

**Government Polytechnic, Mumbai**

**Department of Computer Engineering**



**Semester I**  
**(Course Contents)**

**For P-19 Curriculum**

**Programme    Diploma in Computer Engineering**  
**(Sandwich Pattern)**

**GOVERNMENT POLYTECHNIC MUMBAI**  
 (Academically Autonomously Institute, Government of Maharashtra)  
**Teaching and Examination Scheme (P19)**  
**With effect from AY 2019-20**

**Programme: Diploma in Computer Engineering (Sandwich Pattern)**

**Term / Semester - I**

Course Code	Course Title	Teaching Hours/Contact Hours				Credits	Examination Scheme (Marks)						
		L	P	TU	Total		Theory			PR	OR	TW	Total
							TH	TS1	TS2				
SC19103	Applied Physics	3	2	--	5	5	60	20	20	25*	--	25	150
SC19109	Basic Mathematics	4	--	--	4	4	60	20	20	--	--		100
EC19210	Basics of Electrical and Electronic Engineering	2	2	--	4	4	--	--	--	50	--	25	75
IT19202	Logic Development using Programming in C	3	4	--	7	7	60	20	20	50*	--	25	175
CO19201	Web Page Design	1	2	--	3	3	--	--	--	50*	--	50	100
CO19301	Multimedia and Video Creation	1	2	--	3	3	--	--	--	50*	--	50	100
CO19302	Blender Tool (Spoken Tutorial)	--	4	--	4	4 <sup>#</sup>	--	--	--	--	--	--	--
	<b>Total</b>	<b>14</b>	<b>16</b>	<b>--</b>	<b>30</b>	<b>30</b>	<b>180</b>	<b>60</b>	<b>60</b>	<b>225</b>	<b>--</b>	<b>175</b>	<b>700</b>
Student Centered Activity(SCA)					<b>05</b>								
Total Contact Hours					<b>35</b>								

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment)

\* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination

Note: Duration of Examination--TS1&TS2 -1 hour, TH- 2 hours 30 minutes, PR/OR – 3 hours per batch, SCA- Library - 1 hour, Sports- 2 hours, Creative Activity-2 hours  
 Self, on- line learning Mode through MOOCs /Spoken Tutorials / NPTEL / SWAYAM / FOSSEE etc.

Department Coordinator,  
 Curriculum Development,  
 Dept. of Computer Engineering

Head of Department  
 Dept. of Computer Engineering

In-Charge  
 Curriculum Development Cell

Principal

Programme : <b>Diploma in Information Technology / Computer Engineering (IT/ CO)</b> <b>(Sandwich pattern)</b>										
Course Code: <b>SC19103</b>				Course Title: <b>Applied Physics</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs30 minutes)	TS1 (1Hr.)	TS2 (1Hr.)	PR	OR	TW	Total
<b>3</b>	<b>2</b>	<b>--</b>	<b>5</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>25*</b>	<b>--</b>	<b>25</b>	<b>150</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination  
Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill tests are to be conducted. First skill test at midterm and second skill test at the end of the term

### 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.

**Course Outcomes:** Student should be able to

CO1	State the different physical quantities, identify the proper unit of it and to estimate error in physical measurement.
CO2	Apply laws of motion in various Engineering applications
CO3	Apply the concept of electric field and electromagnetism in Engineering technology
CO4	Identify properties and application of light in Engineering field

**Course Content Details:**

Unit No	Topics / Sub-topics
1	<b>Units and Measurements</b> 1.1 Fundamental Physical quantities, examples. 1.2 Derived physical quantities, examples. 1.3 Definition and requirements of unit 1.4 System of units, C. G. S., M. K. S. and S. I. units. 1.5 Rules to write the unit and conventions of units and Significant figures, rules to write significant figures. 1.6 Error – Definition, types of errors and minimization of errors, 1.7 Numerical problems.  <b>Course Outcome: CO1    Teaching Hours : 6 hrs    Marks: 8 (R- 2, U-2, A-4)</b>
2	<b>Motions</b> <b>2.1 Linear motion</b> –Definition – distance, displacement, velocity, acceleration retardation, equations of motion, acceleration due to gravity, equation of motion under gravity, numerical problems. <b>2.2 Periodic motions:</b> 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. <b>2.3 Angular motion:</b> a) Definition: Angular motion,. Uniform circular motion, Radius vector, linear velocity, Angular velocity , Angular acceleration, b) Relation between linear velocity and angular Velocity (derivation), Radial or centripetal acceleration, Three equations of motion (no derivations) Centripetal and Centrifugal force, examples and applications.  <b>Course Outcome: CO2    Teaching Hours :10 hrs.    Marks: 10    (R- 2 , U-4 , A-4 )</b>
3	<b>Electrostatics</b> 3.1 Definition of charge 3.2 Coulomb's law ,Definition of electric field, Definition and unit of electric field intensity (E) 3.3 Definition and properties of electric lines of force 3.4 Definition of electric flux and electric flux density 3.5 Electric Potential 3.6 Definition & Explanation of Electric Potential 3.7 Definition & Explanation of absolute Electric Potential 3.8 Equation of electric potential (only equation)  <b>Course Outcome: CO3    Teaching Hours :6 hrs.    Marks: 8    (R- 2 , U-2 , A- 4 )</b>
4	<b>Electricity</b> 4.1 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 4.5 Numerical problems  <b>Course Outcome: CO3    Teaching Hours :8 hrs.    Marks: 12    (R- 2 , U- 6 , A- 4 )</b>

