

Government Polytechnic, Mumbai

Department of Computer Engineering

P-23 Scheme

Semester I

(Course Contents)



Programme: Diploma in Computer Engineering

(Sandwich Pattern)

Approved Copy

Government Polytechnic Mumbai
(Academically Atonouns Institute, Government of Maharashtra)
Programme: Diploma in Computer Engineering (Sandwich Pattern)
With Effect From Academic Year
Duration
Scheme

Teaching and examination Scheme (P23)
Duration Of Programme : 6 Semester
Semester : First

: 2023-24
: 16 WEEKS
: (P23)

Sr. No.	Course Code	Course Title	Course Type	Total IKS Hrs for Sem	Learning Scheme					Credits	Assesment Scheme															Total Marks
					Actual Contact Hrs/Week				Self Learning (TW + Assignment)		Notional Larning Hrs / Week	Paper Duration (hrs.)	Theory						Based on LL & TL				Based on Self Learning			
													Practical						FA-PR		SA-PR		SLA			
					FA-TH		SA-TH		Total		Max		Min	Max	Min	Max	Min	Max							Min	
					T1	T2	Max	Min	Max										Min	Max	Min	PR	OR			
					Max	Max																				
1	SC23103	Applied Physics	DSC	2	3	-	2	1	6	3	2.30	20	20	60	10	100	40	25	10	25#	-	10	25	10	175	
2	SC23501	Basic Mathematics	AEC	6	4	2	-	2	8	4	2.30	20	20	60	10	100	40	25	10	-	-	-	25	10	150	
3	CO23501	Basics of Electrical & Electronics Engineering	AEC	-	2	-	2	2	6	3	-	-	-	-	-	-	25	10	50@	-	20	25	10	100		
4	IT23102	Logic Development Using C Programming	DSC	-	3	-	4	1	8	4	2.30	20	20	60	10	100	40	25	10	50#	-	20	25	10	200	
5	CO23101	Web Page Design	DSC	-	1	-	2	1	4	2	-	-	-	-	-	-	25	10	25@	-	10	25	10	75		
6	CO23601	Multimedia and Video Creation	SEC	-	-	-	4	2	6	3	-	-	-	-	-	-	25	10	50#	-	20	25	10	100		
7	UV23301	Universal Human Values	VEC	4	1	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	50	20	50		
Total				12	14	2	14	10	40	20		60	60	180		300		150		200			200		850	

Abbreviations : CL-Classroom Learning, TL-Tutorial Learning, LL- Laboratory Learning, FA-Formative Assessment, SA-Summative Assessment, IKS-Indian Knowledge System, SLA-Self Learning Assessment

Legends :@ Internal Assessment, **#** External Assessment, ***#** On Line Examination , **@\$** Internal Online Examination

Note : 1. FA-TH represents addition of two class tests of 20 marks each conducted during the semester.

2. If candidate is not securing minimum passing marks in FA-PR of any course, then the candidate shall be declared as "Detained" in that semester.

3. If candidate is not securing minimum passing marks in SLA of any course, then candidate shall be declared as fail & will have to repeat & resubmit SLA work.

4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.*16 Weeks

5. 1 credit is equivalent to 30 Notional hrs.

6. *Self learning hours shall not be reflected in the TimeTable.

7. Students must secure a **minimum of 40 marks out of 100** for passing the course. It shall be **mandatory to obtain a minimum of 10 marks out of 60** in the End Term Theory Examination separately.

Course Category : Discipline Specific Core Course (DSC): 3, Discipline Specific Elective (DSE):0, Value Education Course(VEC):1, Intern./Apprenti./Project./Community(INP):0,

Ability Enhancement Course (AEC) : 2, Skill Enhancement Course (SEC) : 1, Interdisciplinary Elective (IDE) : 0

APPROVED COPY

CDC Co-ordinator
G. P. Mumbai

Government Poly. Mumbai

Department Coordinator,
Curriculum Development
Dept. of Computer Engineering

Head of Department
Dept. of Computer Engineering

In-Charge
Curriculum Development Cell

Principal

Programme : Diploma in CO/IT													
Course Code: SC23103						Course Title: APPLIED PHYSICS							
Compulsory / Optional: Compulsory													
Teaching Scheme and Credits						Examination Scheme							
CL	TL	LL	SLH	NLH	Credits	FA-TH		SA-TH (2:30Hrs.)	FA-PR	SA		SLA	Total
										PR	OR		
3	-	2	1	6	3	20	20	60	25	25#	-	25	175

Total IKS Hrs. for course: 2hrs.

Abbreviations: CL- Class Room Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @\$ Internal Online Examination

Note:

1. FA-TH represents an average of two class tests of 20 marks each conducted during the term.
2. SA-TH represents the end term examination.
3. FA-PR represents the term work
4. SA-PR represents the end term practical examination.

I. Rationale:

The subject is included under the category of science. The special feature of the subject is to develop the laboratory skill using principles of scientific phenomenon. This course will serve to satisfy the need of the technical students for their development in technical field. The course is designed by selecting the topics which will develop intellectual skills of the students and will guide students to solve broad based engineering problems. Ultimately the focus of the course is to develop psychomotor skills in the students.

II. Industry / Employer Expected Outcome

Physics is a fundamental science that plays a crucial role in various industries and has numerous outcomes that benefit society: Apply principles of physics to solve broad based relevant engineering problems.

III. Course Outcomes: Students will be able to achieve & demonstrate the following COs on completion of course based learning.

CO1	Classify the different physical quantities, identify the proper unit of it and to estimate error in the measurement of physical quantities.
CO2	Apply laws of motion in various engineering applications.
CO3	Analyze the concept of electric field in Engineering technology.
CO4	Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.
CO5	Identify properties and application of light in Engineering field.

IV. Course Content Details:

Unit No.	Theory Learning Outcomes (TLO's) aligned to CO's	Topics / Sub-topics
1	TLO 1a. Explain physical quantities and its types with examples. TLO 1b. Differentiate between scalar and vector quantities with examples. TLO 1c. Apply dimensional analysis to check correctness of equation and conversion of units in different systems. TLO 1d. Estimate the errors in the measurement for the give problem. TLO 1e. Explain the working of ancient astronomical instruments to measure distance, time and hour angle	Units and Measurements 1.1 Fundamental Physical quantities, examples. 1.2 Derived physical quantities, examples. 1.3 Scalar and Vector Physical Quantities. 1.4 Definition and requirements of unit 1.5 System of units, C. G. S., M. K. S. and S. I. units. 1.6 Dimensions, dimensional formula 1.7 Rules to write the unit and conventions of units and Significant figures, rules to write significant figures 1.8 Error – Definition, types of errors and estimation of errors. 1.9 Ancient astronomical instruments: Chakra, Dhanyata, Yasti and Phalak yantra, Numerical Course Outcome: CO1 Teaching Hours :5 hrs. Marks: 8
2	TLO2a. Differentiate between velocity and speed. Identify changes in motion that produce acceleration. Able to calculate speed, velocity and acceleration of an object, analytically, Classify acceleration as positive, negative, and zero. TLO2b. Identify different periodic motion with examples such as oscillatory motion, Vibratory motion, circular motion. TLO2c. Explain angular motion with equation of angular motion, explain relation between linear velocity and angular Velocity, understand the concept of centripetal and centrifugal force TLO2d. Describe real-life situations that illustrate each of	Motions 2.1 Linear motion –Definition – distance, displacement, velocity, acceleration, retardation, equation of motions, acceleration due to gravity and equation motion under gravity, numerical 2.2 Periodic motions: a) Oscillatory motion, b) Vibratory motion, c) S.H.M. d) Circular motion. (only definition and examples) . Terms related to S.H.M. : Definition: Time period, frequency, amplitude, wavelength, and phase 2.3 Angular motion: a) Definition: angular motion. Uniform circular motion. Radius vector, linear velocity, Angular velocity, Angular acceleration, b) Relation between linear velocity and angular

	Newton's laws of motion. TLO2e. Explain the ancient theory of gravitation and laws of motion.	Velocity(derivation), Radial or centripetal acceleration, Three equations of motion (no derivations), Centripetal and Centrifugal force, examples and applications. 2.4. Laws of Motion and it's applications. 2.5. Ancient theory of Gravitation and laws of motion, Numerical. Course Outcome: CO2 Teaching Hours :14hrs Marks: 16
3	TLO3a. Explain the concept of charge, electric field, potential and potential difference, absolute electric potential TLO3b. Calculate force between two charges using Coulomb's law. TLO3C. Illustrate different properties of lines of force TLO3d. Determine electric intensity, potential due a Charge. TLO 3e. Explain the relation between electric flux and electric flux density	Electrostatics 3.1 Definition of charge 3.2 Coulomb's law, Definition of electric field, 3.3 Definition and unit of electric field intensity(E) (No Derivation) 3.4 Definition and properties of electric lines of force 3.5 Definition of electric flux and electric flux density 3.6 Electric Potential (No Derivation) 3.7 Definition & Explanation of Electric Potential 3.8 Definition & Explanation of absolute Electric Potential, Numerical. Course Outcome: CO3 Teaching Hours :6hrs Marks: 10
4	TLO 4a. Explain electric field, potential and potential difference, Ohm's law TLO 4b. Explain resistance, Specific resistance TLO 4c. Apply laws of series and parallel combination to the given electrical circuits. TLO4d. Obtain the balancing condition of Wheatstone's network TLO 4e. Explain the Magnetic effect of current, magnetic induction. TLO 4f. Apply Fleming left hand rule, Fleming right hand rule	4 Electricity and Electromagnetism 4.1.1 Ohm's Law, Statement and mathematical expression 4.2 Resistance & unit of its, Specific resistance, unit of specific resistance. 4.3 Resistance in series and parallel combination, shunt Resistance 4.4 Wheatstone network, balancing condition for it 4.2 Electromagnetism 4.2.1 Magnetic effect of current, magnetic induction 4.2.2 Properties of magnetic lines of force, 4.2.3 Laplace's law, Fleming left hand rule, Fleming right hand rule, Numerical Course Outcome: CO4 Teaching Hours :12hrs Marks: 14

5	TLO 5a. Explain refraction and reflection of light. TLO 5b. Explain refraction of light through prism. TLO 5c. Estimate refractive index of material of prism. TLO 5d. Derive Prism Formula. TLO 5e. Explain the phenomenon of total internal reflection. TLO 5f. Describe the workings and uses of fibre optics.	5 Optics and Optical Fiber 5.1 Optics 5.1.1 Revision of reflection and refraction of light. 5.1.2 Laws of refraction, Snell's law. 5.1.3 Prism formula (derivation). Numerical. 5.2 Optical Fibers: 5.2.1 Principle of propagation of light through optical fiber. 5.2.2 Structure of Optical fiber. 5.2.3 Applications (electronics and medical) and comparison with electrical cable for communication. Course Outcome: CO5 Teaching Hours :8hrs Marks: 12
---	---	--

V.Laboratory Learning Outcome and Aligned Practical / Tutorial Experiences.

