nets, Frames, Conceptual Dependency Scripts, CYC.	
4. Game Playing and Planning	4a. Apply procedures on given function using given search. 4b. Classify components of given planning on basis of given point. 4c. Develop a program / game on basis of given logic.	4.1 Game Playing: The Minimax Search Procedure, Adding Alpha-beta Cutoffs, Iterative Deepening. 4.2 Planning: The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning	08
5. Learning	5a. Describes the different forms of given learning. 5b. Classify given types of learning on basis of given point.	5.1 Learning: Rote Learning, learning by Taking Advice, Learning in Problem-solving 5.2 Learning from Examples: Induction, Explanation-based Learning, Discovery, Analogy, Formal Learning Theory 5.3 Neural Net Learning and Genetic Learning	06
6. Expert Systems and NLP	6a. Describe given concepts related to expert system. 6b. Apply given tool and language on basis of given point. 6c. Write application on given topic on basis of given point for text processing. 6d. Design given topic based on given point for Robotics.	6.1 Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition. 6.2 NLP (natural language processing): Introduction, syntactic processing, semantic Analysis, Discourse and pragmatic processing. Learning: Rote Learning, learning by Taking Advice, Learning in Problem-solving 6.3 Robotics: components, applications, Difference in Robot System and AI Programs, future of AI.	08
		Total Hrs.	48

❖ LIST OF PRACTICALS / LABORATORY EXPERIENCES / ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Identify different AI framework and its application.	1.Introduction	02
2	Develop a Program for Hill climbing problem.	2.Problemsolving	02
3	Develop a program to Implement Heuristic (Steepest Ascent)Search for Tic-Tac-Toe game problem.		02
4	Develop a program to derive the predicate.(e.g. Shreya is singer, singer is Artist)->Shreya is Artist.		02
5	Develop a program to perform breadth- first search of a given problem.		02
6	Write a family tree program to include following rules 1. M is the mother of P if she is a parent of P and is female 2. F is the father of P if he is a parent of P and is male 3. X is a sibling of Y if they both have the same parent. 4. Then add rules for grandparents, uncle-aunt, sister and brother.	3.Knowledge Representation Using Rules	04
7	Execute programs for computation of recursive functions like factorial Fibonacci numbers, etc.		02
8	Design an application to simulate number puzzle problem		04
9	Solve traveling salesman problem using artificial intelligence technique		02
10	Write a program to derive the predicate. (for e.g.:Sachin is batsman, batsman is cricketer) -> Sachin is Cricketer	4. Game playing and planning	02
11	Write a program based on Minimax Search.		02
12	Identify various types of AI learning.	5.Learning	02
13	Write a program which behaves a small expert for medical Diagnosis	6.Expert Systems and NLP	04
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Introduction	02(02)	06(00)	00(03)	08(05)
2	Problem solving	02(00)	03(03)	06(06)	11(09)
3	Knowledge Representation Using Rules	02(02)	03(03)	03(00)	08(05)
4	Game playing And planning	02(00)	03(03)	06(03)	11(06)
5	Learning	02(00)	00(03)	09(03)	11(06)
6	Expert Systems and NLP	02(02)	03(03)	06(00)	11(05)
	Total	12(06)	18(12)	30(18)	60(36)

R– Remember

U– Understand

A–Analyze/Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T-Unit/Topic Number

L-Level of Question

M-Marks

R-Remember

U-Understand

A-Analyze/Apply

1 R 2 means Unit/ Topic Number No-1, Level of Question–Remember, Marks–2 Marks

Q. No	Bit1			Bit2			Bit3			Bit4			Bit5			Bit6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	3	R	2	6	R	2										
2	2	U	3	3	U	3	4	U	3	2	U	3	6	U	3				3/5
3	1	U	3	1	U	3	6	U	3	3	U	3	4	U	3				3/5
4	2	A	3	2	A	3	6	A	3	2	A	3	2	A	3				3/5
5	6	A	3	3	A	3	5	A	3	5	U	3	1	A	3				3/5
6	4	A	6	5	A	6	2	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Who m	Frequency	Max Mark s	Min Mark s	Evidence Collected	Course Outcome s
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignment s		Assign- ments	15	--	Assignmen t Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5, 6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign- ments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5, 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			

❖ SCHEME OF PRACTICAL EVALUATION:

S.N.	Description	Max. Marks
1	Activities	10
2	Performance	20
3	Output of program	10
4	VivaVoce	10
	TOTAL	50

❖ MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	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 & TEXTBOOKS:

S.N.	Title	Author, Publisher, Edition and Year of Publication	ISBN Number
1	Artificial Intelligence A Modern Approach	S.Russell and P.Norvig., Pearson Education, 4 th edition, 2020	13:978-0-13-604259-4
2	First course in AI	Deepak Khemani, McGraw Hill, 2013	13:978-93-832-8678-2 10:93-832-8678-4
3	Artificial Intelligence	E. Rich and K. Knight and Shivashankar B. Nair., 3 rd edition, Tata McGraw Hill, 2008	13:978-007-008-770-5

4	Introduction to Artificial Intelligence & Expert Systems	Dan W Patterson, PHI., 1990 Learning, 1st ed. 2011	13:9789332551947
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❖ **E-REFERENCES:**

- <https://www.javatpoint.com/types-of-ai-agents>, accessed on 25 Jan 2022
- http://www.dkriesel.com/en/science/neural_networks, accessed on 25 Jan 2022
- https://www.youtube.com/results?search_query=artificial+intelligence, accessed on 25 Jan 2022
- <https://www.youtube.com/watch?v=s-s9ilkMVj8>, accessed on 25 Jan 2022
- <https://www.javatpoint.com/subsets-of-ai>, accessed on 25 Jan 2022
- <https://www.youtube.com/watch?v=s-s9ilkMVj8>, accessed on 25 Jan 2022

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

1. Computer system with latest configuration.
2. Software: open source framework, AI tools (Scikit Learn, Tensor Flow, Auto ML, H2O, google ML kit)

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

S.N.	Name	Designation	Institute/Industry
1	Dr.A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman,(Course Expert)
2	Dr.Paresh R.Kamble	Machine learning specialist, OZ sports, Nagpur. HQ-Reykjavik, Iceland	Industry Expert
3	Dr.Gopal Sakarkar	Assistant Professor, Dept of AI., G H Raisoni college of engineering, Nagpur.	Member from Academics(External)
4	Mr.Swapnil Kale	Lecturer in IT, Govt Polytechnic, Murtijapur	Member from Academics(External)
5	Mr.Pravin Malave	Lecturer in CO, G.P.Arvi	MSBTE Nominee
6	Mr.L.D.Vilhekar	Lecturer in Information Tech.	Member(Internal)
7	Mrs.Shifa A.Mohd	Lecturer in Information Tech.	Member(Internal)
8	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
9	Mrs.Isha Sangolkar	Lecturer in Information Tech.	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY/AIML
COURSE CATEGORY:	PROGRAMME ELECTIVE COURSE
COURSE CODE	: IT210G^s
COURSE TITLE	: WEB PROGRAMMING WITH PYTHON^s
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
PT. EXAM	: 01 HR

❖ RATIONALE:

Web Programming with Python course is designed for students to enrich the knowledge of different Web based Python Frameworks. This course covered Python fundamentals including OOPS concepts. The course has been designed in such a way that a student can handle both the Frontend and Back-end development processes. This course takes you through a hands-on guide to object-oriented python web programming, get a detailed primer on database programming with Python, installing an SQLite server and performing routine data selections and operations. Django, a modern web framework that allows you to create and manage complex database-driven websites.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Use the basic entities of python in programming.
2. Use python data structures, function, modules, and packages in programming.
3. Apply the file handling; object oriented concepts, database connection, exception handling, and internet services to develop python programs.
4. Develop programs to show use Django view and Django templates.

5. Develop models, forms, CRUD application using Django.

6. Build website using python and flask.

❖ **COURSE DETAILS:**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs .
1. Basics of Python	1a. Correct the syntax for given python statements. 1b. Use variable, constant and operators in given python programs. 1c. Develop python program using given control flow statement.	1.1 Introduction on python, Installation of python, How to use python(colab, Jupyter,anaconda) Python Basic Syntax 1.2 Tokens:Literals, Constants & variables, Keywords, Operators, Comments. 1.3 Control flow statement(if else, nesting of if else, for , while) to implement python programs	06
2. Python Data Structure and Functions	2a. Develop python program for given type data structure. 2b. Use indexing into strings and lists for given problem statement. 2c. Use looping over list for given program. 2d. Develop the given python program using function, module or package. 2e. Develop array or Numpy for given problem statement. 2f. Use API and JSON for implement given problem statement.	2.1 Data structure (List, Tuple & dictionary in python) 2.2 Indexing into strings + lists 2.3 Looping over lists 2.4 Function, Module & Packages 2.5 Array Numpy 2.6 APIs + JSON, Requests package, Parsing a JSON response	07
3. Exploring Python	3a. Apply concept of file handling for the given problem.. 3b. Use object oriented features in given python program. 3c. Develop given problem to show use of regular expression. 3d. Use exception handling mechanism to	3.1 Python File Handling. 3.2 Python Object Oriented Programming. 3.3 Python Regular Expression. 3.4 Python Exception Handling. 3.5 Python Database Interaction. 3.6 Python with internet services	10

	implement given problem statement. 3e. Apply given database commands over supplied problem statement. 3f. Develop python program for given internet services.		
4. Basics of Django	4a. Describe Django Framework and its dependencies. 4b. Develop Django program to set server with given configuration. 4c. Develop Django App with given requirements. 4d. Develop Django Template with respect to given problem definition. 4e. Develop Django program to show use of url mapping and file handling with respect to given parameters.	4.1 Introduction on Django , install the Django framework and its dependencies. 4.2 Django Project & server configuration 4.3 Django app, MVT Design Pattern, View. 4.4 DjangoTemplate : Django templates that represent the HTML GUI, 4.5 URL Mapping, Static file Handling.	10
5. Application with Django	5a. Design Django model for given requirements. 5b. Describe process of building, handling, submitting and validating html form in Django. 5c. Develop the given problem statement to show use of file uploading and database connectivity 5d. Develop the given CRUD application in Django 5e. 5e.Develop given program to show use of session and cookies.	5.1 Django models, model relationships, querying models & connecting to MySQL database , Model Form, 5.2 Django Form : Understand the process of building, handling, submitting & validating HTML forms in the Django, 5.3 File Upload, Database connectivity 5.4 Creating CRUD application in Django, 5.5 Django Middleware, Session & cookies	08

6. Working with Flask	6a. Develop the given program to run flask locally. 6b. Build website using Flask or Django. 6c. Describe process to deploy website using PaaS. 6d. Write a process to add a given custom domain.	6.1 Introduction to Flask Using Python packages , Web frameworks, Decorators , Routes , Running Flask locally Debugging a Python program 6.2 Building a basic dynamic site 6.3 Deploying Your Website Using a Platform-as-a-Service (PaaS) 6.4 DNS basics , Adding a custom domain	07
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Develop & Execute four Python programs i) based on variable and constants and operators ii) based on if else and nested if else statement.	1. Basics of Python	02
2	Develop & Execute four programs using while and do-while statement and for loop statement.		02
3	Develop i) three python programs based on List, Tuple, and Dictionary. ii) two programs each over indexing on strings and list, and looping on list.	2. Python Data Structures and Function	02
4	Develop & Execute two programs each on function, module and packages.		02
5	Develop & Execute a four program over array and Numpy.		02
6	Develop & Execute program to show use of JSON and API with python		02
7	Develop & Execute program to show use of object oriented features, and regular expression.	3. Exploring Python	02
8	Develop & Execute program to show use of file handling and exception handling using python.		02
9	Develop & Execute program to show use of database connection and internet services using python.		02
10	Develop & Execute a program to create a Django View	4. Basics of Django	02
11	Develop & Execute a program to create a Django Template		02
12	Develop & Execute a program to create a Django Form	5. Application with Django	02
13	Develop & Execute a CRUD application using Django		04