5	<b>Electromagnetism</b> 5.1 Magnetic effect of current , magnetic induction 5.2 Properties of magnetic lines of force, 5.3 Laplace's law, Fleming left hand rule 5.4 Magnetic induction at Centre of circular coil carrying current only equation 5.5 Force acting on conductor carrying current placed in magnetic field (no derivation) 5.6 Numerical problems.  <b>Course Outcome: CO3 Teaching Hours: 6 hrs. Marks: 8 (R- 2 , U- 2 , A- 4 )</b>
6	<b>Optics and Optical Fiber</b> <b>6.1 Optics</b> 6.1.1 Revision of reflection and refraction of light. 6.1.2 Laws of refraction, Snell's law. 6.1.3 Prism formula ( derivation) 6.1.4 Numerical problems. <b>6.2 Optical Fibers :</b> 6.2.1 Principle of propagation of light through optical fiber. 6.2.2 Structure of Optical fiber. 6.2.3 Applications (electronics and medical) and comparison with electrical cable for communication.  <b>Course Outcome: CO4 Teaching Hours : 9 hrs. Marks: 14 (R- 4 , U- 6 , A-4 )</b>

Suggested Specifications Table (Theory):

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	<b>Units and Measurements</b>	2	2	4	8
2	<b>Motion</b>	2	4	4	10
3	<b>Electrostatic</b>	2	2	4	8
4	<b>Electricity</b>	2	6	4	12
5	<b>Electromagnetism</b>	2	2	4	8
6	<b>Optics and Optical Fiber</b>	4	6	4	14
<b>Total</b>		<b>14</b>	<b>22</b>	<b>24</b>	<b>60</b>

**List of experiments:**

Sr. No.	Unit No	CO	List of Experiments	Hours
1	1	CO 1	To know your Physics laboratory and use of scientific calculator.	2
2	1	CO 1	To measure the dimensions of given objects and to determine their Volume using Vernier caliper.	2
3	2	CO 2	To determine Acceleration due to gravity by simple pendulum	2
4	4	CO 3	To verify Ohm's Law.	2
5	4	CO 3	To find resultant resistance when resistances are connected in series .	2
6	6	CO 4	To find refractive index of a given prism by using pin method.	2
7	2	CO 1	To measure the dimensions of given objects and to determine their Volume using micrometer screw gauge.	2
8	1	CO 2	To determine stiffness constant by using helical spring.	2
9	3	CO 3	To verify Coulomb's law of electrostatics.	2
10	4	CO 3	To find resultant resistance when resistances are connected in parallel	2
11	4	CO 3	To find unknown resistance by using Wheatstone's Bridge.	2
12	4	CO 3	To verify principle of potentiometer.	2
13	5	CO 3	To study properties of magnetic line of force.	2
14	6	CO 4	To demonstrate spectrometer.	2
15	ALL	CO 1	Showing Video on different applications related to units,	2
<b>Total</b>				<b>30</b>

**Note: Experiments No. 1to10 are compulsory and should map all units and Cos. Remaining 5 experiments are to be performing on the importance of topic.**

**References/ Books:**

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Applied Physics	Manikpure&Deshpande ,S.Chand& Company	10:8121919541 13:9788121919548
2	Applied Physics	B.G.Bhandarkar, Vrinda Publication	0071779795
3	Optics & Optical Fibers	Brijlal Subhramanyan	978-3-662-52764-1
4	Engineering Physics	Gaur and S.L.Gupta S.Chand& Company	0-07-058502
5	Physics	Resnick and Halliday Tata McGraw Hills	978-0-07-1755487- 3
6	Physics part I & II	H.C.Varma	9788177091878
7	Properties of Matter	D.S.Mathur	13: 978- 8121908153

**E-References:**

1. www.Physics.org
2. [www.physicsclassroom.com](http://www.physicsclassroom.com)
3. [www.youtube/physics](http://www.youtube/physics)
4. www.ferrophysics.com
5. <http://hperphysics.phastr.gsu.edu/hbase/hph.htm>
6. www.sciencejoywagon.com/physicszone
7. <https://www.vedantu.com/ncert-solutions/ncert-solutions-class-12-physics>
8. MYCBSEGUIDE
9. <https://ndl.jitkbp.ac.in/>