Sr No	Practical / Tutorial / Laboratory Learning Outcome (LLO)	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
1	LLO a. Use of measuring instruments LLO b. Find the least count and range of the instruments. LLO c. Interpretation of graph and use of scientific calculator.	To know your Physics laboratory and Use of Scientific Calculator	2	CO1
2	LLO a. Use Vernier caliper to Measure dimensions of given objects. Measure the dimensions of objects of known dimensions. LLO b. Estimate the errors in measurement.	To measure the dimensions of given objects and to determine their volume using Vernier caliper	2	CO1
3	LLO a. Identify types of motion LLO b. Determine the value of acceleration due to gravity.	To determine Acceleration due to gravity by simple pendulum	2	CO2
4	LLO a. Calculate permittivity of free space.	To determine permittivity of free space.	2	CO3
5	LLO a. Apply Ohm's law to solve circuit problems.	To verify Ohm's Law.	2	CO4
6	LLO a. Explain refraction of light. LLO b. Determine refractive index of a given prism	To find refractive index of a given prism by using pin method.	2	CO5

7	LLO a. Use Micrometer Screw gauge to: Measure dimensions of given objects. Measure the dimensions of objects of known dimensions. LLO b. Estimate the errors in measurement.	To measure the dimensions of given objects and to determine their Volume using micrometer screw gauge.	2	CO1
8	LLO a. Identify type of motion LLO b. Calculate the stiffness constant	To determine stiffness constant by using helical spring.	2	CO2
9	LLO a. Verify principle of potentiometer	To verify principle of potentiometer.	2	CO3
10	LLO a. Obtain the balancing condition of Wheatstone's network	To find unknown resistance by using Wheatstone's Bridge.	2	CO4
11	LLO a. Use magnetic compass to draw the magnetic lines of forces of magnet of different shapes and determine neutral points.	Determination of neutral points by magnetic compass.	2	CO5
12	LLO a. Verify law of series connection of resistors.	To find resultant resistance when resistances are connected in series and parallel.	2	CO4
13	LLO a. Determine the specific resistance of given wire.	Determination of specific resistance of given wire.	2	CO4
14	LLO a. Study the properties of light TIR LLO b. Determine the critical angle	To study total internal reflection and to determine the critical angle.	2	CO5
15	LLO a. Define unit and classify into different types of units	Showing Video on different applications related to units,	2	CO1

Note: 10 to 12 experiments should be performed in a term for completion of TW.

VI. Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning): (Minimum 10 Assignments)

- Convert the units of a given physical quantity from one system of units to another
- Measure room temperature of hot baths / bodies by using mercury thermometer and convert it into different units.
- Prepare a chart to summarize units and measurements.
- Use a digital vernier calliper and micrometre screw gauge for measurements. (Lab - based).
- Make a paper scale of least count e.g. 0.01 cm, 0.2cm, 0.5cm.
- What is the difference between speed and velocity?
- What is motion? Describe Straight line motion.
- Explain Average speed and Average velocity.
- Write in detail about your experience of various, types of motion while riding a bicycle on a road.
- Identify the types of motion.
 - Movement of the earth around the sun:
 - Movement of a ceiling fan:
 - A meteor falling from the sky:
 - A rocket launched from the ground:
 - A fish swimming in water:
 - The plucked string of a sitar: ...

11. Sketch the electric lines of force for two- point charges q_1 and q_2 ($q_1 > q_2$) separated by a distance d .
12. What kind of charges are produced on each, when (i) a glass rod is rubbed with silk and (ii) an ebonite rod is rubbed with wool?
13. How the mass of a body is affected on charging?
14. Find the Answer:

S. No.	V (Volt)	I + (Ampere)	R (Ω)
1.	?	0.75	80
2	220	?	400
3	60	4	?
4	220	?	100
5	300	5	?

15. An electric motor takes 5A from an source of 220v . Determine the power of the motor and energy consumed in 2 hrs.

16. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?

17. Prepare a simulation on Ohm's law.

18. Prepare a simulation on Fleming's left- hand right-hand rule

19. Solve 5 problems on law of resistances in series and parallel.

20. To demonstrate T.I.R and working of optical fiber.

VII. Specification Table:

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Unit and Measurements	2	4	2	8
2	Motions	4	4	8	16
3	Electrostatics	2	4	4	10
4	Electricity and Electromagnetism	4	4	6	14
5	Optics and Optical Fibers	2	4	6	12
Total		14	20	26	60

VII. Assessment Methodologies/Tools**Formative assessment (Assessment for Learning)**

Rubrics for continuous assessment based on process and product related performance indicators(25marks)

Summative Assessment (Assessment of Learning)

- End term examination, Viva-voce, Workshop performance (25 marks)

VIII. Suggested COs - POs Matrix Form(Computer Engineering)

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3			2			2	1	2	
CO2	3						1	1		
CO3	3				1		2	1	2	
CO4	3			2	1		2	1	1	
CO5	3			2			2	1	2	
Legends: - High:03, Medium:02, Low:01, No Mapping: --										

VIII.Suggested COs - POs Matrix Form(Information Technology)

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design / Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3			2			2	1	2	
CO2	3						1	1		
CO3	3				1		2	1	2	
CO4	3			2	1		2	1	1	
CO5	3			2			2	1	2	
Legends: - High:03, Medium:02, Low:01, No Mapping: --										

IX.Learning Materials / Books

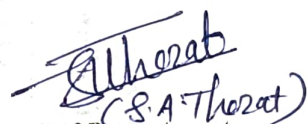
Sr.No.	Author		Publisher
1	R K Gaur & S L Gupta	Engineering Physics	Dhanpati Rai Pub.
2	Prof. Arthur Beiser	Applied Physics	Tata McGraw hill Pub.
3	D K Bhattacharya	Engineering Physics	Oxford University press
4	NCERT / MSBSHSE	Physics 1 & 2	NCERT/MSBSHSE
5	Halliday & Resnick Wiley	Physics Vol 1 & 2	Wiley India
6	Brijlal & Subrahmanyam	Principle of physics	S. CHAND & COMPANY
7	R K Gaur & S L Gupta.	Engineering Physics	Dhanpati Rai Pub.

Sr. No	Link / Portal	Description
1	https://sunitathorat1310.wixsite.com/website-1	Unit and measurement, Motion, Electrostatics, Electricity and Electromagnetism, Optics and Optical fiber,
2	www.physicsclassroom.com	Concept of basic physics
3	www.physics.org	Concept of basic physics
4	www.physics.brown.edu	Concept of basic physics
5	www.amazon.com/Basic-Physics	Concept of basic physics
6	http://scienceworld.wolfram.com/physics/	Concept of basic physics
7	http://en.wikipedia.org/wiki	Concept of basic physics
8	http://hyperphysics.phy-astr.gsu.edu/hbase	Concept of basic physics
9	www.msu.edu/~brechtjo/physics	Concept of basic physics
10	www.answers.com/topic/list-of-basic-physics-topics	Concept of basic physics
11	www.answers.com/topic	Unit and Measurements. Motion, Electrostatics, Electricity and Electromagnetism. Optics and Optical fiber.
12	www.vlab.amrita.edu	All Experiments video
13	www.olabs.edu.in	All Experiments video
14	https://praxilabs.com/en/	All Experiments video
15	www.phet.colorado.edu	Simulation of Topics

XI. Academic Consultation Committee/Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organization
1	Mr. Y.A. Mahajan	Selection grade Lecturer in physics	Bhausaheb Vartak Polytechnic, Vasai
2	Mr. S.S. Salve	Senior Lecturer in physics	S.B.M. Polytechnic, Vile -Parle
3	Mrs. B.J. Chaudhari	Lecturer in physics	Government Polytechnic, Thane
4	Mrs. S.A. Thorat	Lecturer in physics	Government Polytechnic, Mumbai


Coordinator
 Curriculum Development,
 Department of Science & Humanities


Head of Departments
 Department of Science & Humanities


I/C, Curriculum Development Cell


Principal

APPROVED COPY


CDC Co-ordinator
G. P. Mumbar

		Programme : Diploma in EE / EC / IS / CE / ME / CO / IF/AI & ML / RT											
Course Code:SC23501								Course Title :BASIC MATHEMATICS					
		Compulsory / Optional: Compulsory											
Teaching Scheme and Credits						Examination Scheme							
CL	TL	LL	SLH	NLH	Credits	FA-TH		SA-TH (3Hrs.)	FA-PR	SA		SLA	Total
						T1	T2			PR	OR		
4	2	--	2	8	4	20	20	60	25	--	--	25	150

Total IKS Hrs. for course: 06 Hrs

Abbreviations: CL- Classroom Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @\$ Internal Online Examination

Note:

1. FA-TH represents Total of two class tests of 20 marks each conducted during the term.
2. FA-PR represents Tutorial Term-work of 25 Marks
3. SLA represents self learning Assessment of 25 Marks
4. SA-TH represents the end term examination of 60 Marks

I. Rationale

Basic Mathematics plays a crucial role in diploma programmes as it fosters the development of critical thinking skills, enhances quantitative literacy, prepares students for higher education, promotes problem-solving abilities, cultivates logical and abstract thinking and fosters mathematical literacy. By engaging with Mathematics, students acquire logical reasoning, problem-solving techniques and analytical thinking, which are valuable for lifelong learning and professional growth. Calculus is a branch of Mathematics that calculates how matter, particles and heavenly bodies actually move. Derivatives are useful to find maxima and minima of the function, velocity and acceleration are also useful for many engineering optimization problems. Statistics can be defined as a type of mathematical analysis which involves the method of collecting and analyzing data and then summing up the data into a numerical form for a given set of factual data or real-world observations. It equips individuals with the ability to interpret numerical information, make informed decisions and navigate real-world situations. Moreover, Mathematics provides a foundation for further studies in various disciplines and prepares students to tackle complex challenges. By exploring abstract concepts and logical structures, students develop their ability to reason, make connections, and approach problems with clarity and precision. Furthermore, studying Mathematics helps students appreciate the historical and cultural significance of Mathematics and its applications in diverse fields, thereby fostering mathematical literacy and a deeper understanding of the world. Hence the course provides the insight to analyze engineering problems scientifically using logarithms, matrices, trigonometry, straight line, differential calculus and statistics. By incorporating these topics, students comprehend to approach engineering problems from a mathematical perspective, enabling them to devise efficient and effective solutions and this leads to preparing Diploma graduates well-rounded, adaptable and capable of making significant contributions to the branch-specific problems.

II. Industry / Employer Expected Outcome

Apply the concept of Mathematics to solve industry-based technology problems.

III. Course Outcomes: Students will be able to achieve & demonstrate the following COs on completion of course based learning.

CO1	Apply the concepts of algebra to solve engineering (discipline) related problems.
CO2	Utilize trigonometry to solve branch specific engineering problems.
CO3	Solve area specific engineering problems under given conditions of straight lines.
CO4	Apply differential calculus to solve discipline specific problems.
CO5	Use techniques and methods of statistics to crack discipline specific problems.