14	Build a dynamic website using using Flask and deploy it.	6.Working with Flask	04
Total Hrs			32

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Basics of Python	02(02)	03(03)	03(00)	08(05)
2	Python Data Structures and Function	02(02)	06(03)	06(03)	14(08)
3	Exploring Python	02(02)	03(00)	06(06)	11(08)
4	Basics of Django	02(00)	03(03)	03(03)	08(06)
5	Application with Django	02(00)	03(00)	06(06)	11(06)
6	Working with Flask	02(00)	00(03)	06(00)	08(03)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

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

T -Unit/Topic Number

L-Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

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	
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	3	R	2										
2	1	U	3	2	U	3	3	U	3	1	U	3	2	U	3				3/5
3	2	U	3	4	U	3	5	U	3	4	U	3	6	U	3				3/5
4	1	A	3	2	A	3	3	A	3	2	A	3	3	A	3				3/5
5	2	A	3	3	A	3	4	A	3	3	A	3	4	A	3				3/5
6	5	A	6	6	A	6	5	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assign-ments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign-ments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

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

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	
1	3	--	3	3	--	--	--	--	3	
2	3	--	3	3	--	--	--	--	3	
3	3	1	3	3	--	--	--	--	3	
4	3	--	3	3	--	--	--	--	3	
5	3	--	3	3	2	2	2	--	3	
6	3	--	3	3	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	Python Crash Course: A Hands-On, Project-Based Introduction to Programming	Eric Matthes , Nostarch Press , 2nd Edition, 2019	13: 9781593279288
2	Learning Python,	Mark Lutz , O'Reilly , 5th Edition , 2013	13 : 9780596158064
3	Head-First Python	Paul Barry, O'Reilly , 2nd Edition , 2016	13: 9781491919538
4	Django for APIs: Build web APIs with Python & Django	William Vincent, Paperback, 1 st edition, 2020	13:9781735467221

5	Learn Web Development with Python: Get hands-on with Python Programming and Django web development	Fabrizio Romano, Packt, 1 st edition, 2018	13: 9781789953299
6	Build Your First Website with Python and Django	Nigel George, Gnw Independent, 1 st edition, 2017	13:9780994616852

❖ **E-REFERENCES:**

- <https://www.guru99.com/python-tutorials.html> Accessed on 25 Jan. 2022
- <https://towardsdatascience.com/json-and-apis-with-python-fba329ef6ef0> Accessed on 25 Jan. 2022
- <https://realpython.com/python-json/> Accessed on 25 Jan. 2022
- <https://realpython.com/api-integration-in-python/> Accessed on 25 Jan. 2022
- <https://www.freecodecamp.org/news/build-a-simple-json-api-in-python/> Accessed on 25 Jan. 2022
- <https://www.pluralsight.com/guides/introduction-to-django-templates> Accessed on 25 Jan. 2022
- <https://docs.djangoproject.com/en/4.0/intro/tutorial03/> Accessed on 25 Jan. 2022
- https://tutorial.djangogirls.org/en/django_forms/ Accessed on 25 Jan. 2022
- <https://djangobook.com/mdj2-models/> Accessed on 25 Jan. 2022
- <https://medium.com/scalereal/everything-you-need-to-know-about-middleware-in-django-2a3bd3853cd6> Accessed on 25 Jan. 2022
- <https://www.sankalpjonna.com/learn-django/building-a-django-crud-application-in-minutes> Accessed on 25 Jan. 2022

❖ **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	Dr. A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Mr. Dipak Dhote	Operations Manager, IT-Network InfosystemsPvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr.L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal), Course Expert
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)

7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mr.S.J.Pukale	Lecturer in Information Tech.	Course Expert , Reviewer

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING/INFORMATION TECHNOLOGY
COURSE CATEGORY:	PROGRAMME CORE COURSE
COURSE CODE	: AI203G^{\$}
COURSE TITLE	: INTRODUCTION TO MACHINE LEARNING
TEACHING SCHEME:	TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 03 (1 TH/TU CREDIT = 1 CLOCK HR., 2 PR CREDIT = 1 CLOCK HR.)
TH. TEE EXAM	: 03 HRs
PR. TEE EXAM	: 02 HRs
PT. EXAM	: 01 HR

❖ **RATIONALE:**

Machine Learning is a branch of Computer Science that uses algorithms to imitate the way in which humans learn. It uses statistical methods to train algorithms and make predictions. Machine learning is one of the most in-demand Data Science skills, which allows data scientists to increase the accuracy of predictions of software applications, without explicitly programming them to do so. These algorithms make use of historical data to predict output values and these insights and predictions enable businesses to make smart decisions.

With the increased availability of data from varied sources there has been increasing attention paid to the various data driven disciplines such as analytics and machine learning. In this course it is intended to introduce some of the basic concepts of machine learning from a mathematically well motivated perspective. This course will cover the different learning paradigms and some of the more popular algorithms and architectures used in each of these paradigms.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Identify uses and applications of machine learning in real life.
2. Implement preprocessing steps on data to make it ready for analysis
3. Apply classification algorithms for supervised learning

4. Apply regression algorithms for predictive analysis
5. Apply clustering algorithms and association rule mining algorithms for real life problems.
6. Illustrate the concepts of Neural Networks and Genetic Algorithm.

❖ **COURSE DETAILS:**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Introduction To Machine Learning and Preparing A Model	1a. Compare the given types of machine learning on given points. 1b. Describe applications of machine learning, Machine learning activities. 1c. Classify the given data elements based on types of data 1d. Describe data quality and remediation, data preprocessing and its importance.	1.1 Introduction: human learning 1.2 Types of machine learning, 1.3 Applications of machine learning, Languages and tools in machine learning, Machine learning activities 1.4 Basic types of data, Exploring data structure, Data quality and remediation, Data pre-processing	06
2. Model Selection And Feature Engineering	2a. Select a suitable model for the given data with justification. 2b. Describe the process of using supervised learning on the given data. 2c. Describe the process of feature extraction and engineering on the given data. 2d. Compare Feature Engineering for the given type of data. 2e. Select feature scaling, feature selection, dimensionality reduction in the given situation with justification.	2.1 Introduction : Selecting a model 2.2 Training a model for supervised learning 2.3 Features – understand your data better, Feature extraction and engineering, 2.4 Feature engineering on – numerical data & categorical data & text data 2.5 Feature scaling, Feature selection, Dimensionality reduction	08

3. Supervised Learning – Classification	3a. Choose supervised learning model for the given situation with justification. 3b. Classify the given data using Bayesian method with stepwise justification. 3c. Compare given algorithms on given points. 3d. Select a suitable algorithm for classifying the given data. 3e. Describe the performance analysis of given classification model for the given situation.	3.1 Example of supervised learning 3.2 Classification model, Classification learning steps 3.3 Importance of Bayesian method, Bayes theorem and concept learning 3.4 Common algorithms – K nearest neighbor (KNN), Decision tree, Random forest model, Support Vector Machine (SVM) 3.5 Evaluating performance of classification models	10
4. Supervised Learning – Regression	4a. Select a suitable regression algorithm for the given situation with justification. 4b. Describe the problems in regression analysis by considering the given real life situation. 4c. Compare given regression model which improves accuracy on the given points. 4d. Choose regression model for prediction of output values for the given data with justification. 4e. Describe the performance analysis of given regression model for the given situation.	4.1 Introduction : Example of regression 4.2 Common regression algorithms – Simple linear, Multiple linear 4.3 Main problems in regression analysis, Improving accuracy of linear regression model 4.4 Polynomial regression model, Logistic regression 4.5 Maximum likelihood estimation, Evaluating performance of regression models	10
5. Unsupervised Learning	5a. Describe Unsupervised learning concept by considering the given real life situation. 5b. Compare given types of learning on the	5.1 Introduction 5.2 Unsupervised vs supervised learning, Clustering 5.3 Evaluating performance of clustering 5.4 Finding pattern using association rule mining 5.5 Introduction to Neural network,	08

	given points. 5c. Describe the performance analysis of clustering for the given situation. 5d. Find patterns using association rule mining for the given data. 5e. Compare neural network and Deep learning on the given points.	Architectures of neural network, Introduction to Deep learning	
6. Neural Networks and Genetic Algorithms	6a. Describe the given type of neural network representation. 6b. Compare the given neural network algorithms on the given points. 6c. Select type of algorithm for the given situation. 6d. Describe the method of hypothesis space search stepwise for the given data. 6e. Describe the advantages of Genetic programming model over other learning model for the given situation.	6.1 Neural Network Representation 6.2 Problems Perceptions: Multilayer Networks and Back Propagation Algorithms 6.3 Genetic Algorithms 6.4 Hypothesis Space Search 6.5 Genetic Programming – Models of Evolutions and Learning	06
Total Hrs.			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Implement logical rules in Python/R Programming. Execute any two programs based on it.	1. Introduction to Machine Learning and preparing a model	04
2	Perform following operations :(Assume suitable data/dataset if needed). i. Write program to read dataset (Text,CSV,JSON,XML) ii. Which of the attributes are	2. Model selection and feature engineering	04

	iii. numeric and which are categorical? Performing Data Cleaning ,Handling Missing Data, Removing Null data iv. Rescaling Data v. Encoding Data vi. Feature Selection and Dimensionality Reduction vii. Implement Principle Component Analysis																					
3	Write a python /R Programming code to apply Naive Bayesian algorithm for classification using suitable data/dataset.	3. Supervised learning – Classification	04																			
4	Write a python /R Programming code to implement decision tree for classification using suitable data/dataset.		04																			
5	Predict the CPU time if the DiskIO = 40 on the basis of following data :(Assume suitable data). <table><tr><td>DiskIO</td><td>CPUTime</td></tr><tr><td>14</td><td>2</td></tr><tr><td>16</td><td>5</td></tr><tr><td>27</td><td>7</td></tr><tr><td>42</td><td>9</td></tr><tr><td>39</td><td>10</td></tr><tr><td>50</td><td>13</td></tr><tr><td>83</td><td>20</td></tr></table>	DiskIO	CPUTime	14	2	16	5	27	7	42	9	39	10	50	13	83	20	4. Supervised learning – Regression	04			
DiskIO	CPUTime																					
14	2																					
16	5																					
27	7																					
42	9																					
39	10																					
50	13																					
83	20																					
6	Implement unsupervised machine learning algorithm (Clustering – K Means) in python/R Programming on dataset to cluster data. (Assume suitable dataset).	5. Unsupervised learning	04																			
7	Generating Association rule mining for following data set :(Assume suitable data/dataset if needed). <table><tr><td>1</td><td>Red,White,Green</td></tr><tr><td>2</td><td>White,Orange</td></tr><tr><td>3</td><td>White,Blue</td></tr><tr><td>4</td><td>Red,White,Orange</td></tr><tr><td>5</td><td>Red,Blue</td></tr><tr><td>6</td><td>White,Blue</td></tr><tr><td>7</td><td>White,Orange</td></tr><tr><td>8</td><td>Red,White,Blue,Green</td></tr><tr><td>9</td><td>Red,White,Blue</td></tr><tr><td>10</td><td>Yellow</td></tr></table>		1	Red,White,Green	2	White,Orange	3	White,Blue	4	Red,White,Orange	5	Red,Blue	6	White,Blue	7	White,Orange	8	Red,White,Blue,Green	9	Red,White,Blue	10	Yellow
1	Red,White,Green																					
2	White,Orange																					
3	White,Blue																					
4	Red,White,Orange																					
5	Red,Blue																					
6	White,Blue																					
7	White,Orange																					
8	Red,White,Blue,Green																					
9	Red,White,Blue																					
10	Yellow																					
8	Implement/Simulate Back propagation/feed forward neural network.	6. Neural Networks and Genetic Algorithms	04																			
Total Hrs			32																			

❖ SPECIFICATION TABLE FOR THEORY PAPER :