**CO Vs. PO and CO Vs. PSO Mapping (COMPUTER ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1	2	
CO2	3							1		
CO3	3				1			1	2	
CO4	3			2	1			1	1	



**CO Vs. PO and CO Vs. PSO Mapping (INFORMATION TECHNOLOGY)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1		1	
CO2	3								1	
CO3	3				1				1	
CO4	3			2	1				1	

**Industry Consultation Committee:**

Sr. No	Name	Designation	Institute/Organisation
1	Mr. Akshay Mahapadi	Sr. Software Specialist	Mastek , Mahape Ghansoli
2	Mrs. B.J. Choudhary	Lecturer in Physics	Govt. Polytechnic Thane
3	Mrs S.A. Thorat	Lecturer in Physics	Govt. Polytechnic Mumbai
4	Dr. D.S. Nikam	Lecturer in Physics	Govt. Polytechnic Mumbai

Coordinator,  
Curriculum Development,  
Department of Sci. & Humanities

ESTD Head of Departments  
Department of Sci. & Humanities

I/C, Curriculum Development Cell

Principal



Programme : <b>Diploma in CE/ME/IT/CO/EC/IS/EE(Sandwich Pattern)</b>										
Course Code: <b>SC19109</b>				Course Title: <b>BASIC MATHEMATICS</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs. 30 Min.)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
<b>04</b>	-	-	<b>04</b>	<b>60</b>	<b>20</b>	<b>20</b>	-	-	-	<b>100</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill tests are to be conducted. First skill test at midterm and second skill test at the end of the term

### Rationale:

This subject is kept under the branch of sciences. This subject intends to teach student basic facts ,concepts, principles, and procedure of mathematics as a tool to analyze engineering problems and as such lays down foundation for understanding the engineering and core technology subject.

**Course Outcomes:** Student should be able to

<b>CO1</b>	Identify the basic principles of mathematics about the field analysis of any engineering problem.
<b>CO2</b>	Apply rules ,concept and properties to solve the basic problems.
<b>CO3</b>	Establish relation between two variables.

**Course Content Details:**

Unit No	Topics / Sub-topics
1	<b>1.Trigonometry:</b> 1.1 Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), Sub multiple angles 1.2 Factorization and De-factorization Formulae 1.3 Inverse Circular function (definition and simple problems). <b>Course Outcome: CO1 Teaching Hours : 10 hrs Marks: 10 (R- 4, U-4, A-2)</b>
2	<b>2.Vectors:</b> 2.1 Definition of vector , position vector 2.2 Algebra of vectors (Equality, addition ,subtraction and scalar multiplication) 2.3 Dot (Scalar) product & Vector (Cross) product with properties. <b>Course Outcome: CO3 Teaching Hours : 10 hrs Marks: 10 (R- 2 , U-4 , A-4 )</b>
3	<b>3.Logarithms:</b> 3.1 Definition of logarithm 3.2 Laws of logarithm 3.3 simple examples based on laws. <b>Course Outcome: CO2 Teaching Hours : 10hrs Marks:10 (R-4 , U- 4 , A-2 )</b>
4	<b>4.Probability :</b> 4.1 Definition of random experiment , sample space, event, occurrence of event and types of event ( Impossible , mutually exclusive , exhaustive ,equally likely ) 4.2 Definition of Probability 4.3 Addition & Multiplication Theorems of probability without proof , simple examples <b>Course Outcome: CO1 Teaching Hours :10hrs Marks:10 (R-4, U- 4 , A-2 )</b>
5	<b>5.Determinants:-</b> 5.1 Definition of Determinant 5.2 Expansion of Determinant of order 2X3 5.3 Crammer's rule to solve simultaneous equations in 3 unknowns <b>Course Outcome: CO2 Teaching Hours :10 hrs Marks:10 (R- 2 , U-4 , A-4 )</b>
6	<b>6.Matrices:</b> 6.1 Definition of a matrix of order m x n 6.2 Types of matrices 6.3 Algebra of matrices - equality, addition, subtraction ,multiplication & scalar multiplication. 6.4 Transpose of matrix. 6.5 Minor , co-factor of an element. 6.6 Adjoint & inverse of a matrix by adjoint method. 6.7 Solution of a simultaneous equations by matrix inversion method. <b>Course Outcome: CO3 Teaching Hours : 10 hrs Marks: 10 (R- 2 , U- 4 , A- 4 )</b>