Course Content Details:

Unit No.	Theory Learning Outcomes (TLO's) aligned to CO's.	Topics / Sub-topics
1	TLO 1.1 Solve the given simple problem based on laws of logarithm. TLO 1.2 Solve given system of linear equations using matrix inversion method. TLO 1.3 Obtain the proper and improper partial fraction for the given simple rational function. TLO 1.4 Solve simultaneous equations by using concept given in Ancient Indian Mathematics	Unit - I Algebra 1.1 Logarithm: Concept and laws of logarithm. 1.2 Matrices: Matrices, algebra of matrices, transpose, value of determinant of matrix of order 3×3, adjoint and inverse of matrices. 1.3 Matrices: Solution of simultaneous equations by matrix inversion method. 1.4 Partial Fractions: Types of partial fraction based on nature of factors and related Problems. 1.5 Algebra in Indian Knowledge System: Solution of simultaneous equations (Indian Mathematics)..
Course Outcome : CO1 Teaching Hours :12 hrs Marks: 12		
2	TLO 2.1 Apply the concept of Compound angle, allied angle and multiple angles to solve the given simple engineering problem(s). TLO 2.2 Apply the concept of Sub- multiple angle to solve the given simple engineering related problem(s). TLO 2.3 Apply concept of factorization and de-factorization formulae to solve the given simple engineering problem(s). TLO 2.4 Investigate given simple problems by utilizing inverse trigonometric ratios. TLO 2.5 Use concept given in Ancient Indian Mathematics for trigonometry to solve given problems.	Unit - II Trigonometry 2.1 Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), submultiple angles, (without proof) 2.2 Factorization and De factorization formulae. (without proof). 2.3 Inverse Trigonometric Ratios and related problems. 2.4 Principle values and relation between trigonometric and inverse trigonometric ratios. 2.5 Trigonometry in Indian Knowledge System: The Evolution of Sine Function in India. 2.6 Indian Trigonometry: Basic Indian Trigonometry-Introduction and Terminology (From Ancient Beginnings to Nilakantha). 2.7 Trigonometry in Indian Knowledge System: Pythagorean triples in Sulbasutras.
Course Outcome : CO2 Teaching Hours :16 hrs Marks: 12		
3	TLO 3.1 Calculate angle between given two straight lines. TLO 3.2 Formulate equation of straight lines related to given engineering problems. TLO 3.3 Identify perpendicular distance from the given point to the line. TLO 3.4 Calculate perpendicular distance between the given two parallel lines. TLO 3.5 Use geometry given in Sulbasutras to solve the given problems.	Unit - III Straight Line 3.1 Straight line and slope of straight line: Angle between two lines, Condition of parallel and perpendicular lines. 3.2 Various forms of straight lines: Slope point form, two-point form, Double intercept form, General form. 3.3 Perpendicular distance from a point on the line. 3.4 Perpendicular distance between two parallel lines. 3.5 Geometry in Sulbasutras in Indian Knowledge System (construction of square, circling the square). (Indian Mathematics).
Course Outcome : CO3 Teaching Hours :6 hrs Marks: 06		

4	TLO 4.1 Solve the given simple problems based on functions. TLO 4.2 Solve the given simple problems based on rules of differentiation. TLO 4.3 Obtain the derivatives of composite, implicit, parametric, inverse, logarithmic, exponential functions. TLO 4.4 Apply the concept of differentiation to find given equation of tangent and normal. TLO 4.5 Apply the concept of differentiation to calculate maxima, minima and radius of curvature for given function. TLO 4.6 Familiar with concept of calculus given in Indian Mathematics.	Unit - IV Differential Calculus 4.1 Functions and Limits: Concept of function and simple examples. 4.2 Functions and Limits: Concept of limits without examples. 4.3 Derivatives: Rules of derivatives such as sum, Product, Quotient of functions. 4.4 Derivatives: Derivative of composite functions(chain Rule), implicit and parametric functions. 4.5 Derivatives: Derivatives of inverse, logarithmic and exponential functions. 4.6 Applications of derivative: Second order derivative without examples, Equation of tangent and normal, Maxima and minima, Radius of curvature. 4.7 Calculus in Indian Knowledge System: The Discovery of Calculus by Indian Astronomers.(Indian Mathematics).
Course Outcome : CO4 Teaching Hours :16 hrs Marks: 18		
5	TLO 5.1 Obtain the range and coefficient of range of the given grouped and ungrouped data. TLO 5.2 Calculate mean and standard deviation of ungrouped and grouped data related to the given simple engineering problem(s). TLO 5.3 Determine the variance and coefficient of variance of given grouped and ungrouped data. TLO 5.4 Justify the consistency of given simple sets of data.	Unit - V Statistics 5.1 Range, coefficient of range of discrete and grouped data. 5.2 Mean deviation and standard deviation from mean of grouped and ungrouped data. 5.3 Variance and coefficient of variance. 5.4 Comparison of two sets of observation.
Course Outcome : CO5 Teaching Hours :10 hrs Marks: 12		

IV. Laboratory Learning Outcome and Aligned Practical / Tutorial Experiences.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr. No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Solve simple problems of Logarithms based on given applications.	1	Solve simple problems of Logarithms based on given applications.	2	CO1
LLO 2.1 Solve elementary problems on Algebra of matrices for branch specific engineering related applications.	2	Solve elementary problems on Algebra of matrices for branch specific engineering related applications.	2	CO1
LLO 3.1 Apply the concept of matrix to solve engineering problems.	3	Solve solution of Simultaneous Equation using inversion method.	2	CO1
LLO 4.1 Apply the concept of matrix to solve engineering problems.	4	Apply Matrix Inversion method to determine currents through various branches of given electrical networks.	2	CO1
LLO 5.1 Apply the concept of matrix to solve engineering problems.	5	Determine inverse of a non-singular matrix by using open source software.	2	CO1
LLO 6.1 Apply the concept of partial fraction to solve engineering problems.	6	Resolve into partial fraction using linear non-repeated, repeated, and irreducible quadratic factors.	2	CO1
LLO 7.1 Solve problems on Compound, Allied, multiple and sub multiple angles for related shapes.	7	Solve problems on Compound, Allied, multiple and sub multiple angles for related shapes.	2	CO2
LLO 8.1 Utilize the concept of trigonometry to solve engineering problems.	8	Practice problems on factorization and de factorization.	2	CO2
LLO 9.1 Utilize the concept of trigonometry to solve engineering problems.	9	Solve problems on inverse trigonometric ratios based on applications.	2	CO2
LLO 10.1 Solve branch specific engineering problems under given conditions of straight lines.	10	Practice problems on equation of straight lines using different forms.	2	CO3

LLO 11.1 Solve branch specific engineering problems under given conditions of straight lines.	11	Solve problems on perpendicular distance, distance between two parallel lines and angle between two lines.	2	CO3
LLO 12.1 Solve branch specific engineering problems under given conditions of straight lines.	12	Use given form of straight line to calculate the speed, distance and time of moving object.	2	CO3
LLO 13.1 Apply the concept of derivative to solve engineering problems.	13	Solve problems to find derivatives of implicit function and parametric function.	2	CO4
LLO 14.1 Apply the concept of derivative to solve engineering problems.	14	Solve problems to find derivative of logarithmic and exponential functions for engineering applications.	2	CO4
LLO 15.1 Apply the concept of equation of tangent and normal to solve engineering problems.	15	Solve problems based on finding equation of tangent and normal for engineering applications.	2	CO4
LLO 16.1 Apply the concept of maxima, minima and radius of curvature to solve engineering problems.	16	Solve problems based on finding maxima, minima of function and radius of curvature at a given point for engineering applications.	2	CO4
LLO 17.1 Apply the concept of equation of tangent and normal to solve engineering problems.	17	Use the concept of tangent and normal to solve the given problem of Engineering Drawing.	2	CO4
LLO 18.1 Apply the concept of Maxima and Minima to solve engineering problems.	18	Use the concept of Maxima and Minima to obtain optimum value for given engineering problem.	2	CO4
LLO 19.1 Apply the concept of radius of curvature to solve engineering problems.	19	Use the concept of radius of curvature to solve given branch specific engineering problem.	2	CO4
LLO 20.1 Utilize the concept of derivative to solve engineering problems.	20	Use the concept of derivative to find the slope of a bending curve for given engineering problem.	2	CO4
LLO 21.1 Use concept of range and mean deviation to crack branch specific problems.	21	Solve problems on finding range, coefficient of range and mean deviation for given applications.	2	CO5
LLO 22.1 Use concept of standard deviation and coefficient of variance to crack branch specific problems.	22	Solve problems on standard deviation, coefficient of variation and comparison of two sets.	2	CO5
LLO 23.1 Use concept of standard deviation to crack branch specific problems.	23	Calculate the Standard Deviation for Concrete with the given data for given engineering applications.	2	CO5

Note: 1. Take any 10-12 tutorials out of 23 and ensure that all the units are covered. 2. Take tutorial in the batch size of 20 to 30 students. 3. Give students at least 10 problems to solve in each tutorial.

Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning):

- Collect examples based on real world applications of logarithm and prepare a pdf file
- Solve the simultaneous system of equation in two variables by Matrix Inversion Method.
Write down a Mathematical programming using any open source software to verify the result.
- Collect an examples on coding theory using applications of matrices and prepare a pdf file.
- Represent the Graph of Trigonometric function, Logarithmic function on Geogebra and interpret the nature of graph and Make a pdf file.
- Measure height of trees in surrounding locations using trigonometry and prepare presentation.
- Find the derivative of $y = x^x \sin x$ and visualize the graph of the function and its derivative using any open source software geometrically.
- Find height of room or distance between two pillars by using concept of straight line.
- Collect at least 10 examples based on real world applications of standard deviation/variance.

- Collect at least 10 examples based on real world uses of applications of derivative.
- Attempt any 5-7 Assignment, out of the given list.

V. Specification Table:

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Algebra	2	4	6	12
2	Trigonometry	2	4	6	12
3	Straight Line	2	2	2	6
4	Differential Calculus	2	8	8	18
5	Statistics	2	4	6	12
Total		10	22	28	60

VI. Assessment Methodologies/Tools**Formative assessment (Assessment for Learning)**

- TH- Progressive /Periodic Test test each of 20 Marks
- TL - Continuous Assessment of Tutorials for 25 Marks
- SL - Continuous Assessment of Self Learning for 25 Marks

Summative Assessment (Assessment of Learning)

- TH - Term End examination of 60 Marks

VII. Suggested COs - POs Matrix Form

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	--	1	--	1	1			
CO2	3	1	--	--	1	1	1			
CO3	3	--	--	--	--	--	--			
CO4	3	1	1	1	--	1	--			
CO5	3	2	1	1	1	1	1			