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Introduction to Machine Learning and preparing a model	02(02)	03(03)	03(00)	08(05)
2	Model selection and feature engineering	02(02)	06(06)	03(00)	11(08)
3	Supervised learning – Classification	02(00)	03(03)	06(03)	11(06)
4	Supervised learning – Regression	02(00)	03(03)	06(03)	11(06)
5	Unsupervised learning	02(00)	06(00)	03(06)	11(06)
6	Neural Networks and Genetic Algorithms	02(02)	03(03)	03(00)	08(05)
	Total	12(06)	24(18)	24(12)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER :

T- Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	6	R	2										
2	1	U	3	1	A	3	2	U	3	1	U	3	2	U	3				3/5
3	2	U	3	2	A	3	3	U	3	2	U	3	3	U	3				3/5
4	4	U	3	5	U	3	5	U	3	3	A	3	4	U	3				3/5
5	5	A	3	6	U	3	6	A	3	4	A	3	6	U	3				3/5
6	3	A	6	4	A	6	5	A	6										2/3

❖ **ASSESSMENT AND EVALUATION SCHEME:**

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assign-ments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign-ments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Activities/ Writing program	20
2	Performance/Execution of program	20
3	Viva Voce	10
	TOTAL	50

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

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

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	Machine Learning	Tom M Mitchell, McGraw Hill, First edition, 1997	13: 978-0070428072
2	Machine Learning in Action	Peter Harrington, DreamTech, First Edition, 2012	13: 978-1617290183
3	Machine Learning	Anuradha Srinivasa Raghavan, Vincy Joseph, Wiley India, First edition, 2019	13 : 978-8126578511

❖ **E-REFERENCES:**

- <https://data-flair.training/blogs/machine-learning-tutorial/> , accessed on 27th January 2022
- <https://www.youtube.com/watch?v=GwIo3gDZCVQ&t=834s>, accessed on 27th January 2022
- <https://www.simplilearn.com/tutorials/machine-learning-tutorial>, accessed on 27th January 2022

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

1. Computer (Dual CORE and above) with Internet connection.
2. Windows 7 or 8 or latest (Professional Edition/Academic edition)
3. Network printer.

4. LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1	Dr. A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Dr. Paresh R. Kamble	Machine learning specialist, OZ sports, Nagpur. HQ- Reykjavik, Iceland	Industry Expert
3	Dr. Gopal Sakarkar	Assistant Professor, Dept of AI., G H Raison college of engineering, Nagpur.	Member from Academics(External)
4	Mr. Pravin Malave	Lecturer in CO , G.P.Arvi	MSBTE Nominee
5	Mr. L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs. Shifa A. Mohd	Lecturer in Information Tech.	Member (Internal), Course Expert
7	Mr. M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mrs. D.P.Chanmanwar	Lecturer in InformationTech.	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY:	PROGRAMME CORE COURSE
COURSE CODE	: IT252G
COURSE TITLE	: GUI PROGRAMMING
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	: --
PR. TEE EXAM	: 02 HRs
PT. EXAM	: --

❖ RATIONALE:

Engineering students should know the advanced features of python programming in open source environment. Python is a high-level programming language used as a general-purpose language..Writing a Python program that uses a graphical user interface (GUI) to interact with the user involves using the provided libraries that come with the Python language. Using these special libraries, Python will interact with the operating system to present windows, buttons, and event handlers to detect what a user is doing with the keyboard and mouse. By learning a few important methods, studentwill find Python GUI development very easier.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Use the basic Tkinter widget in GUI programming.
2. Apply layouts using different methods of geometry manager to create the GUI application.
3. Design button, box , canvas, scale, menu widget in master window.
4. Use several methods to implement different events in the GUI application.
5. Develop various GUI applications using Tkinter.
6. Design GUI application using object oriented features.

❖ **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	Introduction to Python PyQt5, wxPython, Tkinter, Installation of Python Tkinter on windows,	1.Introduction to Tkinter Widgets in GUI	02
2	Develop and execute a Tkinter GUI program to show use of label widget		02
3	Develop and execute a Tkinter GUI program to show use of different button widget.		02
4	Develop and execute a Tkinter GUI program to show use of image, entry widget.		02
5	Develop and execute a Tkinter GUI program to show use of text widget		02
6	Develop and execute a Tkinter GUI program to show use of frame widget.		02
7	Develop and execute a Tkinter GUI program to show use of pack() method of geometry managers.	2.Layout Management in GUI	02
8	Develop and execute a Tkinter GUI program to show use of place() method of geometry managers.		02
9	Develop and execute a Tkinter GUI program to show use of grid() method of geometry managers.		02
10	Develop and execute a Tkinter GUI program to show use of various methods used while designing the master window.	3.Exploring Tkinter Widgets	04
11	Develop and execute a Tkinter GUI program to show use of canvas, menu, scale, scrollbar widget.		02
12	Develop and execute a Tkinter GUI program to show use of check box, combo box, list box, spin box.		02
13	Develop and execute a Tkinter GUI program to show use of tkMessageBox, Yes/No Dialogue, Ok/Cancel Dialogue, Retry/Cancel Dialogue, Open File Dialogue box.		02
14	Develop and execute a Tkinter GUI program to show use of event handlers using bind method.	4.Event Handling in GUI	04

15	Develop and execute a Tkinter GUI to show use of event handlers using command.		04
16	Develop and execute a Tkinter GUI program of simple calculator.	5.Applications of Tkinter GUI	02
17	Develop and execute a Tkinter GUI program of temperature converter		02
18	Develop and execute a Tkinter GUI program for color theme maker.		04
19	Develop and execute a Tkinter GUI program for Matplotlib		04
20	Develop and execute a Tkinter GUI program for text editor		06
21	Develop and execute a Tkinter GUI program to show use of object oriented window in Tkinter.	6.Object Oriented programming with Tkinter	02
22	Develop and execute a Tkinter GUI program to show use of object oriented frame in Tkinter.		02
23	Develop and execute a Tkinter GUI program to display a Progress Bar while a Thread is running in Tkinter		04
24	Develop and execute a Tkinter GUI program of temperature converter using object oriented feature.		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)	PT	Students	Two PT (average of two tests will be computed)	--	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	--	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	Theory Answer Scripts	1,2,3,4,5,6
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

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

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	
1	3	--	3	3	--	--	--	--	3	
2	3	2	3	3	--	--	--	--	3	
3	3	--	3	3	--	--	--	--	3	
4	3	2	3	3	--	--	--	--	3	
5	3	--	3	3	--	3	3	--	3	
6	3	2	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	Python and Tkinter Programming	John A. Greyson , Manning , 1st Edition, 2000	13: 9781884777813
2	Python GUI Programming with Tkinter: Develop responsive and powerful GUI applications with Tkinter	Alan Moore, Packt Publishing; 1st edition 2018	13: 9781788835688
3	Python GUI Programming - A Complete Reference Guide: Develop responsive and powerful GUI applications with PyQt and Tkinter	Alan Moore, Packt Publishing; 1st edition 2019	13: 978-1838988470
4	Learning Python,	Mark Lutz , O'Reilly , 5th Edition , 2013	13 : 9780596158064

❖ **E-REFERENCES:**

- <https://docs.python.org/3/library/tkinter.html> Accessed on 25 Jan. 2022
- https://www.udemy.com/course/building-cross-platform-python-gui-applications-withtkinter/?site_ref=discudemy.com&utm_source=adwords&utm_medium=udemyads&utm_campaign=DSA_Catchall_la.EN_cc.INDIA&utm_content=deal4584&utm_term=._ag_82569850245_.ad_575897107176_.kw_.de_c_.dm_.pl_.ti_dsa93451758763_.li_1007786_.pd_.&matchtype=&gclid=Cj0KCQiAosmPBhCPARIsAHOenM1pm37xthqSasIhUKPIOhLph5angkZ9h5e687cROYgneqXifNph8QaAg2sEALw_wcB Accessed on 25 Jan. 2022
- <https://realpython.com/python-gui-tkinter/> Accessed on 25 Jan. 2022
- <https://www.tutorialsteacher.com/python/create-gui-using-tkinter-python> Accessed on 25 Jan. 2022
- https://www.tutorialspoint.com/python/tk_entry.htm Accessed on 25 Jan. 2022
- <https://www.pythontutorial.net/tkinter/> Accessed on 25 Jan. 2022
- <https://mockitt.wondershare.com/ui-ux-design/gui-python.html> Accessed on 25 Jan. 2022

❖ **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	Dr.A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Dr.Paresh Kamble	Machine Learning Specialist, OZ Sports Nagpur.	Industry Expert
3	Dr.Gopal Sakarkar	Assistant Professor, A.I., G. H. Raison College of Engineering, Nagpur.	Member from Academics(External)
4	Mr. Pravin Malve	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr. L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal), Course Expert
6	Mrs.S.Mohammad	Lecturer in Information Tech.	Member (Internal)
7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mr.S.J. Pukale	Lecturer in Information Tech.	Course Expert , Reviewer

 (Member Secretary PBOS)

 (Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN INFORMATION TECHNOLOGY/AIML
COURSE CATEGORY: PROGRAMME CORE COURSE
COURSE CODE : IT301G
COURSE TITLE : OPERATING SYSTEMS
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
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 Understanding the role of operating system with its function and services.
- 2 Utilize process concept to solve/select CPU scheduling algorithm/problems.
- 3 Solve the process synchronization problem using semaphores.
- 4 Apply various concepts related with Deadlock to solve Problems.
- 5 Apply Memory Management techniques.
- 6 Implement the file system.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs .
1. Introduction to Operating System	1a. Define various terms related to Operating system 1b. Classify resource management techniques of OS . 1c. Compare various types of operating systems. 1d. Classify and summarize the system calls. 1e. Illustrate Operating-System Structure	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	06
2. Process Managemen t	2a. Describe process scheduling. 2b. Define Inter process Communication, thread. 2c. Compare multithreading and it's various models. 2d. Classify and 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	09
3. Process Synchroniza tion	3a. Define Race condition, Semaphore, Critical-Section Problem. 3b. Demonstrate the solution for Critical-Section Problem. 3c. State classic problems of synchronization.	3.1 The Critical-Section Problem 3.2 Peterson's Solution, Synchronization Hardware 3.3 Semaphores, Classic Problems of Synchronization	06
4. Deadlocks	4a. Define related terms. 4b. Identify deadlocks. 4c. Illustrate with example the algorithms for deadlock prevention, avoidance 4d. State provision for recovery from deadlock.	4.1 System Model, 4.2 Deadlock Characterization 4.3 Methods for Handling Deadlocks -Deadlock Prevention, Deadlock Avoidance 4.4 Deadlock Detection, Recovery from Deadlock	08
5. Memory Managemen t	5a. Define related terms. 5b. Illustrate swapping. 5c. Describe Paging, Paging table. 5d. Compare and contrast segmentation with paging 5e. Apply Page replacement	5.1 Main Memory: Background 5.2 Swapping, Contiguous Memory Allocation 5.3 Paging, Structure of the Page Table 5.4 Segmentation 5.5 Virtual Memory: Background,	10

	policy for solving virtual memory problem.	Demand Paging, , Page Replacement. Allocation of frames, Trashing.	
6. File System and Security	6a. Define/ describe related terms. 6b. Describe File system and sharing 6c. Illustrate various implementations related to file. 6d. Classify the allocation methods. 6e. Demonstrate free space management.	6.1 File-System Interface: File Concept, Access Methods, Directory and Disk Structure, 6.2 File-System Mounting, File Sharing, Protection 6.3 File-System Implementation: File-System Structure, File-System Implementation, Directory Implementation, 6.4 Allocation Methods, 6.5 Free-Space Management	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	02
2	Install and configure Windows 9x, Windows NT, Windows 2000 & Windows XP Operating Systems.		04
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		02
4	Develop, debug and Execute a C program to simulate the FCFS CPU scheduling algorithms to find turnaround time and waiting time.	Process Management	02
5	Develop, debug and Execute a C program to simulate the SJF CPU scheduling algorithms to find turnaround time and waiting time.		02
6	Develop, debug and Execute a C program to simulate the Round Robin CPU scheduling algorithms to find turnaround time and waiting time.		02
7	Develop, debug and Execute a C program to simulate the priority CPU scheduling algorithms to find turnaround time and waiting time.		02
8	Develop, debug and Execute a C program to simulate producer-consumer problem using semaphores.	Process Synchronization	04
9	Develop, debug and Execute a C program to simulate FIFO page replacement algorithms	Memory	02

10	Develop, debug and Execute a C program to simulate LRU page replacement algorithms	Management	02
11	Develop, debug and Execute a C program to simulate Optimal page replacement algorithms		02
12	Develop, debug and Execute a C program to simulate LFU page replacement algorithms		02
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		04
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	02(02)	03(00)	00(00)	05(02)
2	Process Management	02(00)	03(03)	09(06)	14(09)
3	Process Synchronization	02(00)	03(03)	06(03)	11(06)
4	Deadlocks	02(00)	03(03)	09(06)	14(09)
5	Memory Management	02(02)	03(00)	06(03)	11(05)
6	File System	02(02)	03(03)	00(00)	05(05)
	Total	12(06)	18(12)	30(18)	60(36)

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	
1	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	1	R	2	6/9
	5	R	2	1	R	2	6	R	2										
2	1	U	3	4	U	3	2	U	3	5	A	3	2	A	3				3/5
3	3	U	3	5	U	3	6	U	3	4	U	3	2	U	3				3/5
4	3	A	3	4	A	3	2	A	3	2	A	3	3	U	3				3/5
5	2	A	3	4	A	3	2	A	3	3	A	3	4	A	3				3/5
6	3	A	6	5	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)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Sheet	1, 2, 3
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Sheet	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment	Students	End of every practical	20	--	Practical Answer Sheet	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 Sheet	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			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:**

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

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	Ekta Walia, Khanna Publishers, 2 nd Edition, 2015	13:9789380016658

❖ **E-REFERENCES:**

- <https://nptel.ac.in/courses/106/106/106106144/>, accessed on 31st January 2022
- https://onlinecourses.nptel.ac.in/noc16_cs10, accessed on 31st January 2022

❖ **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 Department (I.T.Dept.)	Chairman
2	Mr. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr. L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)), Course Expert
7	Mr. M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY:	PROGRAMME CORE COURSE
COURSE CODE	: IT302G^{\$}
COURSE TITLE	: LINUX OPERATING SYSTEM^{\$}
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
PT. EXAM	: 01 HR

❖ RATIONALE:

Operating System is most essential component of Computer System. Nowadays, 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. Knowledge of Linux operating system is essential, as it provides many features such as multitasking, multiuser, security etc. which are mainly used in both server and workstation systems. So, this course will enable the students to inculcate the basics of Linux operating system, writing shell scripts as well as administer the network.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Install Linux Operating System.
2. Execute various commands of Linux Operating System.
3. Develop programs using shell programming.
4. Create user groups and its privileges using various tools.
5. Maintain Linux system security.
6. Use Linux network services.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Introduction	1a. Compare features of given operating system. 1b. Identify tools and application of given operating system. 1c. Classify given operating system on the basis of given point. 1d. Write the steps to create users and configure on given network O.S.	1.1 History of Linux, Features of open source operating system ,Advantages of using Linux, Linux distribution, Linux kernel,Architecture 1.2 OS services,System call ,Run levels, GNU/GPL license, Free software foundation, MULTICS 1.3 File system: Hierarchical File system, File system features, Data structures 1.4 Process: Process concepts, context of process, Context switch, process state, State transition diagram, Data structures for processes.	08
2. Linux Commands and Utilities	2a. Classify given commands as internal or external. 2b. Compare various types of commands on basis of given point. 2c. Apply Linux commands to manipulate given file and directory. 2d. Describe the given file structure on the basis of given point. 2e. Compare init process of different boot loader on basis of given point with justification.	2.1 Internal & external commands in Linux: Internal commands-echo, type etc.External commands -ls, mv, rm, cat, useradd etc. 2.2 Command line commands –who, log name, banner, cal, date bc, man, info etc.Files & directory commands –cat, less, more, ls, comm, diff,tar,Directory related commands–pwd, cd, mkdir, rmdir, 2.3 Manipulating file commands -cp, mv, rm, File link commands chmod, umask, file, wc, split, cmp,diff. 2.4 Linux file system structure- ext2, ext3 file system 2.5 Linux boot loader – GRUB &LILO,SYSV init process, Init Run level	10
3. Shell Programming	3a. Write Shell scripts for given commands. 3b. Develop program using Vi editor in the specified mode to carry out given operation. 3c. Write the steps to execute given programs on given	3.1 Shell programming – Shellscrips, executing shell scripts,Creating shell scripts. 3.2 Vi Editor: Appending files into current file, 3.3 Changing Text commands, Cursor Positioning Commands, Cutting and Pasting, Text, Exiting from vi, Text 3.4 Deletion Commands, Text,Insertion Commands, Undo Commands	08

	editor.		
4. Linux Administration	4a. Write the procedure to perform given administrative tasks. 4b. Describe the purpose of using given run level. 4c. Write procedure to perform the given operation for managing the users/groups. 4d. Select and use relevant command as per given disk management operation.	4.1 System Administration: Role of Administrator's, The Root Account-Administrator's login, Sudo, SU, User Private Group(UPG), The shadow password file. Task scheduling using Cron, Maintaining security. 4.2 Operations: Startup and shutdown, System run levels 4.3 Managing Disk Space: df, du, find command-Locating files dd, Command-Copying Disks, disk management-RAID.	08
5. Linux System Security	5a. Compare various types of given permissions. 5b. Apply given tool to access and grant different types of permissions to the files. 5c. Configure the given boot security on given point. 5d. Describe given module and transaction on basis of given point.	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.	06
6. Servers and Services	6a. Describe given services in Linux. 6b. Write method to configure the setting in the firewall to apply given network security features. 6c. Classify given server on basis of its usage with justification. 6d. Configure the given setting in the DHCP server/client.	6.1 DNS (Domain Name System), Mail Transfer Agent & Local Directory Agent, understanding pop3 & SMTP, telnet, FTP 6.2 Apache server (HTTP), feature of Apache 6.3 Firewall and internet security 6.4 NFS server and Its Usage. 6.5 Working of DHCP & benefits of DHCP deployment.	08
TOTAL			48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Install Linux OS on standalone machine.	1.Introduction	04
2	Execute Logging/logout via terminals and network.		04
3	Execute general purpose utility commands in Linux.	2. Linux Commands and utilities	04
4	Use text editor in different modes.		
5	Develop any two Shell script program in VI Editor using control structure.	3. Shell programming	04
6	Develop any two C program in VI Editor using loop structure.		04
7	Manage and create Users or groups in Linux as a super user.	4. Linux Administration	02
8	Recover Root Password.		02
9	Run SUDO command to access system privileges.		02
10	Configure and maintain DHCP server/client.	5.Linux system security	02
11	Configure and maintain firewall for computer security.		02
12	Configure NFS server.	6. Servers and services	02
Total Hrs.			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Introduction	02(02)	06(00)	00(03)	08(05)
2	Linux Commands and Linux file system	02(00)	03(03)	06(06)	11(09)
3	Introduction to Shell programming	02(02)	03(03)	03(00)	08(05)
4	Managing User accounts and Disk space	02(00)	03(03)	06(03)	11(06)
5	Linux system security	02(00)	00(03)	09(03)	11(06)
6	Servers and services	02(02)	03(03)	06(00)	11(05)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T- Unit/Topic Number

L- Level of Question

M-Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	3	R	2	6	R	2										
2	2	U	3	3	U	3	4	U	3	2	U	3	6	U	3				3/5
3	1	U	3	1	U	3	6	U	3	3	U	3	4	U	3				3/5
4	2	A	3	2	A	3	6	A	3	2	A	3	2	A	3				3/5
5	6	A	3	3	A	3	5	A	3	5	U	3	1	A	3				3/5
6	4	A	6	5	A	6	2	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assign-ments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assign-ments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Configuration of Linux operating system	10
2	Performance, correctness for various commands	20
3	Debugging program , Result after executing commands	10
4	Viva Voce	10
	TOTAL	50

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	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	Linux Command Line and Shell Scripting Bible	Richard Blum, Christine Bresnahan, 3 rd Edition, John Wiley & Sonspub., Jan 2015	13: 9781118983843
2	The Linux Command Line: A Complete Introduction	William E. Shotts Jr., 1st Edition, 2012	13: 9781118983843
3	Linux: The Beginners Choice For the Linux System	Simon Bedford, Create Space Independent Publishing, April 13, 2015	13: 9781514895658

❖ **E-REFERENCES:**

- <https://www.linux.com/tutorials> ,accessed on 1 Feb 2022
- <https://www.javatpoint.com/>,accessed on 1 Feb 2022
- <http://www.slideshare.net/vignesh0009/linux-practicals>,accessed on 1 Feb 2022

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

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

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

S.N.	Name	Designation	Institute / Industry
1	Dr.A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Mr.Dipak Dhote	Operations Manager, IT-Network InfosystemsPvt LTD	Industry Expert
3	Dr.Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg. and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr.L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal), Course Expert
7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mrs.Isha Sangolkar	Lecturer in Information Tech.	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMM	: DIPLOMA IN INFORMATION TECHNOLOGY / AIML
COURSE CATEGORY	: PROGRAMME CORE COURSE
COURSECODE	: IT303G
COURSE TITLE	: MULTIMEDIA TECHNIQUES
TEACHING SCHEME	: TH: 03; TU: 00; PR: 02(CLOCK HRs.)
TOTAL CREDITS	: 04 (1 TH/TU CREDIT = 1HR., 1 PR CREDIT= 2HR.)
TH.TEE	: 03HRs
PR.TEE	: 02 HRs
PT.	: 01HR

❖ 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. Animation is required to create action oriented phenomena in applications that can be hosted on website. Animation plays a huge role in entertainment (providing action and realism) in advertising, films and gaming industry and also be extremely effective in education (providing visualization and demonstrations of abstract ideas and concepts).

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Operate on different software tools for creating multimedia files
2. Identify a range of concepts, techniques and tools for creating and editing the interactive multimedia applications.
3. Perform testing on images using lossless compression.
4. Perform testing on image using loss compression.
5. Develop multimedia application for a given scenario
6. Develop animated objects.