Legends: - High:03, Medium:02, Low:01, No Mapping: --

VIII. Suggested Learning Materials / Books

Sr.No	Author	Title	Publisher
1	Grewal B. S.	Higher Engineering Mathematics	Khanna publication New Delhi , 2013 ISBN:8174091955
2	Dutta, D	A text book of Engineering Mathematics	New age publication New Delhi, 2006 ISBN 978-81-224-1689-3
3	Kreyszig, Ervin	Advance Engineering Mathematics	Wiley publication New Delhi 2016 ISBN: 978-81-265-5423-2
4	Das H.K.	Advance Engineering Mathematics	S Chand publication New Delhi 2008 ISBN:9788121903455
5	Marvin L. Bittinger David J. Ellenbogen Scott A. Sargent	Calculus and Its Applications	Addison-Wesley 10th Edition ISBN-13: 978-0-321-69433-1
6	C. S. Seshadri	Studies in the History of Indian Mathematics	Hindustan Book Agency, New Delhi 110016. ISBN978-92-80250-06-9
7	George Gheverghese Joseph	Indian Mathematics Engaging with the World from Ancient to Modern Times	World Scientific Publishing Europe Ltd. 57 ISBN978-17-86340-61-0
8	Deepak Singh	Mathematics-I	Khanna Book Publishing Co. (P) Ltd. ISBN: 978-93-91505-42-4
9	Garima Singh	Mathematics-II	Khanna Book Publishing Co. (P) Ltd. ISBN: 978-93-91505-52-3
10	Gareth James, Daniela Witten, Trevor Hastie Robert and Tibshirani	An Introduction to Statistical Learning with Applications in R	Springer New York Heidelberg Dordrecht London ISBN 978-1-4614-7137-0 ISBN 978-1-4614-7138-7 (eBook)
11	Gunakar Muley	Sansar Ke Mahan Ganitagya	First Edition, Rajkamal Prakashan, ISBN-10.8126703571, ISBN-13. 978-8126703579
12	T.S. Bhanumurthy	A Modern introduction to Ancient Indian Mathematics	New Age International Private Limited, 1 January 2008 ISBN- 10. 812242600X, ISBN-13. 978-8122426007
13	M.P. Trivedi and P.Y. Trivedi	Consider Dimension and Replace Pi	Notion Press; 1st edition (2018), ISBN-978-1644291795

IX. Learning Websites & Portals

Sr.No	Link /Portal	Description
1	http://nptel.ac.in/courses/106102064/1	Online Learning Initiatives by IITs and IISc
2	www.scilab.org/ -SCI Lab	Signal processing, statistical analysis, image enhancement.
3	www.mathworks.com/product/matlab/ -MATLAB	Applications of concepts of Mathematics to coding.
4	Spreadsheet Applications	Use of Microsoft Excel, Apple Numbers, Google Sheets.
5	https://ocw.mit.edu/	MIT Course ware
6	https://www.khanacademy.org/math?gclid=CNqHuabCys4CFdOJaddHoPig	Concept of Mathematics through video lectures and notes
7	http://ocw.abu.edu.ng/courses/mathematics/	List of Mathematical Courses.

8	https://libguides.furman.edu/oer/subject/mathematics	Open Education Resources (OER) in Mathematics.
9	https://phet.colorado.edu/en/simulations/filter?subjects=math&type=html,prototype	Phet Simulation for Mathematics.
10	https://libguides.cmich.edu/OER/mathematics	Mathematics with OER.

X. Academic Consultation Committee/Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organization
1	Mrs.Sanchita Datta	Lecturer in Mathematics (Selection Grade)	St.Xavier's Institute of Technology,Mahim
2	Mr.Abhijit Sadashiv Patil	Lecturer in Mathematics	Government Polytechnic,Mumbai
3	Mr.Vinod Shantaram Patil	Lecturer in Mathematics	Government Polytechnic,Mumbai

Coordinator,
Curriculum Development,
Department of _____

Engineering

Head of Department
Department of _____

Engineering

I/C, Curriculum Development Cell

Principal

APPROVED COPY

CDC Co-ordinator
G. P. Mumbai

Programme : Diploma in Computer Engineering and Information Technology (Sandwich Pattern)												
Course Code:CO23501						Course Title : Basics of Electrical & Electronics Engineering						
Compulsory / Optional: Compulsory												
Teaching Scheme and Credits						Examination Scheme						
CL	TL	LL	SLH	NLH	Credits	FA-TH	SA-TH (3Hrs.)	FA-PR	SA		SLA	Total
									PR	OR		
02		02	02	06	03			25	50@		25	100

▪ **Total IKS Hrs. for course:**

Abbreviations: CL- ClassRoom Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# on Line Examination, @\$ Internal Online Examination

Note:

1. FA-TH represents a two class tests of 20 marks each conducted during the term.
2. SA-TH represents the end term examination.

I. Rationale

The foundation for working of computer and its peripherals are based on electronics. Circuits used in computer and its peripherals utilize electrical energy for their operations. The course has been designed to give fundamental knowledge of electrical and electronics circuits. It will develop skills in students to understand simple electrical and electronic components and circuits, so that they will be able to handle computer hardware and its peripherals.

II. Industry / Employer Expected Outcome

1. Apply electrical and electronics fundamentals.

III. Course Outcomes: Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1	Represent different number system.
CO2	Explain fundamentals of alternating quantities and its behavior with resistive, inductive and capacitive circuits.
CO3	Apply AC and DC circuit's fundamental.
CO4	Design and experiment with various application circuits using diodes and transistors.
CO5	Explain the working and Use of various semiconductor devices.

Course Content Details:

Unit No.	Theory Learning Outcomes (TLO's) aligned to CO's.	Topics / Sub-topics
1	TLO 1.1 Describe types of signals and systems. Compare analog and digital signals, analog system and digital system. TLO 1.2 Understand the concept of base of number system. TLO 1.3 Describe Decimal number system and its conversion in other number systems. TLO 1.4 Describe Binary number system and its conversion in other number systems. TLO 1.5 Describe Octal number system and its conversion in other number systems. TLO 1.6 Describe Hexadecimal number system and its conversion in other number systems. TLO 1.7 Explain types of codes and its conversions.	Number Systems and codes 1.1 Introduction to digital signal, Difference between analog signal and digital signal. Advantages of digital systems over analog systems, positive and negative logic 1.2 Concept of base of number system 1.3 Decimal number system 1.4 Binary number system, 1.5 Octal number system 1.6 Hexadecimal number system 1.7 Types of codes : BCD, Excess 3, Gray code Course Outcome : CO1 Teaching Hours : 6hrs Marks: Marks: R- NA, U-NA, A-NA
2	TLO 2.1 Derive mathematical expression for ac quantities. TLO 2.2 Represent the given ac quantities with phasor diagram. TLO 2.3 Understand the quantities their units and derive equation for resistors in series and parallel.	AC fundamentals 2.1 Alternating Current, Sinusoidal waveforms Mathematical Expression of alternating quantity. 2.2 Definition of Waveform instantaneous value, Cycle, Time period, Frequency. Amplitude, Peak value, Average value and RMS value, Form factor and Peak factor for sinusoidal wave, Phase, Phase difference, Phasor representation of sinusoidal quantities. 2.3 Electrical circuit elements: Resistors, Inductors, Capacitors. Their properties, units, symbols. Resistors in series and parallel Capacitors in series and parallel. Course Outcome : CO2 Teaching Hours : 4hrs Marks: Marks: R- NA, U-NA, A-NA

3	TLO 3.1 Calculate the impedance, current, power factor of ac circuits. TLO 3.2 Represent ac quantities with phasor diagram. TLO 3.3 Differentiate between ac current and dc current. TLO 3.4 Derive equation for equivalent resistors connected in series and apply voltage divider rule. TLO 3.5 Derive equation for equivalent resistors connected in parallel and apply current divider rule. Read the terms related the circuits and apply KCL and KVL.	AC and DC Circuits 3.1 Performance of AC when it passes through Pure R, Pure L and Pure C, Concept of inductive reactance and capacitive reactance and impedance. 3.2 Circuit diagram, phasor diagram and waveform for RL, series, RC series and RLC series circuit. Impedance and Impedance Triangle. Active power, Reactive power and apparent power, power factor. (only Definitions) 3.3 Direct current definition and waveform, Difference between AC and DC 3.4 DC series circuit: Concept, Equation for equivalent resistance connected in series, Voltage division rule, Application of series circuit. 3.5 DC Parallel circuit: Concept, Equation for equivalent resistance connected in parallel, Current division rule, Application of Parallel circuit. Series parallel circuit, Application of series parallel circuit. Definition of Circuit, Parameter, Linear circuit, Nonlinear circuit, Bilateral circuit, Unilateral circuit, Electric network, Passive-Network. Active network, Node, Branch, Loop, Mesh. Kirchhoff's current law, Kirchhoff's voltage law, signs convention. Course Outcome : CO3 Teaching Hours :8hrs Marks: Marks: R- NA, U-NA, A-NA
4	TLO 4.1 Understand and explain semiconductor and its types. TLO 4.2 Draw VI characteristics of zener diode and calculate its voltage. TLO 4.3 Explain working of transistors and VI characteristics in all modes. Compare BJT and FET. TLO 4.4 Explain working of MOSFET.	Semiconductor Devices 4.1 Semiconductors: Intrinsic, Extrinsic semiconductor, P type, N type semiconductor 4.2 Semiconductor Diode: PN junction diode, Zener diode, (Symbol, working, VI characteristics, applications) Transistors: 4.3 BJT: NPN, PNP transistors (symbol, working, Active, cut off, saturation region. FET: N channel, P channel (symbol, working), Difference between BJT and FET 4.4 MOSFET (symbol, working, applications) Course Outcome : CO4 Teaching Hours :6hrs Marks: Marks: R- NA, U-NA, A-NA

5	TLO 5.1 Draw diagrams of all types of semiconductor devices and draw its VI characteristics. TLO 5.2 Describe types of Filters and rectifiers with circuit diagram. TLO 5.3 Explain applications of diode .Explain working of transistor as switch and amplifier.	Semiconductor Devices Applications 5.1 LED, LASER diodes, 7 segment display, Photodiode, Phototransistor 5.2 Rectifiers and filters: Half Wave Rectifier, Full Wave Rectifier and Bridge rectifierwith RC, LC, II filter (Circuits, waveforms, applications, comparison, No mathematical analysis) 5.3 Diode as clipper (Circuits, waveform,working). Positive clipper, Negative clipper) ,Diode as clamper: Positive clamper, Negative clamper, Zener diode as a voltage regulator, Transistor as an amplifier Transistors as a switch. Course Outcome : CO5 Teaching Hours :6hrs Marks: Marks: R- NA, U-NA, A-NA
---	---	---

IV. Laboratory Learning Outcome and Aligned Practical / Tutorial Experiences.

Sr N o	Practical / Tutorial / Laboratory Learning Outcome (LLO)	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
1	LLO: 1. Build a series resistive and parallel resistive circuit. 2. Measure its voltages and currents. 3. Verify voltage division and current division rule.	Measure voltages and currents in series and parallel resistive circuit and verify voltage division rule and current divisionrule.	02	CO1
2	LLO: 1. Build a KVL and KCL circuit. 2. Observe its readings. And verify laws.	Verify KCL and KVL	02	CO2
3	LLO: 1. Build a half wave rectifier. 2. Observe its input and output waveform. 3. Calculate its amplitude and frequency.	To construct and test half wave rectifier. Observe and measure input and output waveforms (Amplitude, frequency)	02	CO5
4	LLO: 1. Build a Zener voltage regulator. 2. Draw the observation table and calculate line and load regulation.	To construct and test Zener voltage regulator. Find out loadand line regulation.	02	CO4
5	LLO: 1. Build a R, L, C ac circuits. 2. Measure its phase relation between voltages and current and draw phasor diagram.	Measure the phase relation between voltage and current in pure resistive, inductive and capacitive circuit.	02	CO3

6	LLO: 1. Build a ac circuit. 2. Observe sinusoidal waveform. 3. Calculate its amplitude and frequency.	Measure amplitude, frequency of a sinusoidal waveform on oscilloscope	02	CO2
7	LLO: 1. Build a full wave rectifier. 2. Observe its input and output waveform. 3. Calculate its amplitude and frequency.	To construct and test full wave rectifier. Observe and measure input and output waveforms (Amplitude, frequency)	02	CO5
8	LLO: 1. Build a Bridge rectifier. 2. Observe its input and output waveform. 3. Calculate its amplitude and frequency.	To construct and test Bridge rectifier. Observe and measure input and output waveforms (Amplitude, frequency)	02	CO5
9	LLO: 1. Build a transistor as a switch. 2. Observe its output and on off state.	To construct and test transistor as a switch.	02	CO5
10	LLO: 1. Build a clipper and clamper circuit. 2. Observe its input and output waveform. 3. Calculate its amplitude and frequency.	To construct and see the waveforms of any type of clipper & clamper	02	CO5
11	LLO: 1. Build a circuit according to topic. 2. Draw its circuit diagram and observe readings or show the output.	Mini Project (Electronic hobby kit)	02	All CO

Note: if any

V. Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning):

1. Make a poster showing various representations of number system.
2. Make a poster showing various semiconductor devices.
3. Make a poster showing types of Rectifiers.

VI. Specification Table: NA

VII. Assessment Methodologies/Tools

Formative assessment (Assessment for Learning)

Rubrics for continuous assessment based on process and product related performance indicators (__ marks)

Summative Assessment (Assessment of Learning)

End term examination, Viva-voce, Workshop performance (__ marks)

VIII. Suggested COs - POs Matrix Form

Course Outcomes (COs)	Programme Outcomes (POs) (Information Technology)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CO1	1			2			1		1	
CO2	1			2			1	2		
CO3	2			2	1				2	
CO4	2			3	1		2		3	1
CO5	2			3					3	1
Legends: - High:03, Medium:02, Low:01, No Mapping: --										

Course Outcomes (COs)	Programme Outcomes (POs) (Computer Engineering)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CO1	1			2			1		1	
CO2	1			2			1	2	1	
CO3	2			2	1			1	2	
CO4	2			3	1		2		3	2
CO5	2			3				1	3	1
Legends: - High:03, Medium:02, Low:01, No Mapping: --										

IX. Suggested Learning Materials / Books

Sr.No	Author	Title	Publisher
1	V. K. Mehta, Rohit Mehta, S.Chand, First, 1996	Principles of Electrical Engineering and Electronics	81-219-2729-3
2	B. L. Theraja, A. K. Theraja, S.Chand, First, 2006	Electrical Technology Volume I	81-219-2440-5
	B. L. Theraja, A. K. Theraja, S.Chand, First, 2006	Electrical Technology Volume IV	978-81-219-2667-6
	Hughes, Pearson, Ninth, 2005	Electrical and Electronic Technology	978-81-317-1468-3

X. Learning Websites & Portals

Sr.No	Link / Portal	Description
1	www.electricaltechnology.org	
2	www.electronics-tutorials.ws	
3	www.allaboutcircuits.com	
4	www.electronics.wisc-online.com	
5	www.alldatasheet.com	

XI. Academic Consultation Committee/Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organization
1	Prof. P. S. Sadafule	Lecturer In Computer Engineering	Govt Polytechnic Mumbai
2	Prof. J. S. Patil	Lecturer In Computer Engineering	Govt Polytechnic Mumbai
3	Prof. Leena Bharambe	Lecturer In Computer Engineering	Govt Polytechnic Mumbai
4	Prof. Prajakta Nagargoje	Lecturer in Electronics and Telecommunications	Govt. Polytechnic Mumbai

Coordinator,
Curriculum Development,
Department of Computer Engineering

I/C, Curriculum Development Cell

Head of Department
Department of Computer Engineering

Principal

APPROVED COPY

CDC Co-ordinator
G. P. Mumbai

Programme : Diploma in Information Technology and Computer Engineering (Sandwich Pattern)													
Course Code:IT23102						Course Title : Logic Development using C Programming							
Compulsory / Optional: Compulsory													
Teaching Scheme and Credits							Examination Scheme						
CL	TL	LL	SLH	NLH	Credits	FA-TH		SA-TH (3Hrs.)	FA-PR	SA		SLA	Total
										PR	OR		
3	-	4	1	8	4	20	20	60	25	50#	-	25	200

Total IKS Hrs. for course:

Abbreviations: CL- Classroom Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @\$ Internal Online Examination

Note:

1. FA-TH represents an average of two class tests of 30 marks each conducted during the term.
2. SA-TH represents the end term examination.

I. Rationale

In today's information technology era, computer Technology plays an important role. Computer applications are all pervasive in day to day life of human being. It became compulsory to all employable to have sound knowledge of how computer works and process data and information. This subject covers from the basic concept of C to pointers in C. This course will act as "programming concept developer" for students. It will also act as "Backbone" for subjects like OOPS, VB, Windows Programming, JAVA, OOMD, etc.

II. Industry / Employer Expected Outcome

Students should be able to develop application in C programming.

III. Course Outcomes: Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1	Illustrate the Flow chart and describe an algorithm for a given program.
CO2	Understand I/O statements in C
CO3	Use Conditional and iterative statements in C programs
CO4	Demonstrate arrays and strings
CO5	Demonstrate the use of user defined functions to solve real time problems
CO6	Understand Structures and unions and Files.
CO7	Describe the use of pointers

Course Content Details:

Unit No.	Theory Learning Outcomes (TLO's) aligned to CO's	Topics / Sub-topics
1	TLO 1.1: Explain what is algorithm how to write the algorithm and pseudocode. TLO 1.2: Explain how to write algorithms for different problems like – (i) Exchange the values of two variables with and without temporary variable, (ii) Counting positive numbers from a set of integers, (iii) Summation of set of numbers, (iv) Reversing the digits of an integer, (v) Find smallest positive divisor of an integer other than 1, (vi) Find G.C.D. and L.C.M. of two as well as three positive integers, (vii) Generating prime numbers. TLO 1.3: Explain what is flowchart and different symbols used in flowchart and how to develop the flowchart.	Program Logic development 1.1 Fundamentals of algorithms: Notion of an algorithm. Pseudo-code conventions like assignment statements and basic control structures. 1.2 Algorithmic problems: Develop fundamental algorithms for (i) Exchange the values of two variables with and without temporary variable, (ii) Counting positive numbers from a set of integers, (iii) Summation of set of numbers, (iv) Reversing the digits of an integer, (v) Find smallest positive divisor of an integer other than 1, (vi) Find G.C.D. and L.C.M. of two as well as three positive integers, (vii) Generating prime numbers. 1.3 Flow chart: Draw flow charts for all algorithms developed Course Outcome- CO1 Teaching Hours – 05 Marks: 08(R-02 U-02 A-04)
2	TLO 2.1: Explain the different programming approaches - Procedural approach, Object Oriented approach, Event Driven approach with examples. TLO 2.2 : Explain what is structure of C with diagram and each section of the diagram. Explain the use of comments and compilation of the program. TLO 2.3: Explain Data Concepts: Variables, Constants, data types like: int, float char, double and void with different example programs.	Basics of C programming 2.1 Different approaches in programming: Procedural approach, Object Oriented approach, Event Driven approach. 2.2 Structure of C: Header and body, Use of comments, Compilation of a program. 2.3 Data Concepts: Variables, Constants, data types like: int, float char, double and void. Qualifiers: short and long size qualifiers, signed and unsigned qualifiers. Declaring variables, Scope of the variables according to block, Hierarchy of data types.

	Qualifiers: short and long size qualifiers, signed and unsigned qualifiers. Declaring variables, Scope of the variables according to block, Hierarchy of data types with different example programs. TLO 2.4: Explain different operators in C - Logical, Arithmetic, Bitwise, Relational, Assignment with example programs. TLO 2.5: Explain different Input output statements - Input and output using printf() and scanf() character I/O.(Programs based on I/O) with different example programs.	2.4 Operators in C: Logical, Arithmetic, Bitwise, Relational, Assignment 2.5 Basic Input output: C program structure, Input and output using printf() and scanf(), character I/O. (Programs based on I/O) Course Outcome- CO2 Teaching Hours – 08 Marks:08(R-02 U-02 A-04)
3	TLO 3.1: Explain different Decision making like - If Statement, If else statement, Nesting of if-else using syntax and examples and student should be able to write programs. TLO 3.2: Describe branching statement The switch statement with syntax and examples. TLO 3.3: Explain the looping statement While loop, Do-while loop, For loop with syntax and example programs. TLO 3.4: Describe the Ternary operator with syntax and example programs. TLO 3.5: Explain the Go to statement with syntax and example programs. TLO 3.6: Explain the use of break and continue statements with syntax and example programs.	Control Structures 3.1 Decision making: If Statement, If else statement, Nesting of if-else 3.2 branching: The switch statement 3.3 Looping: While loop, Do-while loop, For loop 3.4 Ternary operator 3.5 Go to statement 3.6 Use of break and continue statements Course Outcome- CO3 Teaching Hours – 10 Marks:10 (R-02 U-04 A-04)
4	TLO 4.1: Explain One dimension, two dimension and multidimensional arrays with syntax and example programs. TLO 4.2: Describe and explain Array declaration with examples. TLO 4.3: Explain Array initialisation with examples. TLO 4.4: Describe and explain calculating the	Arrays and Strings 4.1 One dimension, two dimension and multidimensional arrays 4.2 Array declaration 4.3 Array initialization 4.4 calculating the length of an array

	length of an array with examples. TLO 4.5: List and explain different operations on array. TLO 4.6: List different String input/output. TLO 4.7 : List different String operations. TLO4.8: Explain Array of strings	4.5 Operation on array 4.6 String input/output 4.7 String operations 4.8 Array of strings Course Outcome- CO4 Teaching Hours – 08 Marks:10 (R-02 U-04 A-04)
5	TLO 5.1: Uses and concept of Library functions. TLO 5.2 : List different String functions (comparison, concatenation, length) with example programs TLO 5.3: User-defined functions and example programs. TLO 5.4 : Define Local & global variables and give examples. TLO 5.5: Describe Parameter passing with example programs TLO5.6: Name and explain different Storage classes	Functions 5.1 Concept of library functions 5.2 String functions (comparison, concatenation, length) 5.3 User-defined functions 5.4 Local & global variables 5.5 Parameter passing 5.6 Storage classes Course Outcome- CO5 Teaching Hours – 05 Marks:08 (R-02 U-02 A-04)
6	TLO 6.1: Explain Basic Concept of Structure and Union and Files. TLO 6.2 : Describe Structure declaration, initialization with examples. TLO 6.3 : Explain Structure within structure with example program. TLO 6.4 : Describe Structure within structure with example programs. TLO 6.5 :: Describe Array of Structure. TLO 6.6 : Describe and Explain Union. TLO 6.7: Describe and Explain Creating a file. TLO 6.8 : List and explain CRUD operations on File.	Structure and Union and Files 6.1 Basic Concept 6.2 Structure declaration, initialization 6.3 Structure within structure 6.4 Nested Structures 6.5: Array of Structure 6.6 Union 6.7 Creating a file 6.8 CRUD operations on File. Course Outcome- CO6 Teaching Hours:05 Marks:08 (R-02 U-02 A-04)