❖ COURSEDETAILS:

A. THEORY:

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs .
1. Introduction to Multimedia	1a. Compare various media types on given points. 1b. Choose the relevant media types on given media communication. 1c. Choose the relevant multimedia application on given scenario.	1.1 Definition of Multimedia, Communications View point 1.2 Media Types : Static time-dependent discrete media, Dynamic time dependent continuous media 1.3 Data stream characteristics of continuous media. Multimedia Application Scenarios	08
2. Multimedia Basics	2a. Find the sampling and quantization on given digital image sample. 2b. Compare different types of images on given parameter. 2c. Compare different image, audio & video on given points. 2d. Choose the relevant file format for a given multimedia application. 2e. Describe the procedure on given coding algorithm.	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, Gray scale 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 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	3a. Describe the concept of compression on given file format. 3b. Compare various coding algorithm in lossless	3.1 Introduction to compression, compression with loss, compression without loss, importance of compression, introduction to redundancy	09 2

	compression on given parameter. 3c. Compare various coding algorithm in loss compression on given parameter. 3d. Choose the relevant coding algorithm on given file format.	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	
4. Compression with Loss	4a. Perform the image compression on given image file format. 4b. Perform the audio compression on given image file format. 4c. Perform the video compression on given image file format.	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	5a. Choose the relevant storage for given file data. 5b. Compare levels of multimedia synchronization on given points. 5c. Describe the multimedia database on given points.	5.1 Portable low-form factor Media, DLT for Audio , Optical Storage: Compact Disk Audio(CD), Digital Versatile Disk(DVD), Dolby Sound, Television and HDTV. 5.2 Three levels of Multimedia Synchronization: Intra-Media, Inter-Media and Inter-Party 5.3 Multimedia database, Requirements of multimedia DBMS, Major issues in multimedia DBMS : Query Support, Storage Support, Presentation and Delivery Support	09

6. Images and Animation	6a. Compare image and animation on given parameter. 6b. Compare various organizing tools in multimedia on given parameters. 6c. Design animation on given animation techniques. 6d. Select the approximate animation techniques for a given scenario. 6e. Describe Action Script working on given mode.	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. 6.5 Introduction to Action Script: When to Use Action Script, Introducing the Actions Panel, Working in Normal Mode, Working in Expert Mode, Using the Reference Panel, Understanding Action Script Syntax.	08
		Total Hrs.	48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Configure various components of graphical processing tools.	Introduction to Multimedia	02
2	Install any multimedia file editing software like Adobe flash software.		02
3	Convert given image into different image formats.	Multimedia Basics	02
4	Develop images using RGB/ CMY/ HSB color models.		02
5	Install lossless compression software like GZIP, Brotli, WebP.	Lossless Compression	02
6	Perform testing on images (IFF, GIF, and PNG file formats) reduce size upto example 50%.		04
7	Perform lossless compression on multimedia files (image, audio and video).		02
8	Perform testing on images (JPEG and MPEG file formats) reduce size upto example 50%.	Loss Compression	04
9	Perform lossless compression on multimedia files (image, audio and video).		02
10	Prepare an abstract on Storage retrieval and different presentation of media	Storage, Retrieval and Presentation of Media	4 02

11	Develop an animation to represent the growing moon in latest Flash software.	Images and Animation	04
12	Develop an animation to represent the ball bouncing on Steps in latest Flash software.		04
Total Hrs.			32

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Introduction	02(02)	06(00)	00(03)	08(05)
2	Multimedia Basics	02(02)	06(03)	03(00)	11 (05)
3	Lossless Compression	02(00)	03(03)	09(03)	14(06)
4	Compression with Loss	02(00)	03(03)	03(06)	08(09)
5	Storage, Retrieval and Presentation of Media	02(02)	03(03)	06(00)	11(05)
6	Images and Animation	02(00)	03(06)	03(00)	08(06)
	Total	12(06)	24(18)	24(12)	60(36)

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	
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	5	R	2										
2	1	U	3	2	U	3	3	U	3	2	U	3	3	U	3				3/5
3	1	U	3	2	U	3	4	U	3	4	U	3	5	U	3				3/5
4	5	U	3	6	U	3	2	A	3	6	U	3	6	U	3				3/5
5	3	A	3	4	A	3	6	A	3	1	A	3	3	A	3				3/5
6	3	A	6	5	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)	PT	Students	Two PT (average of two tests will be computed)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Installation and configuring	20
2	Performing	10
3	Testing	10
4	Viva voce	10
	TOTAL	50

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	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	--	--	--	--	--	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	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:**

- <https://nptel.ac.in/courses/117105083>, accessed on 10th Jan 2022
- https://onlinecourses.swayam2.ac.in/nou20_cs05/preview , accessed on 12th Jan 2022
- http://ggn.dronacharya.info/ITDept/Downloads/QuestionBank/Even/IV%20sem/ Multimedia_technology.pdf, accessed on 12th Jan 2022
- http://www.cet.iitkgp.ac.in/course_mtech/, accessed on 25th Jan 2022

❖ **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 Department (I.T.Dept.)	Chairman
2	Mr. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr.L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)
7	Mr. M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mrs. Shifa Mohd Azharuddin	Lecturer in Information Tech.	Course expert
9	Mrs.Isha L.Sangolkar	Lecturer in Information Tech.	Course expert

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY	: PROGRAMME CORE COURSE
COURSECODE	: IT304G
COURSE TITLE	: NETWORK SECURITY
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
PT	: 01 HRs

❖ RATIONALE:

Network security is one of the most important aspects to consider when working over the internet, LAN or other method, no matter how small or big your business is. While there is no network that is immune to attacks, a stable and efficient network security system is essential to protecting client data. A good network security system helps business reduce the risk of falling victim of data theft and sabotage.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Select and apply appropriate algorithms to make system more secured.
2. Apply the solutions hardware and software security of network.
3. Install firewall and IDS for secure network.
4. Configure and troubleshoot wireless LAN for secured wireless network.
5. Develop secure web security by reducing susceptibility to threats.
6. Analysis security and law along with Internet Governance and Email policy.

❖ **COURSE DETAILS:****A. THEORY:**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Introduction to Network Security and Cryptography	1a. Choose the relevant security mechanism on given security attack type. 1b. Find encrypted text by using various cryptography algorithms on given data. 1c. Compare various cryptography algorithm on given parameters. 1d. Choose the relevant Authentication Algorithm on given application.	1.1 Introduction: Network security concepts, The OSI security architecture. 1.2 Security attacks, Security services, Security mechanisms. 1.3 Cryptography: Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Random and Pseudorandom Numbers, Stream Ciphers and RC4, Cipher Block Modes of Operation. 1.4 Approaches to Message Authentication, Secure Hash Function, Message Authentication Codes, Public Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures.	10
2. Hardware & Software Security	2a. Classify the given types of hardware security device based on given points. 2b. Describe virtual private network and Compare various types of VPN on given points. 2c. Compare various security protocols on given application.	2.1 Hardware Security, Smart Cards, Biometrics, 2.2 Virtual Private Networks, Types of VPN's, 2.3 Trusted Operating Systems, Pretty Good Privacy (PGP), Security Protocols, Security Socket Layer, Transport Layer Security, IPSec, S/MIME(Secure/Multipurpose Internet Mail Extension)	08
3. Intrusion Detection System and Firewalls	3a. Draw a network plan by using given type of IDS on given situation. 3b. Compare various Intrusion detection systems on given parameters. 3c. Compare various Firewall systems on given parameters.	3.1 IDS: Infrastructure of IDS, Classification of IDS, 3.2 Host-based IDS, and Network based IDS, Anomaly Vs Signature Detection, Normal Behavior Patterns-Anomaly Detection, 3.3 Misbehavior Signatures-	10

	3d. Select the relevant security system for given situation with justification.	Signature Detection, and Parameter Pattern Matching, Manage IDS. 3.4 Firewalls, Packet-Filtering Firewalls, State full Inspection Firewalls, and Proxy firewalls, Guard, Personal Firewalls, Limitations of Firewalls.	
4. Wireless Security	4a. Describe the procedure for configuring wireless LAN for given network parameters. 4b. Select appropriate wireless protocol for given issues on network security. 4c. Configure and troubleshoot wireless access point on application.	4.1 Wireless Application Protocol, WAP Security, Authentication, Integrity, Confidentiality, Security Issues with Wireless Transport Layer Security (WTLS), 4.2 Wireless LAN, WLAN Configuration, WLAN Technology consideration, Wireless LAN Security 4.3 Access Point Security.	06
5. Web Security	5a. Describe Client/Server model on given security application. 5b. Describe SSL stages on given points. 5c. Compare SSL connections and SSL sessions with given points.	5.1 Client/Server Architecture, Security considerations and Threats, Web traffic security approaches, SSL/TLS for secure web services, 5.2 The Twin concept of “SSL Connection” and “SSL Session”, SSL session state, SSL Connection State, SSL Record Protocol, SSL Handshake Protocol. 5.3 Secure Hypertext Transport Protocol(S-HTTP).	08
6. Security and Law, Internet Governance and Email Policy	6a. Compare various security laws of Cybercrime in India on given parameters. 6b. Compare various Initiatives taken by Government of India on given points. 6c. Select appropriate law and act on given situation. 6d. Choose relevant Email Policies on given network security aspects.	6.1 Security and Law: Regulations in India, Information Technology Act 2000, Cyber Crime and the IT Act 2000, 6.2 Indian Contract Act, 1872, Indian Penal Code, Indian Copyright Act, 6.3 Consumer Protection Act, 1986, Specific Relief Act, 1963, Government Initiatives, Future Trends-Law of Convergence. 6.4 Internet Governance and Email Policy: Internet	06

		Governance, Network Security Aspects in E-Governance.	
		Total Hrs.	48

B.LIST OF PRACTICALS / LABORATORY EXPERIENCES / ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Install the latest operating system security updates.	Introduction to Network security and Cryptography	04
2	Perform access control work on Windows.		02
3	Installation and comparison of various anti-virus softwares.	Hardware & Software Security	02
4	Scanning systems with Microsoft Baseline Security Analyzer.		02
5	Install and Configure IDS.	Intrusion Detection System and Firewalls	04
6	Install Firewall and Configure Firewall on Windows.		04
7	Prevent unwanted network access by using firewall.		02
8	Configure one of the Wireless discovery tools (ex. Net Stumbler, Kismet, Win Sniffer, etc.)	Wireless Security	04
9	Perform Steps to ensure Security of web browser.	Web Security	02
10	Perform Add on- like Firebug, WOT security for Web browsers.		02
11	Prepare abstract on Cyber security laws and policies of Government of India.	Security and Law, Internet Governance and Email Policy	04
		Total Hrs	32

❖ **SPECIFICATION TABLE FOR THEORY PAPER:**

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Introduction to Network security and Cryptography	02(02)	06(00)	03(03)	11(05)
2	Hardware & Software Security	02(02)	06(03)	03(00)	11(05)
3	Intrusion Detection System and Firewalls	02(00)	03(03)	09(03)	14(06)
4	Wireless Security	02(00)	03(03)	03(06)	08(09)
5	Web Security	02(02)	03(03)	06(00)	11(05)
6	Security and Law, Internet Governance and Email Policy	02(00)	03(06)	00(00)	05(06)
	Total	12(06)	24(18)	24(12)	60(36)

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			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	5	R	2										
2	1	U	3	2	U	3	3	U	3	2	U	3	3	U	3				3/5
3	1	U	3	2	U	3	4	U	3	4	U	3	5	U	3				3/5
4	5	U	3	6	U	3	2	A	3	6	U	3	6	U	3				3/5
5	3	A	3	4	A	3	1	A	3	1	A	3	3	A	3				3/5
6	3	A	6	5	A	6	4	A	6										2/3

T- Unit/Topic Number

L- Level of Question

M-Marks

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	(Term End Exam)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	(Term End Exam)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Installation and Configuration	20
2	Testing	10
3	Performance/Result	10
4	Viva Voce	10
	TOTAL	50

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

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

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	Network Security Essentials: Applications and Standards	William Stallings, Pearson Educaiton	ISBN: 9788131716649
2	Network Security and Management	2nd edition, Brijendra Sing, PHI	ISBN: 9788120339101
3	Network Security Bible	2nd edition, Eric Cole, Wiley Publisher	ISBN: 9788126523313

❖ **E-REFERENCES:**

- www.cs.iit.edu/~cs549/lectures/CNS-1.pdf accessed on 14th January, 2022
- nptel.ac.in/courses/106105031 accessed on 14th January, 2022
- williamstallings.com/Extras/Security-Notes/ accessed on 17th January, 2022

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

S.N.	Name	Designation	Institute / Industry
1	Dr. A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Mr. Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr.L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal)
7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mrs.Shifa Mohd Azharuddin	Lecturer in Information Tech.	Course expert
9	Mr.L.LBhadekar	Lecturer in Information Tech.	Course expert



(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN AE/AI/CM/CE/EC/EE/IT/MC/ME/MT/
PK/TX/TR

COURSE CATEGORY: HUMANITIES AND SOCIAL SCIENCE COURSE

COURSE CODE : ES351G

COURSE TITLE : ENTREPRENEURSHIP AND START UP

TEACHING SCHEME : TH: 02; TU: 00; PR: 02 (CLOCK HRS.)