7	TLO 7.1: Explain Basic concept of Pointers.	Pointers
	TLO 7.2: Describe Pointer & arrays	7.1 Basic concept
	TLO 7.3: Describe Pointer & functions	7.2 Pointer & arrays
	TLO 7.4: Explain Pointer arithmetic	7.3 Pointer & functions
		7.4 Pointer arithmetic
Course Outcome- CO7 Teaching Hours:06 Marks:08 (R-02 U-02 A-04)		

IV. Laboratory Learning Outcome and Aligned Practical / Tutorial Experiences.

Sr No	Practical / Tutorial / Laboratory Learning Outcome (LLO)	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant Cos
1	LLO a: Able to Write an algorithm and draw the flow chart To find out number is odd or even. LLO b: Able to Write an algorithm and draw the flow chart to find out factorial value of a number. LLO c: Able to Write an algorithm and draw the flow chart To check a number is prime number or not.	Write an algorithm and draw the flow chart for following: a) To find out number is odd or even. b) To find out factorial value of a number. c) To check a number is prime number or not.	4	CO1
2	LLO a: Able to write program to find out number is odd or even. LLO b: Able to write program to find out factorial value of a number. LLO c: Able to write program to check a number is prime number or not.	Program based on Input/output statement. a) To find out number is odd or even. b) To find out factorial value of a number. c) To check a number is prime number or not.	4	CO2

3	LLO a: Understand and write program to find whether the input number is even or odd. LLO b: Understand and write program to find whether the number entered is positive or negative. LLO c: Understand and write program to find the greatest number among three numbers using nested if d) Program that asks user an arithmetic operator (,,+,, "-,, "*" or ,,/") and take two operands and perform the corresponding calculation on the operands using switch case	Program using control structures: Branching a) To find whether the input number is even or odd. b) To find whether the number entered is positive or negative. c) To find the greatest number among three numbers using nested if d) Program that asks user an arithmetic operator (,,+,, "-,, "*" or ,,/") and take two operands and perform the corresponding calculation on the operands using switch case	4	CO3
4	LLO a: Understand and write program to find the sum of first n natural numbers where n is entered by user. LLO b: Understand and write program to Find Number of Digits in a Number. LLO c: Understand and write program to check whether a number is palindrome or not. LLO d: Understand and write program to Generate Multiplication Table.	Program using control structures: Looping (using loops) To find the sum of first n natural numbers where n is entered by user. b) To Find Number of Digits in a Number. c) To check whether a number is palindrome or not. d) To Generate Multiplication Table.	4	CO3
5	LLO a: Understand and write program to accept values in 2-Dimensional 3 by 3 arrays and display the sum of all the elements. LLO b: Understand and write program to compute the sum of all elements stored in an array using pointers	Program for arrays – a) to accept values in 2-Dimensional 3 by 3 arrays and display the sum of all the elements. b) Program to compute the sum of all elements stored in an array using pointers	4	CO4
6	LLO: Able to write Program using array of strings.	Program using array of strings.	4	CO4
7	LLO: Able to write Program to perform different operations on string.	Program to perform different operations on string.	4	CO4
8	LLO a: Understand and write program using function (call by value) to	Program using function (call by value) a) to swap two numbers b) to find square of given number	4	CO5

	swap to numbers LLO b: Understand and write program to find square of given number using functions.			
9	LLO a: Understand and write program using structure and union to store information of 3 students (Name, Roll No, Marks) LLO b: Understand and write program to store information of 2 employees (empid, name, salary) and display the details of the employee having salary greater than Rs. 5000.	Program using structure and union a) To store information of 3 students (Name, Roll No, Marks) b) To store information of 2 employees (emp_id, name, salary) and display the details of the employee having salary greater than Rs. 5000.	4	CO6
10	LLO: Able to write Program to print following pattern * ** ****	Write a program to print following pattern * ** ****	4	CO6
11	LLO: Understand and Able to write Program using pointer.	Program using pointer.	4	CO7
12	LLO: Understand and Able to write Program using pointer Arithmetic.	Program using pointer Arithmetic.	4	CO7
13	LLO: Understand and Able to write Program to perform CRUD operations on Files	Write a program to perform CRUD operations on Files	4	CO6
14	LLO: Understand and Able to do Mini Project .	Mini Project	4	ALL
		Total	60	

V. Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning):

1. Bank Management System
2. Calendar Application Project
3. Contact Management System
4. Departmental Store Management
5. Personal Diary Management
6. Quiz Game Project

VI. Specification Table:

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Program Logic development	2	2	4	8
2	Basics of C programming	2	2	4	8
3	Control Structures	2	4	4	10
4	Arrays and Strings	2	4	4	10
5	Functions	2	2	4	8
6	Structure and Union	2	2	4	8
7	Pointers	2	2	4	8
Total		14	18	28	60

VII. Assessment**Methodologies/Tools****Formative assessment (Assessment for Learning)**

- Rubrics for continuous assessment based on process and product related performance indicators(____ marks)

Summative Assessment (Assessment of Learning)

- End term examination, Viva-voce, Workshop performance (____ marks)

VIII. COs - POs Matrix Form

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CO1	3	-	-		2	1	-	2		1
CO2	1	3	2	2	-	-	1		2	-
CO3	-	2	-	-	1	1	2	2	-	-
CO4	2	-	2	--	-	2	-	1	-	-
CO5	2	-	-	2	2	-	1	-	2	-
CO6	-	2	-	-	3	1	-	1		1
CO7	1	-	1	2	-	-	1	-	1	-
Legends: - High:03, Medium:02, Low:01, No Mapping: --										

IX. Suggested Learning Materials / Books

Sr. No	Author/ Publisher	Title	ISBN
1	Brian W. Kernighan, Dennis Ritchie Prentice Hall	The C Programming language	978-0131103627
2	E. Balgurusamy The Mc-Graw Hill	Programming in ANSI C	978-9339219666
3	Yashawant Kanetkar BPB Publications	Let us C	978-9387284494

X. Learning Websites & Portals

Sr.No	Link / Portal
1	https://www.w3schools.com
2	https://www.tutorialspoint.com
3	www.cppinstitute.org/
4	https://www.programiz.com › c-programming
5	https://www.javatpoint.com › c-programming-language-tutorial
6	https://beginnersbook.com › 2015/02 › simple-c-programs
7	https://www.udemy.com › c-programming-for-beginners

XI. Academic Consultation Committee/Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organization
1	Mr. Vaibhav Ashok Wankhade	Software Engineer	Software Engineer, WhiteCode Canada
2	Ms. Sree Latha Komuguri	Lecturer in Information Technology	Government Polytechnic Mumbai
3	Ms. Pradnya Natekar	Lecturer in Computer engineering	Shree Baghubai Maftalal Polytechnic, Mumbai

Coordinator,

Curriculum Development,

Department of Information Engineering Technology

I/C, Curriculum Development Cell

Head of Department

Department of IT Engineering

Principal

Logic Development Using C Programming

Approved Copy

P-23scheme

APPROVED COPY

CDC Co-ordinator
G. P. Mumbai

Programme : Diploma in Computer Engineering (Sandwich Pattern)

Course Code:CO23101

Course Title :Web Page Design

Compulsory / Optional: Compulsory

Teaching Scheme and Credits						Examination Scheme						
CL	TL	LL	SLH	NLH	Credits	FA-TH	SA-TH (3Hrs.)	FA- PR	SA		SLA	Total
									PR	OR		
1	---	02	1	4	2	---	---	25	25	--	25	75

Total IKS Hrs. for course: 0

Abbreviations: CL- Class Room Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @\$ Internal Online Examination

Note:

1. FA-TH represents two class tests of 20 marks each conducted during the term.

2. SA-TH represents the end term examination.

I. Rationale

The focus in this course is on the World Wide Web as a platform for interactive applications, content publishing and social services. The development of web-based applications requires knowledge about the underlying technology and the formats and standards the web is based upon. In this course, students will learn about the advanced versions of mark-up languages HTML, XML and the CSS standards for formatting and transforming web content, interactive graphics and multimedia content on the web page.

II. Industry / Employer Expected Outcome

Student will be able to

1. Design web page.
2. Develop website using HTML, CSS, JavaScript.

III. Course Outcomes:

Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1	Visualize the concept of Internet & scope of web technology.
CO2	Create interactive web page(s) using HTML
CO3	Design Web Page using CSS
CO4	Write client side script using JavaScript
CO5	Customize a WordPress site using CSS and HTML

Course Content Details:

Unit No.	Teaching Learning Outcome	Topics / Sub-topics
1	TLO 1.1. Identify various web technology TLO 1.2. Use different HTML tags	Introduction To Web Technology & HTML Careers in Web Technologies and Job Profiles, Web Site Design Principles – How the Website Works? 1.1 HTML: Introduction to elements of HTML & HTML tags, working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls. Course Outcome: CO1 Teaching Hours: 4 hrs
2	TLO 2.1. Plan site organization & site navigation TLO 2.2. Create division based layout. TLO 2.3. Use HTML5 tags. TLO 2.4. Incorporate sound & video in HTML5	Working With HTML 5 2.1 HTML5 Page layout and navigation: Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL Creating division-based layouts: HTML5, semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions. 2.2 HTML5 Tables, Forms and Media: Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables, applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, Creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5. Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page. Course Outcome: CO2 Teaching Hours: 5hrs
3	TLO 3.1. Demonstrate using basic CSS syntax. TLO 3.2. Demonstrate using CSS for styling text, font, and properties. TLO 3.3. Demonstrate using CSS for styling page backgrounds. TLO 3.4. Demonstrate styling lists in CSS. Demonstrate using CSS classes and IDs.	Working With CSS 3.1 Cascading Style Sheets 2.0 Introduction to CSS, Types of Style Sheets (Inline, Internal and External), Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model (Introduction, Border properties, Padding Properties, Margin properties), CSS Color, Creating page Layout and Site Designs 3.2 Cascading Style Sheets (CSS 3.0) CSS Rounded Corners, Border Images, Border Shadows, CSS Gradients, CSS Background properties, Text-Shadow Property, Text-Stroke Property Course Outcome: CO3 Teaching Hours: 3hrs

4	TLO 4.1. Know the client scripting TLO 4.2. Summarize variable naming rules and JavaScript data types.	Introduction To JavaScript Client side scripting, What is JavaScript, How to develop JavaScript Simple JavaScript, variables, functions, conditions, loops and repetition Course Outcome: CO4 Teaching Hours: 2hrs
5	TLO 5.1. Install & configure WordPress	Introduction to Wordpress Wordpress Overview: Features, Advantages Wordpress Installation Wordpress Dashboard Wordpress General Settings Course Outcome: CO5 Teaching Hours: 2hrs