TOTAL CREDITS : 03 (1 TH/TU CREDIT = 1 CLOCK HR., 1PR CREDIT = 2 CLOCK HR.)

TH. TEE EXAM : --

PR. TEE EXAM : --

PT. EXAM : --

RATIONALE:

Entrepreneurship as a mind set and a way of looking toward opportunity, focus and creativity. It's about creating value for customers, investor, entrepreneur, gaining independent in engineering career. Taking bold risk and solving challenges with undefined solution to be an entrepreneur, you need to have the ability to innovate, to improve the old and invent the new. In recent times, our society is influenced by knowledge creation and technological advancements. Competencies affecting Innovation and creativity have become important in all walks of life, including business context. This makes entrepreneurship education even more important for enhancing quality of life. Entrepreneurship plays an influential role in the economic growth and development of the nation. As the world economy is changing so is the dynamism of the business world. The aim of this course is to instil and kindle the spirit of Entrepreneurship amongst students. The idea of this course is to create job providers rather than job seekers.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to

1. Develop Entrepreneurial mindset.
2. Select self-employment as a viable option for earning dignified career.
3. Adapt the dynamic changes happening in the economy to create employment.
4. Prioritize entrepreneurship as life-skills to improve quality of life and skills of creation to start up.

5. Evaluate opportunities for new creation with overall business Potential and weakness.
6. Develop leadership skill particularly in the area of entrepreneur leadership.

❖ **COURSE DETAILS:**

A. THEORY :

Units	Topics and Subtopics	Hrs.
1. Entrepreneurship Concept and Functions	1.1 Introduction to Entrepreneurship, Entrepreneurship – Concept, Functions and Need 1.2 Entrepreneurship – The Indian Scenario. 1.3 Business Environment and Domain knowledge	04
2. An Entrepreneur & Entrepreneurial Journey	2.1 Development of Entrepreneurial skill and inclination towards entrepreneurship. 2.2 Dimension of Entrepreneurship 2.3 Competencies and characteristics for entrepreneur.	05
3. Entrepreneurs-hip as Innovation and Start up	3.1 Entrepreneurs as problem solvers 3.2 Innovations and Entrepreneurial Ventures – Global and Indian 3.3 Idea generation, Incubation centre.	06
4. Understanding the Market	4.1 Market Concept 4.2 Micro and Macro Market Environment 4.3 Market Research – Concept and Marketing Mix	05
5. Business Finance and Project preparation	5.1 Business plan and project 5.2 Feasibility study of the project 5.3 Project report preparation	06
6. Resource Mobilization	6.1 Institutional Infrastructure to promote entrepreneurship 6.2 Selection and utilization of human resources. 6.3 Business Environment and start up	06

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Outline the success story of any Three entrepreneur from Your Discipline.	1.Entrepreneurship Concept and Functions	02
2	Outline the contribution of SME in GDP of India.	1.Entrepreneurship Concept and Functions	02
3	List out the Barriers faced by entrepreneurship.	1.Entrepreneurship Concept and Functions	02
4	Identify the entrepreneurial traits in students.	1.Entrepreneurship Concept and Functions	04
5	Elaborate the formation of family Business in case study format.	2.An Entrepreneur & Entrepreneurial Journey	02
6	Develop Case study on Technopreneurs like Infosys, UBER, and ZOMATO.	2.An Entrepreneur & Entrepreneurial Journey	06
7	Compose idea generation of new enterprises related to your branch.	3.Entrepreneurship as Innovation and Start up	04
8	Organization of technical feasibility report for the stakeholders and submission for approval.	4.Understanding the Market	04
9	Survey on SSI in your discipline.	5.Business Finance and Project preparation	04
10	List out the facilities and subsidy of SSI unit in your own discipline.	6.Resource Mobilization	02
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)	PT	Students	Two PT (average of two tests will be computed)	--	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	--	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	Theory Answer Scripts	1,2,3,4,5,6
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course				
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Practical Content	20
2	Entrepreneur Skills Observed	10
3	Result and Conclusion	10
4	Viva Voce	10
	TOTAL	50

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1					3	3	3			
2					3	3	3			
3					3	3	3			
4					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	Entrepreneurship Development and Small Business Management.	Charantimath, P.M.	
2	Entrepreneurship Development in India.	Gupta C.B.	
3	Fundamental of Entrepreneurship and Small Business Management	Himalaya Publishing House.	

❖ **E-REFERENCES:**

1. Harvard Business Review
2. Business India/Business Today/Business World, University News
3. The Journal of Entrepreneurship by SAGE Publisher.
Journals.sagepub.com/home/joe
4. The journal of Entrepreneurship and Innovation in Emerging Economies by SAGE Publisher, journals.sagepub.com/home/eie.
5. International journal of Entrepreneurship and small Business by Inderscience Publisher, www.inderscience.com/ijesb
6. Vikalp Prabandhan

❖ **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.C.P.Kapse	In Charge Head of Deptt, Textile Technology	Government Polytechnic, Nagpur.
2	Dr.G.K.Awari	Head of deptt. , Automobile Engg. Deptt.	Government Polytechnic, Nagpur.
3	Dr.K.S.Dixit	Lecturer, Automobile Engg.Deptt.	Government Polytechnic, Nagpur.

(Member Secretary PBOS)

(Chairman PBOS)

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

COURSE CURRICULUM

PROGRAMME	: DIPLOMA IN INFORMATION TECHNOLOGY / COMPUTER ENGINEERING /AIML
COURSE CATEGORY	: PROGRAM ELECTIVE COURSE
COURSE CODE	: IT305G
COURSE TITLE	: SOFTWARE TESTING
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
PT. EXAM	: 01 HR

❖ **RATIONALE:**

This course presents the concepts and techniques for testing software and assuring its quality. Course describes how to apply the Testing concepts to any software testing situation and how testing is more efficient and effective by using a classical engineering approach. This course is also helpful to Inculcate essential software testing skill about automated testing capabilities for functional, regression, GUI, and data-driven testing, required to reasonably test a system under development.

❖ **COURSE OUTCOMES:**

After completing this course students will be able to–

1. Identify the importance of testing techniques in software quality management & assurance.
2. Apply different types of Testing Techniques.
3. Design Test Cases for different levels of Testing.
4. Test different software applications for various software risks.
5. Build Defect Report of any web application under Test.
6. Use at least one test automation tool to demonstrate the test automation.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Basics of Software Testing	1a. Evaluate the Quality of test software on the basis of Software Quality attributes. 1b. State why Software Testing is Important. 1c. Identify Errors and Bugs in software applications. 1d. Evaluate Entry and Exit Criteria for given test application. 1e. Describe Software Testing Life Cycle (STLC) 1f. Validate the given test software using V & V Model in relation to quality assurance.	1.1 Software quality ,Software Quality Assurance and Quality Control , Software Quality Attributes , Precision and Accuracy 1.2 Define Testing, Its Objective and need, Infamous Software Error Case Studies, Role of testing ,Testing Principles, Attributes of Good Tester 1.3 Terminology: Bugs,Error,Defect,Fault, Failure, Testing Axiom-The Pesticide Paradox, Debugging v/s Testing. 1.4 When to start and stop Testing 1.5 The Software Development Process, Product Components, Software Project Staff, Cost of testing, Verification and validation	08
2. Types of Testing	2a. Differentiate different types of testing methods on the basis given points. 2b. Apply high-level Techniques used for reviewing a given product specification. 2c. Apply Various White box testing Techniques to test given specified web application. 2d. Apply Various Black box testing Techniques to test given specified web application. 2e. Make use of Review Code Technique to find errors in test software.	2.1 Black-Box and white-box Testing, Static and Dynamic Testing, Static Black Box Testing: Testing The Specification , Static White Box Testing: Examining Design and Code 2.2 Performing a High Level Review of the Specification, Low Level Specification Test Techniques 2.3 White Box Test Techniques: Static Testing –Review, Walkthrough, Inspection, Structural Testing –Code Functional, Code Coverage, Code Complexity –Cyclomatic Complexity 2.4 Black Box Test Techniques: Requirement Testing, Positive & Negative Testing, Boundary Value Analysis, Equivalence Partitioning, Decision Tables, User Documentation Testing, Graph Based Testing. AND Other Black Box Test Techniques 2.5 Test-to-pass and Test-to-fail , Generic Code Review Checklist-Data Reference Errors, Data Declaration	10

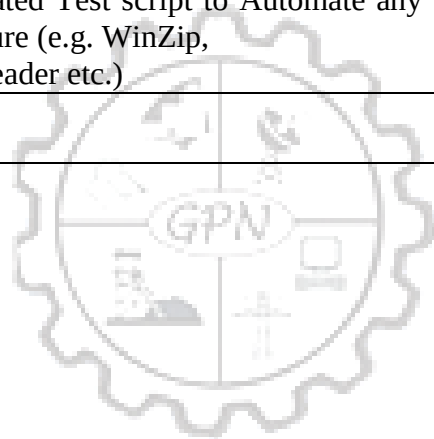
		Errors, Computation Errors, Comparison Errors, Control Flow Errors, Subroutine Error, I/O Errors	
3. Levels of Testing & Writing Test Cases	3a. Apply Testing Levels for given web based application 3b. Test the software for given special Tests. 3c. Create Test Cases for given Test Scenario's. 3d. Prepare test scenarios and Test Data for specified web applications. 3e. Prepare Test Report of executed test cases for given applications.	3.1 Levels of Testing: Unit Testing- Drivers, Stubs Integration Testing- Top down and Bottom Up Testing, Bi-Directional Integration Testing. Testing on web application- Performance Testing, Load Testing, Stress Testing, Security Testing Acceptance Testing –Alpha Testing, Beta Testing 3.2 Regression Testing ,Smoke and Sanity Testing ,Usability, Compatibility Testing 3.3 Test Case, Test Case Specification, Best Practice for writing good Test Cases, Difference between Test Case and Test Scenario 3.4 Preparing test scenarios and Test Data, Writing test cases -User Interface, Functional & Security Test Cases.	08
4. Applying Testing Skills	4a. Prepare Test Plan for software under test. 4b. State why Configuration & Compatibility Testing is necessary. 4c. Identify fundamental parts of a given web page that need to be tested. 4d. Apply basic white-box and black-box techniques to test given web application. 4e. Generate the Test Cases for User interface testing of software under test.	4.1 Test Planning, Test Planning V/s Test Execution, Scope Management, Test Approach, Setting Up criteria for testing, Identify Responsibility, Staffing & Training, Resource Requirements ,Test Deliverables, Testing Tasks. 4.2 An Overview of Configuration Testing, Approaching the Task. 4.3 Compatibility Testing Overview, Platform and Application Versions, Standards and Guidelines, Data Sharing Compatibility. 4.4 User Interface Testing, Making a Good UI, Testing for the Disabled. 4.5 Web Testing Checklists- Functionality Testing, Usability testing, Interface testing, Compatibility testing, Gray-Box Testing, Performance testing, Security testing	10
5. Defect Managemen	5a. Evaluate Cost and economy Aspects related to Testing.	5.1 Cost of Testing, , Testing and Risk 5.2 Test Strategies, Preventive versus Reactive Approach, Analytical	06

t	5b. Apply Test Strategies to test software. 5c. Classify Defects on the basis of estimated Impact 5d. Build Defect Report on any given application. 5e. Apply defect Management process on suitable software.	versus. Heuristic Approach Testing Metrics 5.3 Defect Classification, Defect Management & Prevention ,Defect Life Cycle, 5.4 Defect Report Template ,Defect Logging and Tracking	
6. Automated Testing & Testing Tools	6a. Describe the necessity of test tools and Test automation. 6b. Identify Different Automation Testing Tools to test given application. 6c. Build Automated Test Scripts for sample application. 6d. Develop Methodology to select automation Tool to improve efficiency of testing. 6e. Evaluate Software Testing Metrics in Testing given web application.	6.1 Manual Testing, Limitations of Manual Testing ,Automated Testing & its Benefits, Test Tools, Random Testing, Realities of Using Test Tools and Automation ,when not to automate 6.2 Selection of Best Tool, Types of Test Tools ,advantage and disadvantage of using Test Tools, Test Automation, Testing Using Automated Tools. 6.3 Test Script, Difference Between Test Case And Test Script, ways to create a test script, Run the Test Script 6.4 Define Metrics, Measurements ,Types of Metrics-Process Metrics, Product Metrics, Object Oriented Metrics	06
		Total Hrs.	48

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Develop program in C/C++ to find the roots of a quadratic equation and perform Boundary Value Analysis (BVA)	2.Types of Testing	04
2	Develop a program in C/C++ to find the area of a circle, triangle, square and rectangle and perform Equivalence Class testing.		02
3	Develop a C program to Find the Largest Number Among Three Numbersand Test the same using basis path testing also find it's Cyclomatic Complexity by all the three methods.		02

4	Design Test Cases for Purchase Order Management Specification.	3. Levels of Testing & Writing Test Cases	04
5	Test a website using automation tool like QTP, Winrunner , Selenium etc) and Prepare Test Report of executed Test Cases.	4. Applying Testing Skills	04
6	Test to Perform load and performance testing of web application with Load Testing Tool -JMeter (Apache JMeter).		04
7	Demonstrate test management tool (e.g. Test Director) for testing given web application.		02
8	Use Bug Tracking Tool (e.g. Bugzilla, Bugit, etc) for test software	5.Defect Management	04
9	Use any automated test tool.(e.g. Autoit V3 tool) to test 1) If...else 2) For ...Loop 3)Do...Until 4) Switch .Case	6. Automated Testing &Testing Tools	02
10	Develop any GUI Application e.g. Calculator and Automate using Autoit V3 tool.		02
11	Develop an automated Test script to Automate any installation procedure (e.g. WinZip, Winrar, Acrobet Reader etc.)		02
Total Hrs			32



❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Basics of Software Testing	02(02)	03(03)	03(00)	08(05)
2	Types of Testing	02(02)	03(03)	03(00)	08(05)
3	Levels of Testing & Writing Test Cases	02(02)	03(00)	06(06)	11(08)
4	Applying Your Testing Skills	02(00)	03(03)	06(03)	11(06)
5	Defect Management	02(00)	03(03)	06(03)	11(06)
6	Automated Testing & Testing Tools	02(00)	03(00)	06(06)	11(06)
	Total	12(06)	18(12)	30(18)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T-Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	2	R	2	3	R	2										
2	1	U	3	2	U	3	3	U	3	4	U	3	5	U	3				3/5
3	4	U	3	5	U	3	6	U	3	1	U	3	2	U	3				3/5
4	1	A	3	2	A	3	3	A	3	3	A	3	4	A	3				3/5
5	3	A	3	4	A	3	4	A	3	3	A	3	5	A	3				3/5
6	5	A	6	6	A	6	6	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5, 6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5, 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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Identification of specification	10
2	Generating Test Scenario, Test Cases, Use of automated test tool, Tool Demonstration.	20
3	Automate procedure-Test Scripts, selection of proper testing method & Tool	10
4	Viva Voce	10
	TOTAL	50

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

Course Outcome s (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	--	--	--	--	--	--	--	3
2	3	--	--	--	--	--	--	--	3
3	3	3	3	--	--	--	--	--	3
4	3	3	3	--	--	--	--	--	3
5	3	3	3	2	--	--	--	--	3
6	3	3	3	2	--	--	--	--	3

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

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

Course Outcome s (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	1	2
1	3	--	--	--	--	--	--	3	--
2	3	--	--	--	--	--	--	3	--
3	3	3	3	--	--	--	--	3	--
4	3	3	3	--	--	--	--	3	--
5	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	Software Testing	Pearson Education India ,Second Edition	9788177580310
2	Software Testing Foundations	Andreas Spillner, Tilo Linz, Hans Schaefer, Spillner, Linz, Schaefer, 4th Edition, 2014	978-1937538422
3	Foundations Of Software Testing	AdityaMathur,2nd Edition ©2014 Addison-Wesley Professional	13:9780134195728
4	The Art Of Software Testing	Glenford J. Myers Tom Badgett Corey Sandler, Johnwiley& Sons, Inc., Hoboken, New Jersey., Third Edition	978-1-118-03196-4 978-1-118-13313-2

❖ **E-REFERENCES:**

- Software Engineering – A Practitioner’s Approach, 7th Edition, Roger Pressman
- Bugzilla-<https://www.bugzilla.org/> Accessed on 20/01/2022
- Selenium -<https://www.selenium.dev/> Accessed on 20/01/2022
- AutoIt -<https://www.autoitscript.com/site/> Accessed on 20/01/2022

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

1. Computer System with Latest Configuration
2. Selenium 4 /QTP4.53
3. Autoit Toolv3.2.12.1
4. Bugzilla
5. Spreadsheet Package

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

S.N.	Name	Designation	Institute / Industry
1	Dr.A.R.Mahajan	HoD, Information Technology	Govt.Polytechnic, Nagpur.
2	Dr.M.V.Sarode	HoD, Computer Engineering	Govt. Polytechnic, Nagpur.
3	Mr.Dipak Dhote	Operations Manager, IT-Network Infosystems Pvt LTD	Industry Expert
4	Dr.Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg. and Management, Nagpur.	Member from Academics (External)
5	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
6	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge
7	Mrs.D.P.Chanmanwar	Lecturer in IT	Member (Internal)

8	Mr.L.D.Vilhekar	Lecturer in IT	Member (Internal), Course Reviewer
9	Mr.M.A.Rahman	Lecturer in CM	Course Expert CM
10	Mr.S.J.Pukale	Lecturer in IT	Course Expert IT

(Member Secretary PBOS)

(Chairman PBOS)



GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY: PROGRAMME ELECTIVE COURSE
COURSE CODE : IT306G
COURSE TITLE : MOBILE COMPUTING
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
PT. EXAM : 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. Android application development is one of the rising and growing trends in the industry of mobile. This course examine the principles of mobile application design which are required to understand mobile based applications and develop Android based Application in particular. After completing this course students will design and build a variety of real-time Apps using Android.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Interprets features of different mobile technology.
2. Identify 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. Execute Event driven programming.

❖ **COURSE DETAILS:****A. THEORY :**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and Subtopics	Hrs
1. Introduction to Mobile Computing	1a. Select given tools and software required for given mobile (android) application with justification. 1b. Describe effects on given parameter on given concept of mobile. 1c. Describe given Mobile technology on basis of given point. 1d. Compare services of given architecture on basis of given point.	1.1 Concept of Mobile Communication, Different generations of wireless technology 1.2 Basics of cell, cluster and frequency reuse concept, Noise and its effects on mobile 1.3 Understanding GSM and CDMA, Evolution of mobile system: CDMA, FDMA, TDMA, GSMGPRS Mobility: handoff, types of Handoffs 1.4 Location management, HLRVLRscheme, Hierarchical scheme, predictive location management schemes. 1.5 Basics of GSM architecture and services like voice call, SMS, MMS, LBS, VAS	08
2. Mobile Communication	2a. Design the given mobile computing with consideration of given point. 2b. Describe Security issue concern with given device required for mobile computing. 2c. Describe given IP for making given existing application. 2d. Analyze Mobile computing through telephony on basis of given point. 2e. Classify communication satellite on basis of given point with justification.	2.1 Modes used for Mobile Communication Architecture of Mobile Computing(3 tier), Design considerations for mobile computing, Characteristics of Mobile Communication, Application of Mobile Communication 2.2 Security Concern Related to Mobile Computing, Middleware and Gateway required for mobile Computing 2.3 Making Existing Application, Mobile Enable , Mobile IP, Basic Mobile Computing Protocol 2.4 Mobile Communication via Satellite, Low orbit satellite ,Medium orbit satellite Geo stationary satellite 2.5 Satellite phones	10

3. Introduction to Android	3a. Analyze Open source mobile technology on basis of given Application development. 3b. Demonstrate android Framework on basis of given application. 3c. Set up and create Android Application on basis of given requirements / point.	3.1 Overview of Android, Android Internals, Android for mobile apps development 3.2 Environment setup for Android apps development, Framework, Android, SDK, Eclipse 3.3 Emulators –Emulator / Android AVD Android Emulation – Creation and set up, First Android Application	08
4. Android Activities and GUI Design Concepts	4a. Select criteria for development of given android Application. 4b. Design Android application on basis of given Activities lifecycle. 4c. Describe the steps to use given type of layouts on basis of given point. 4d. Develop simple user interface on basis of given point using GUI objects.	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, Simple UI -Layouts and Layout 4.3 Properties :Introduction to Android UI Design 4.4 XML Introduction to GUI objects viz.: Push Button , Text / Labels ,Edit Text, Toggle Button , Padding	08
5. Advanced UI Programming	5a. Develop Event driven programming in android on basis of given point using given elements. 5b. Demonstrate application using event driven programming in android using given point. 5c. Develop application using time and date	5.1 Event driven Programming in Android (Text Edit, Button clicked etc.) 5.2 Activity Lifecycle of Android, Time and date picker	06

	picker on basis of given point.		
6. Toast, Menu, Dialog, List and Adapters	6a. Describe working with menus and dialog on basis of given point. 6b. Develop Demo Application on basis of given point. 6c. Develop and write a query to perform given database management operation using given tool.	6.1 Menu :Basics, Custom v/s System Menus, Create and Use Handsetmenu Button (Hardware) 6.2 Dialog : Creating and AlteringDialogs, Toast : List & Adapters 6.3 Demo Application Development and Launching, Basic operation of SQLite Database, Android Application Priorities.	08
TOTAL			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 androidSDK, setup eclipse IDE, setup android development tools (ADT)plug-in, create android virtual device.	Introduction Introduction to Android	04
2	Create “Hello World” application. That will display “HelloWorld” in the middle of the screen using Text View Widget in the red color.	Mobile communication	02
3	Design an application for demonstration of android activity life cycle.	Introduction to android	02
4	Develop a Registration page to demonstration of Basic widgets available in android.		
5	Design sample application with login module.(Check user name and password) On successful login, Change Text View “Login Successful”. And on failing login, alert user using Toast “Login fails”.	Android Activities and GUI Design Concepts	02
6	Develop login application where you will have to validate username and passwords Till the username and password is not validated, login button should remain disabled.		02

7	Create an Login application as above. Validate login data and display Error to user using set Error() method.		02
8	Design an application for demonstration of Relative and Table Layout in android.		02
9	Create an application for demonstration of Scroll view in android.		02
10	Create an application for demonstration of Explicitly Starting New Activity using Intent.		02
11	Design an application that will pass two number using Text View to the next screen, and on the next screen display sum of that number.		02
12	Design an application that will get the Text Entered in Edit Text and display that Text using toast (Message).	Advanced UI Programming	02
13	Design an application that will Demonstrate Button on Click()Event and change the Text View Color based on button Clicked.		02
14	Design an UI such that, one screen have list of all the types of cars. On selecting of any car name, next screen should show Cardetails like: name, launched date, company name.	Toast, Menu, Dialog, List and Adapters	04
15	Design an application that will Demonstrate Dialog Box Control In Android.		02
Total Hrs			32

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1	Introduction to Mobile Computing	02(02)	06(00)	00(03)	08(05)
2	Mobile Communication	02(00)	03(03)	06(06)	11(09)
3	Introduction to Android	02(02)	03(03)	03(00)	08(05)
4	Android Activities and GUI Design Concepts	02(00)	03(03)	06(03)	11(06)
5	Advanced UI Programming	02(00)	00(03)	09(03)	11(06)
6	Toast, Menu, Dialog, List and Adapters	02(02)	03(03)	06(00)	11(05)
	Total	12(06)	18(15)	30(15)	60(36)