IV. Laboratory Learning Outcome and Aligned Practical /Tutorial Experiences.

Sr No	Laboratory Learning Outcome	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
1	LLO 1.1 Identify & compare various web technology	Prepare a report on latest web technologies	2	CO1
2	LLO 2.1 Demonstrate the use of HTML5 in designing a form	Create Student feedback form (use textbox, text area, checkbox, radio button, select box etc.)	2	CO2
3	LLO 3.1 Demonstrate the use of HTML5 tags	Create your resume using HTML tags also experiment with colors, text, link, size and also other tags you studied.	2	CO2
4	LLO 4.1. Demonstrate the use of HTML5 features to design a web page LLO 4.2. Design attractive web page	Design a web page of your home town with an attractive background color, text color, image, font etc.	2	CO2
5	LLO 5.1 Embed audio & video in web page	Insert audio & video files in your web page created for home town.	2	CO2
6	LLO 6.1. Demonstrate the use of HTML5 features to design a web page LLO 6.2. Design attractive web page	Design web pages for your college containing a description of the courses, departments, faculties, library etc, Use href, list tags.	4	CO2
7	LLO 7.1 Use of table tags efficiently	Create class timetable using table tag.	2	CO2
8	LLO 8.1 Demonstrate the use of HTML5 for site navigation	Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and	2	CO2

		contentpage on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right hand side.		
9	LLO 9.1 Demonstrate the use of HTML5 for division based layout	Write html code to develop a webpage having two frames that divide the web page into two equal rows and then divide the row into equal columns , fill each frame with a different background color.	2	CO2
10	LLO 10.1 Use CSS for responsive application	a. Use Inline CSS to format your resume that you created. b. Use External CSS to format your class timetable as you created.	2	CO3
11	LLO 11.1 Use JavaScript for responsive application	a. Develop a JavaScript to display today's date. b. Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript	2	CO4
12	LLO 12.1 Demonstrate the use of WordPress	Create a page by using WordPress.	2	CO5
13	LLO 13.1 Demonstrate the use of WordPress	Create a post by using WordPress	2	CO5

V. Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning):

1. Create a static website for your department using web technology.
2. Create a functional calculator.
3. Create a landing page using HTML and CSS.
4. Use HTML5 and CSS to build personal portfolio page.
5. Create To-Do List by using HTML5 ,CSS & JavaScript.

VI. Assessment Methodologies/Tools

Formative assessment (Assessment for Learning)

Rubrics for continuous assessment based on process and product related performance indicators (25 marks)

Summative Assessment (Assessment of Learning)

End term examination, Viva-voce, Workshop performance (25 marks)

VII. Suggested COs - POs Matrix Form

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	1	--	--	2	2	1	3	3	2	3
CO2	3	2	3	3	2	2	3	3	3	3
CO3	3	2	3	3	2	2	3	3	3	3
CO4	3	2	3	3	2	2	3	3	2	3

Legends: - High:03, Medium:02, Low:01, No Mapping: --

VIII. Suggested Learning Materials / Books

Sr.No	Author	Title	Publisher
1	M. Srinivasan	Web Technology: Theory and Practice	Pearson India
2	Gopalam Akilandeswari	Web Technology	Prentice-Hall of India

IX. Learning Websites & Portals

Sr.No	Link / Portal	Description
1	http://www.w3schools.com/html	
2	http://www.html.net/	
3	http://www.2createawebsite.com	
4	http://webdesign.about.com	

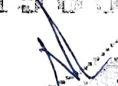
X. Academic Consultation Committee/Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organization
1	Mr. Atul Jadhav	Founder	9 TH Legends Pvt,Ltd
2	Mr. Samit Shukla	Assistant Manager	L & T Infotech,Pune
3	Mrs. R.V. Molawade	Lecturer in Computer Engineering	Government Polytechnic, Mumbai
4	Mrs. V. A. Patil	Lecturer in Computer Engineering	Government Polytechnic, Mumbai

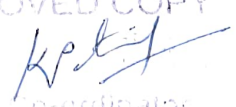

Coordinator,
Curriculum Development,
Department of Computer Engineering


Head of Department
Department of Computer Engineering


I/C, Curriculum Development Cell


Principal

APPROVED COPY


Co-ordinator
C. E. Department

Programme : Diploma in Computer Engineering (Sandwich Pattern)												
Course Code: CO23601						Course Title : Multimedia and Video Creation						
Compulsory / Optional: Compulsory												
Teaching Scheme and Credits						Examination Scheme						
CL	TL	LL	SLH	NLH	Credits	FA-TH	SA-TH (3Hrs.)	FA-PR	SA		SLA	Total
									PR	OR		
--	--	04	02	06	03	--	--	25	50#	--	25	100

total IKS Hrs. for course:

Abbreviations: CL- ClassRoom Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @\$ Internal Online Examination

Note:

1. FA-TH represents two class tests of 20 marks each conducted during the term.
2. SA-TH represents the end term examination.

I. Rationale

Great advancements are being achieved in the field of multimedia. It has not been limited to Image processing but it has also been extended to audio, video, animation and 3D animation. Content generation in the form of videos, podcasts, text and audio blogs has become very popular and a rich source of earning. To make the students aware of latest technology in multimedia this course is being introduced in Diploma in Computer Engineering. This course focuses on the use of various open source software for design and generation of different media which will be helpful to the students to earn their living with a small or almost zero capital.

II. Industry / Employer Expected Outcome

1. To create digital content such as images, audio, videos and animations.
2. To publish digital content on the Internet.

III. Course Outcomes: Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1	Identify different types of licenses such as Copyrights, Public Domain, Creative Commons, etc.
CO2	Create Digital Images using free / open source tools and software.
CO3	Create Digital Audio using free / open source tools and software.
CO4	Create Digital Video using free / open source tools and software.
CO5	Create Animations using free / open source tools and software.

IV. Laboratory Learning Outcome and Aligned Practical / Tutorial Experiences.

Laboratory Learning Outcome	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO1.1 Know different open source software / tools for multimedia processing LLO1.2 Understand different licenses for content	1	1.1 Survey of Open Source Multimedia Processing Software - i Search for Open Source Multimedia Processing Software on Internet. - ii Categorize them into Image Processing, Audio Processing; Video Processing; All in one, etc. (Consider at least one software for each of the categories.) e. g. GIMP, Synfig, Studio, Audacity, OpenShot, Screencast-o-matic, OBS Studio, CamStudio, etc. - iii Note the hardware and software requirements for them. - iv Make a report of your survey. 1.2 Survey of different licenses available for content - i List the different licenses with their details - ii Browse any 10 website/ video/ audio resources on Internet and identify their licenses. - iii Create your own content such as bio data, photos, audio, video, etc. and license it. - iv Make a report of your survey	10	1, 2
LLO2.1 Edit images using open source image processing software / tools such as GIMP,	2	2.1 Image Editing Suggested open source image editing software: GIMP Synfig Studio. Capture a color picture of any place, nature, etc. using a digital camera device (you can use your mobile phone for the	10	2

VIII. Suggested COs - POs Matrix Form

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CO1	3	3	3	1	1	2	1	3	2	3
CO2	1	3	3	3	1	2	2	3	3	3
CO3	1	3	3	3	1	2	1	3	3	3
CO4	1	3	3	3	1	3	2	3	3	3
CO5	1	3	3	3	1	2	1	3	3	3

Legends: - High:03, Medium:02, Low:01, No Mapping:-

IX. Suggested Learning Materials / Books: NA

X. Learning Websites & Portals

Sr. No	Link/ Portal	Description
2	https://www.youtube.com/watch?v=4ZvJGV6YF6Y	For Licenses for the content
3	https://wiki.creativecommons.org/wiki/public_domain	For public domain
4	https://www.acm.org/publications/policies/roles-and-responsibilities	ACM Policy on Authorship, Peer Review, Readership, and Conference Publication
5	https://en.wikipedia.org/wiki/Open_content	Free content
6	https://www.gimp.org/	For GIMP Tool for image editing
7	https://www.synfig.org/	For SynFigStudio Tool for image editing
8	Audacity ® Download for Windows (audacityteam.org)	For Audacity Tool for audio editing
9	https://www.openshot.org/	For Openshot Tool for video editing
10	https://obsproject.com/	For OBSStudio for video editing
11	What is Screencast-O-Matic and How Does it Work? Tech & Learning (techlearning.com)	For Screencast-O-Matic Tool for video recording
12	Features — blender.org	For Blender Animation Tool

SynFig		same) and do the following: - Import the picture into your computer. - Note the properties of the picture like resolution, size, etc. - Resize it to increase or decrease the size. - Invert its Aspect Ratio. - Change the contrast and brightness. - Change the sharpness. - Crop the edges of the picture. - Make an Image Negative.		
LLO3.1 Edit audio to give various effect using Audacity software	3	Audacity I - Learn to create, save and export the Audacity Project, - Import an Audio into the Project - Perform Mic Check. - Choose any topic, prepare a short script and record it in your own voice. - Perform Audio Editing: Audio Clipping, Cutting, Copying, Pasting a clip - Apply effects: Inversion, Compression, Fade In Fade Out, Noise Removal - Split Stereo Track into two tracks viz. left and right. - Convert Stereo to Mono and Mono to Stereo - Change pitch, tempo and speed of an Audio - Make precise adjustments to the audio speed (tempo) while maintaining pitch in order to run for a predetermined length of time - Combine the track again to stereo after changes - Export the project to mp3 format.	10	2
LLO4.1 Perform vocal removal from an audio song using Audacity software	4	Audacity II (Creating Karaoke) - Import a song of your choice into an Audacity Project. - Perform the steps to remove vocals from the track. - Export the track to mp3 format.	10	2
LLO5.1 Edit images using OpenShot software	5	Video Editing using OpenShot - Download and install OpenShot. - Import a video into OpenShot - Explore the various options in OpenShot. - Edit the video. Remove undesired clips. - Add suitable background music. - Apply different effects for different clips in the	10	2, 3

		video.		
		LLO5.8 Add some subtitles to the video.		
LLO6.1 Use Blender Animation Tool to apply basic animation effects on objects	6	Blender Animation Tool LLO6.2 Download and install Blender Tool LLO6.3 Use the 3D cursor to understand the viewport. LLO6.4 Add 3D objects like cube, hemisphere, etc. to the 3D view. (Add at least 4 objects.) LLO6.5 Roll, pan and dolly the Camera View. LLO6.6 Apply some animation effects to the objects you have added. LLO6.7 Apply transformations like translation, rotation, etc. to the objects. LLO6.8 Export the movie.	10	5

V. Suggested Micro Project / Assignment/ Activities for Specific Learning / Skills Development (Self Learning):

1. Make a poster showing various free/ open source tools and software for editing digital images, audio, videos and animations.
2. Choose any topic in latest technology in Computer Science and make a poster for it using any open source Image editing software. Use your imagination at the fullest.
3. YouTube Video Making
 - a. Choose any topic from any course in your curriculum.
 - b. Study the topic well and prepare a script for narration.
 - c. You can prepare a presentation or show a demo on any relevant software.
 - d. Make a screen cast of the presentation/ demo using Screencast-o-matic or OBS Studio.
 - e. You can record your narration along with the screen casting, (or use your mobile phone to record the narration separately and add your audio to the video you created in 3 in OpenShot).
 - f. Try to give a professional touch to your video in OpenShot by clipping/ removing undesired part of audio/ video, adding some background music, animation, etc.
 - g. Sign into YouTube and upload your video on it under Creative Commons License. The video should not exceed 10 minutes.
4. Create an animated movie of 1 minute. You can choose any story for the movie.