R – Remember

U – Understand

A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

T-Unit/Topic Number

L- Level of Question

M- Marks

R-Remember

U-Understand

A-Analyze/ Apply

1 R 2 means Unit/Topic Number No- 1, Level of Question –Remember, Marks – 2 Marks

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Options
1	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	6	R	2	6/9
	1	R	2	3	R	2	6	R	2										
2	2	U	3	3	U	3	4	U	3	2	U	3	6	U	3				3/5
3	1	U	3	1	U	3	6	U	3	3	U	3	4	U	3				3/5
4	2	A	3	2	A	3	6	A	3	1	A	3	4	A	3				3/5
5	6	A	3	3	A	3	5	A	3	5	A	3	5	U	3				3/5
6	4	A	6	5	A	6	2	A	6										2/3

❖ ASSESSMENT AND EVALUATION SCHEME:

	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)	25	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	15	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	60	24	Theory Answer Scripts	1,2,3,4,5,6
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	20	--	Journal	1, 2, 3,4,5,6
		Journal Writing		Assignments	05	--	Journal	1, 2, 3,4,5,6
				Total	25	10		
	TEE (Term End Examination)	End Exam	Students	End of the Course	50	20	Practical Answer Scripts	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing program, Logic of the program	10
2	Performance, 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)							Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	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	Building Android Apps In Easy Steps	McGraw Hill Education; 1st 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/>, accessed on 1 Feb 2022
- <http://mobisys.in/blog/2012/01/introduction-to-android-sqlite-database/>, accessed on 1 Feb 2022
- http://www.tutorialspoint.com/android/android_overview.htm, accessed on 1 Feb 2022

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

1. Computer System with latest configuration
2. Hardware: Necessary Kits or Environment to briefly introduce mobile technology Environment like GSM, CDMA and GSM services.
3. Software: Java, Net beans, 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 Department (I.T.Dept.)	Chairman,
2	Mr. DipakDhote	Operations Manager, IT-Network Infosystems Pvt. LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics (External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr.L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal), Course Expert
7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary
8	Mrs.Isha Sangolkar	Lecturer in Information Tech.	Course Expert

(Member Secretary PBOS)

(Chairman PBOS)

GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN INFORMATION TECHNOLOGY
COURSE CATEGORY: PROJECT AND INTERNSHIP
COURSE CODE : IT351G^s
COURSE TITLE : PROJECT
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 : --
PR. TEE EXAM : 02 HR
PT. EXAM : --

❖ RATIONALE:

The project work is to introduce final year students to professional engineering practices. In project work students are engaged in the analysis, synthesis and application of the courses covered in their studies and to undertake & tackle an independent problem related to Information Technology. This course is very useful for understanding the higher level knowledge in the field of Information Technology.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Identify, analyze and define the problems in Information Technology areas.
2. Find different solutions to the problem by collecting data and select most appropriate solution using latest practices in Information Technology.
3. Use and integrate knowledge of different courses and data collected to make simple design with the help of I.S.codes, Handbook, standard data book.
4. Perform project work independently as a leader as well as member of a team.
5. Assess the impact of the project on society.
6. Prepare and present project 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	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	1.Introductory task and Literature Survey	10
2	Plan project Prepare Synopsis in standard format which includes following. Title Page: Project Title, Purpose of	2.Planning	10

	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		
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. • 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.	3.Project Work	15
4	Test Project work	4.Testing	15
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	5. Project Writing	10

	with project report		
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.	6. Presentation	04
Total Hrs			64

C. Project Report:

Students will prepare a “Project Report” with following contents.

- Title page (with the name of team members and mentor teacher)
- Certificate
- Acknowledgements
- Abstract
- Content page

Chapters

1. Chapter:1 Introduction
2. Chapter:2 Literature Survey
3. Chapter:3 Scope of the project
4. Chapter:4 Methodology
5. Chapter:5 Details of designs, working and processes
6. Chapter:6 Results and applications
7. Chapter:7 Conclusions and future scope
8. Appendix (if any)
9. References and Bibliography

Note: The report should contain diagrams, figures and charts etc as relevant for the project.

❖ **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)	PT	Students	Two PT (average of two tests will be computed)	--	--	Test Answer Scripts	1, 2, 3,4,5,6
		Class Room Assignments		Assignments	--	--	Assignment Book	1, 2, 3,4,5,6
	TEE (Term End Examination)	End Exam	Students	End of the Course	--	--	Theory Answer Scripts	1,2,3,4,5,6
				Total	--	--		
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessment of Practical	Students	End of Every Practical	100	40	Project Diary,Notes, Model, Assembly	1, 2, 3,4,5,6
		Journal Writing		Assignments	--	--	Journal	1, 2, 3,4,5,6
				Total	100	40		
	TEE (Term End Examination)	End Exam	Students	End of the Course	100	40	Project Report, Model, Assembly	1,2,3,4,5,6
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			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Identification of Topic	10
2	Punctuality and overall contribution	
3	Project Diary	
4	Execution of Project Work	20
5	Project Report including documentation	20
6	Presentation	20
7	Question and Answer	30
	TOTAL	100

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

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	1	2	3
1	3	--	--	--	--	3	3	3	--	3
2	3	3	--	3	3	3	3	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	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	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:**

- http://people.csail.mit.edu/billf/publications/How_To_Do_Research.pdf accessed on 27th January 2022
- <http://library.bcu.ac.uk/learner/writingguides/1.04.htm> accessed on 27th January 2022

❖ **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:**

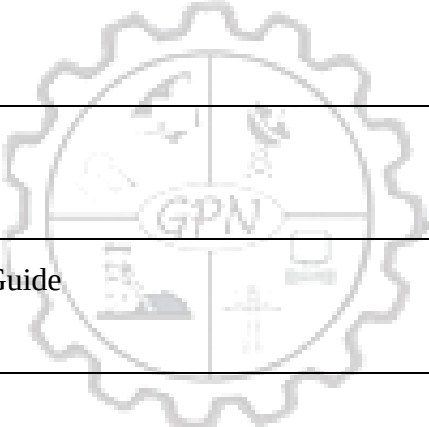
S.N.	Name	Designation	Institute / Industry
1	Dr. A.R.Mahajan	Head of Department (I.T.Dept.)	Chairman
2	Mr. Dipak Dhote	Operations Manager, IT-Network InfosystemsPvt LTD	Industry Expert
3	Dr. Rakesh Kadu	Assistant Professor, I.T., Ramdeobaba College of Engg, and Management, Nagpur.	Member from Academics(External)
4	Mrs.V.A.Raje	Lecturer in C.O., G.P.Arvi	MSBTE Nominee
5	Mr. L.D.Vilhekar	Lecturer in Information Tech.	Member (Internal)
6	Mrs.D.P.Chanmanwar	Lecturer in Information Tech.	Member (Internal), Course Expert
7	Mr.M.N.Gawande	Lecturer in Electrical Engg.	CDC In Charge and Member Secretary

(Member Secretary PBOS)

(Chairman PBOS)

Appendix
Suggestive Project Diary Format

Week No.:
Activities Planned:
Activities Executed:
Reason for delay if any
Corrective measures adopted
Remark and signature of the Guide

A circular logo with a gear-like outer border. Inside the circle, there are four quadrants, each containing a different icon: a lightbulb, a person, a gear, and a person. In the center of the circle, the letters 'GPN' are written in a stylized font.

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/
TR/MC/AIML

COURSE CATEGORY : PROJECT AND INTERNSHIP

COURSE CODE :IN351G

COURSE TITLE :INTERNSHIP

TEACHING SCHEME :TH: 00; TU: 00; PR: 30 (CLOCK Hrs.)

TOTAL CREDITS :15 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCKHR.)

Table: Credit framework for Internship.

Sr. No.	Suggested Schedule	Suggested Duration	Activities	Credits
1.	6 th Semester	16 Weeks	Inter/Intra Institutional activities	15
			Industries/Govt./Non-Govt./NGO/ Rural Internship/Innovation/Entrepreneurship/Research Organizations	
			Seminars/Presentations/Internal Evaluation Work	
			Seminars/Presentations/External Evaluation Work	

TH. TEE : --

PR. TEE : 02 HRs

PT. EXAM : --

❖ **RATIONALE:**

Internship is educational and career development opportunity, providing practical experience in a field or discipline. Industrial training is the demonstration of technical knowledge acquired by the students during their course work. This course provides an opportunity to the students to identify and solve real life problem of the industries / research organizations / society. The main aim of this initiative is enhancement of the employability skills of the students passing out from the institute.

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. Improve career related skills
2. Adopt industrial safety practices
3. Originate survey, related to industrial processes.
4. Appraise industrial working environment.
5. Elaborate Industrial problems
6. Compile, prepare and present report on activities carried out.

❖ **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)	Units	Hrs.
1	Improve Career related activities • Soft Skills • Presentation skills • Career Guidance • Resume Writing skills • Group Discussion skills • Interview skills • Business Etiquette • Effective Email writing • Telephone etiquette • IT Foundation skills • Do's and Don'ts to be followed in Industry • Safety Practices	Orientation / Training	60
2	Adopt 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	60
3	Originate survey, related to the Industrial Process • Collect information regarding various processes carried out in an industry by discussing the allotted supervisor/officer • Note down findings • Prepare brief report	Survey	90
4	Appraise industrial working environment • Follow instructions of supervisor • Observe industrial processes • Record daily work done in diary	Working Experiences	120

❖ **SPECIFICATION TABLE FOR THEORY PAPER:** Not Applicable

❖ **QUESTION PAPER PROFILE FOR THEORY PAPER:** Not Applicable

❖ ASSESSMENT AND EVALUATION SCHEME:

ASSESSMENT AND EVALUATION SCHEME:								
☐	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous)	Progressiv e Test (PT)	Students	Two PT (average of two tests will be computed)	--	--	--	--
		Assignment s		Continuous	--	--	--	--
	TEE (Term End)	End Exam	Stude nts	End of the Course	--	--	--	--
				Total	--	--	--	--
Direct Assessment Practical	CA (Continuous Assessment)	Continuous Assessmen t of Practical	Students	End of Every week	40	--	Rubrics, Assessme nt Sheets & Report	1,2,3,4,5,6
		Report Writing		Continuous	10	--	Report	1,2,3,4,5,6
		Presentation and Viva- Voce		End of the Course or last two weeks	50	--	Rubrics, Report & Presentatio n	1,2,3,4,5,6
				Total	100	40		
	TEE	End Exam	Stude nts	End of the Course	100	40	Rubrics, Report & Presentati on	1, 2, 3, 4,5,6
	Indirect Assessment	Student Feedback on course		Stude nts	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	10
2	Survey	10
3	Work done and Feasibility of work/ problem identified	20
4	Report writing	10
5	Presentation Skills and Viva-Voce	50
Total		100

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

Course Outcomes (Cos)	Program Outcomes (POs)							PSOs	
	1	2	3	4	5	6	7	1	2
1	2	-	2	2	3	3	3	3	3
2	2	3	3	3	2	3	3	3	3
3	3	3	3	3	-	2	3	3	3
4	-	2	3	2	-	3	3	3	3
5	2	3	3	2	1	3	3	3	3
6	-	2	2	-	-	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:**

- <https://learning.tcsionhub.in/courses/career-edge-young-professional/>
- https://www.academia.edu/9360059/INDUSTRIAL_TRAINING_GUIDELINE_BOOK

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

- DLP Projector
- Computers having latest specification

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

S.N.	Name	Designation	Institute / Industry
1	Dr. M. V. Sarode	Head of Deptt., Computer Engg. Deptt and TPO	Government Polytechnic, Nagpur.
2	Dr. G. V. Gotmare	Lecturer	Government Polytechnic, Gondia.
3	Mr. Avinash Shende	Managing Director (Operation & Planning)	Virtual Galaxy InfoTech Pvt. Ltd. Nagpur
4	Mr. Sachin Pande	Managing Director (Business Development & Management)	Virtual Galaxy InfoTech Pvt. Ltd. Nagpur
5	Mr. Vijay Thakare	CEO	SimSoft Technologies Nagpur

(Member Secretary PBOS)



(Chairman PBOS)