VI. Specification Table: NA

VII. Assessment Methodologies/Tools

Formative assessment (Assessment for Learning)

Rubrics for continuous assessment based on process and product related performance indicators (25 marks)

Summative Assessment (Assessment of Learning)

End term examination, Viva-voce, Workshop performance (25marks)

XI. Academic Consultation Committee/Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organization
1	Mr. V. M. Pawar	Director	Atocon Systems, Ltd.
2	Mr. S. B. Bhosale	Lecturer in Information Technology	Government Polytechnic, Tasgaon
3	Ms. J. S. Patil	Lecturer in Computer Engineering	Government Polytechnic, Mumbai

[Signature]
Coordinator,
Curriculum Development,
Department of Computer Engineering

[Signature]
I/C, Curriculum Development Cell

[Signature]
Head of Department
Department of Computer Engineering

[Signature]
Principal

APPROVED COPY

[Signature]
CDC Co-ordinator
G. P. Mumbai

Programme : Diploma in ME/CE/EE/CO/IF/IS/EC/RT/LT/LG (Sandwich Pattern), AIML												
Course Code: UV23301						Course Title : Universal Human Values-I						
Compulsory / Optional: Compulsory												
Teaching Scheme and Credits						Examination Scheme						
CL	TL	LL	SLH	NLH	Credits	FA-TH	SA-TH	FA- PR	SA		SI A	'Total
									PR	OR		
01	—	—	01	02	01	—	—	—	—	—	50	50

Total IKS Hrs. for course: 04

Abbreviations: CL- Classroom Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH- Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, ## Online Examination, @\$ Internal Online Examination

Note:

1. FA-TH represents an average of two class tests of 30 marks each conducted during the term.
2. SA-TH represents the end term examination.

Rationale:

Human beings have materially developed to a great extent through technological development. Still the scarcity of happiness and satisfaction result in personal and social conflicts. The value system develops the frame of reference of the individual to benchmark his/ her behavioral pattern respecting the righteousness during life. The appreciation and inculcation of a value system can develop a person as a creative contributor for society, nation and by-large the world.

By inculcating universal values, not only can a person resolve the personal, social and professional situations positively but also can lead toward an enriched life. Once these values are inculcated in a student's personality, it will result in the sustainable development of a student. This course is designed to make the student think that by observing the universally accepted human values, it is easy to become a good human being, a good citizen and make their own life goal-oriented, cladded with happiness and satisfaction. The core universal values to be inculcated: personal values, social values and professional values. The aspirations and concerns to be explored at the level of individual, at the level of family, at the level of society and at the level of nature.

Industry / Employer Expected Outcome

To demonstrate value based behavior at the workplace.

Course Outcomes:

On completion of this course, Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1	Appreciate universal human values to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
CO2	Develop a holistic approach to environment, family and society.
CO3	Develop more confidence in self.
CO4	Derive joy of giving.
CO5	Improve understanding and perform acts of kindness.

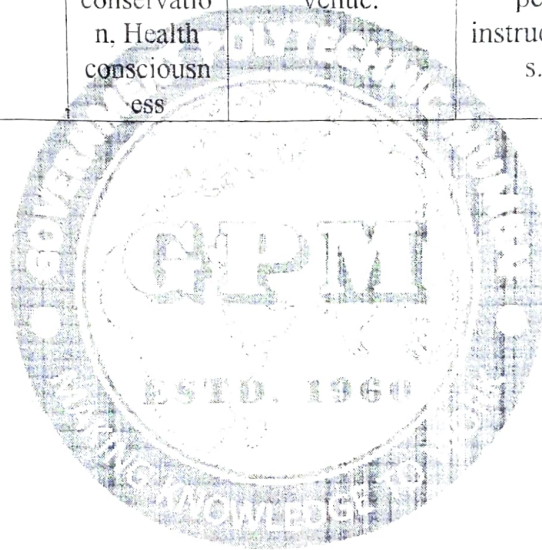
Course Content Details:

Sr. No	CO	Activity	Related Value/s	Methodology of Implementation	Student's Role	Mentor's role	Resources Required
01	CO1 CO3	Prepare a self-introduction sheet i) Name, School passed from, achievements up to 10 th standard • What are your goals in your life? • What are your expectations from institute, Family, Society? • Information of family members • Most happy moments and difficult moments in your life, Special trips, Hobbies, Sports, Music, etc	Honesty, Self-exploration	Preparing a note and presenting in front of peers	Thoughtfully answer the questions in an honest manner.	Provide information about the institute and motivate students to honestly express themselves.	Official website of the institute

02	CO1 CO2	List behavioral characteristics and analyze self, friend, family members. ● Do you like these characters yes/no – why	Self-exploration , Honesty	Preparing a presentation	Honestly and sincerely analyse self and others	Create a stress-free environment and see that there will be no conflict of expression.	Provide a list of character traits by referring to various resources like internet, books, etc. For e.g. https://www.teachersunion.com/writing/character-traits-list-examples
03	CO2 CO3	Identify your needs and desires	Honesty Self-exploration	Making a list of needs and desires	Reflect and identify needs and desires.	Stay wary of controversial subjects	list of historical personalities who set the example.
04	CO2 CO5	Singing a patriotic song in group ● Make group, select song, explain meaning, use music/karaoke and demonstrate to class	Patriotism	Forming group of interested students. Students will rehearse the activity and will perform in groups	Diligently practice and cooperate with others.	Manage the logistics of creating groups and assigning roles.	Music system, list of patriotic songs

05	CO1 CO3	Essay writing ● My dreams as an Engineer ● India a Super power in my views ● Society & I ● Indian culture and values ● My role models in life IKS hours- Religious and cultural history of India- Indus civilization	Self – exploration Patriotism Accountability	Selecting a topic from the list and writing an essay on it	Thoughtfully write the essay on a selected topic.	Display the best essays on the notice board.	notice board, panel of judges
06	CO2 CO3	Play Music instruments/ Singing/ Drawing/Any stage performance/ photography/any creative art IKS hours - History of Indian classical music.	Derive the joy	Present to peers	Pursue your creative interest	Identify and categorize students. Create groups accordingly	logistical support
07	CO2 CO4 CO5	Visit a nature park, identify the flora & fauna, ecological factors & their role in our life. (e.g Maharashtra nature park society, Dharavi, Mumbai)	Environment Conservation	Students to arrange visit under supervision of mentor	Study various flora & fauna in a disciplined manner.	Assure safety of students and manage activities.	https://maharashtra.naturepark.org/
08	CO2 CO4	Tree plantation and caring for it.	Environment Conservation	Students to arrange activity under supervision of mentor	Plant the appropriate saplings according to instructions.	Assure safety of students and provide adequate instructions.	saplings, soil, shovels, fertilizer

09	CO3	List the distractors which are responsible to deviate you from integrity and find out the solution	Integrity, Rightcousness	Observation and identification of common distractors.	Identify distractors like TV shows, movies and bad habits	Provide historical case studies of previous students.	Case studies
10	CO2 CO5	Prepare the chart DOs and DONTs for different situations like local trains, travel, public place, classroom, examination, etc.	Conscientiousness, honesty, social gratitude	Preparing the chart	Identify DOs and DONTs and prepare various charts	Create groups and assign topics.	Official websites of respective administrations like railways, Municipal corporation, etc..
11	CO4	Beach cleaning, institute cleaning	Environment conservation, Health consciousness	Organizing a visit to clean the venue.	Clean the venue as per instructions.	Assure safety and aid in organization.	https://www.unitedwaymumbai.org/clean-shores



12	CO4 CO5	a) To prepare a first aid box to be kept at home b) Preparation of a report on industrial accident	Care for others, accountability	Collection of information from various available sources and use it for intended purpose.	a) Prepare a list of contents for a first aid box to be kept at home b) Prepare a first aid box as per prepared list c) Prepare a list of various accidental hazards at home. d) Prepare a display of safety precautions for use of gas stove. e) Collect information of one industrial accident, its effects, probable causes from various resources and prepare a report.	To explain and monitor the task	Medicine, Box, paper
----	------------	--	---------------------------------	---	--	---------------------------------	----------------------

Methodology:

1. The course teacher will be the mentor.
2. In consultation and under supervision of a mentor, the student/ Group of students has to complete the activity.
3. The mentor will work as a facilitator/ advisor.
4. The strategies to learn the course is "Self- Exploratory" and "Experiential Learning"
5. The onus of responsibility for completing the activities is with students.
6. The student has to complete at least **five** no. of activities throughout the term. Each activity carries 10 marks.

Assessment methodologies/Tools:**Formative Assessment(Assessment for Learning)**

The student has to complete at least **five** no. of activities throughout the term. Each activity carries 10 marks

Criterion No.	Criterion	Max. Marks	Not Satisfactory	Satisfactory	Good	Excellent
1	Attendance	02	0	1	2	2
2	Knowledge	04	1	2	3	4
3	Presentation / Performance	04	1	2	3	4
	Total	10				

Suggested CO-PO Matrix form:

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	-	-	-	-	2	1	3			
CO2	-	1	1	-	1	1	2			
CO3		1	-	-	1	1	2			
CO4	-	-	-	-	1	-	2			
CO5	-	-	-	-	1	-	2			
Legends :- High:03, Medium:02,Low:01, No Mapping: - *CO PSOs mapping to be formulated at department level										

References/ Books:

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria, Excel Books, New Delhi, 2010	978-8-174-46781-2
2	Human Values	A.N. Tripathy, New Age International Publishers, 2003	978-8-122-42589-5
3	Teacher's Manual - A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria, Excel Books, New Delhi, 2010	-
4	Science and Humanism, Towards a Unified World View	PL Dhar, RR Gaur, Commonwealth Publications, 1992	978-8-171-69222-4
5	Education for values in schools- a framework	NCERT	
6	Value oriented education	E N Gawande	

E-References:

- 1) https://youtu.be/kOJu1vj_BV4 (The 10 Most Important Human Values)
- 2) Dr. Prakash Baba Amte- Movie
- 3) <https://youtu.be/QeogOt7G2Is> (Value of Education -short film)

E-References for mentors:

- 1) <https://www.edutopia.org/>
- 2) <https://sdgs.un.org/goals>

Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Dr. L.A. Patil	Principal (Retired)	Pratap College, Amalner
2	Dr. Nitin Deshpande	Lead Consultant	Dnyanpeeth Academy, Pune
3	Dr. Chandrakant Shahasane	Founder Trustee	Karnala Charitable Trust, Pune
4	Mr. Sunil V. Joshi	Ex- Sr. Lecturer, Mechanical Engineering,	Government Polytechnic, Mumbai
5	Mrs. Swati D. Deshpande	Principal	Government Polytechnic, Mumbai
6	Mr. U.A. Agnihouri	Lecturer, Mechanical Engineering	Government Polytechnic, Mumbai
7	Mr. K. V. Patil	Lecturer Mechanical Engineering	Government Polytechnic, Mumbai
8	Mrs. P. A. Khande	Lecturer, Electronics Engineering	Government Polytechnic, Mumbai


Institute Coordinator,
Curriculum Development,


Principal
Government Polytechnic, Mumbai

APPROVED COPY

Universal Human Values - I (UV 23301) (Approved copy)

(P23 Scheme)


CDC Co-ordinator
G. P. Mumbai