**Suggested Specifications Table (Theory):**

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	<b>Trigonometry</b>	04	04	02	10
2	<b>Vectors</b>	02	04	04	10
3	<b>Logarithms</b>	04	04	02	10
4	<b>Probability</b>	04	04	02	10
5	<b>Determinants</b>	02	04	04	10
6	<b>Matrices</b>	02	04	04	10
<b>Total</b>		<b>18</b>	<b>24</b>	<b>18</b>	<b>60</b>

**References/ Books:**

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Mathematics for Polytechnic Students	S.P.Deshpande, Pune Vidyavardhini Graha Prakashan	-
2	Mathematics for Polytechnic Students ( Volume I )	H.K.Dass, S.Chand Prakashan	9788121935241
3	Companions to Basic Maths	G.V.Kumbhojkar, Phadke Prakashan	10-B07951HJDQ 13-B07951HJDQ
4	Applied Mathematics	N.Raghvendra Bhatt late, Tata McGraw Hill Publication Shri R Mohan Singh	9789339219567, 9339219562

**E-References:**

1. [www.math-magic.com](http://www.math-magic.com)
2. [www.Scilab.org/-SCI](http://www.Scilab.org/-SCI) Lab
3. [www.mathworks.com/Products/Matlab/-MATLAB](http://www.mathworks.com/Products/Matlab/-MATLAB)
4. [www.wolfram.com/mathematica/-Mathematica](http://www.wolfram.com/mathematica/-Mathematica)
5. <https://www.khanaacademy.org/math?gclid=CNqHuabCys4CFdoJaAoddHoPig>
6. [www.dplot.com/-Dplot](http://www.dplot.com/-Dplot)
7. [www.allmathcad.com/-Math CAD](http://www.allmathcad.com/-Math CAD)
8. [www.easycalculation.com](http://www.easycalculation.com)
9. <https://www.vedantu.com/ncert-solutions/ncert-solutions-class-12-maths>
10. MYCBSEGUIDE

**CO Vs PO and CO Vs PSO Mapping (CIVIL ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		1
CO2	3	2					1	1		1
CO3	3			2			1	1		1

**CO Vs PO and CO Vs PSO Mapping (MECHANICAL ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3			2			1	1	
CO2	3	2					1	1	
CO3	3			2			1	1	

**CO Vs PO and CO Vs PSO Mapping (COMPUTER ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		
CO2	3	2					1	1		
CO3	3			2			1	1		

**CO Vs PO and CO Vs PSO Mapping (INFORMATION TECHNOLOGY)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		1
CO2	3	2					1	1		1
CO3	3			2			1	1		1

**CO Vs PO and CO Vs PSO Mapping (ELECTRONICS ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1		1	1
CO2	3	2					1		1	1
CO3	3			2			1		1	1

**CO Vs PO and CO Vs PSO Mapping (ELECTRICAL ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1		1	
CO2	3	2					1		1	
CO3	3			2			1		1	

**CO Vs PO and CO Vs PSO Mapping ( INSTRUMENTATION ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3			2			1	1	1
CO2	3	2					1	1	1
CO3	3			2			1	1	1

**Industry Consultation Committee:**

Sr. No	Name	Designation	Institute/Organisation
1	Neelamkumar R. Sawant	State Head Technical Services for (Maharashtra and Goa)	JSW Cement ltd. Mumbai Head Office
2	Mrs. Deepawali S. kaware	Lecturer in Mathematics	Government polytechnic Vikaramgad
3	Mr. A.S.Patil	Lecturer in Mathematics	Government polytechnic Mumbai
4	Mr. V.S.Patil	Lecturer in Mathematics	Government polytechnic Mumbai

Head of Department

Coordinator,  
Curriculum Development,  
Department of Science And Humanities

Department of Science And Humanities

I/C, Curriculum Development Cell

Principal

Programme :Diploma in Information Technology and Computer Engineering (Sandwich Pattern)										
Course Code: EC19210				Course Title: Basics of Electrical and Electronics Engineering						
Compulsory / Optional: Compulsory										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs 30min)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
2	2	--	4	--	--	--	50	--	25	75

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination

**Note:** For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill tests are to be conducted. First skill test at midterm and second skill test at the end of the term

### 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.

**Course Outcomes:** Student should be able to

CO1	Explain fundamentals of alternating quantities and its behavior with resistive, inductive and capacitive circuits.
CO2	Apply KCL, KVL, Voltage division rule, and current division rule to a series or parallel circuit.
CO3	Explain the working of various semiconductor devices.
CO4	Design and experiment with various application circuits using diodes and transistors.
CO5	Use optoelectronic devices in various electronic circuits

### Course Content Details:

Unit No	Topics / Sub-topics
1	<b>AC fundamentals</b> 1.1 Alternating Current, Sinusoidal waveforms Mathematical Expression of alternating quantity. 1.2 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. 1.3 Electrical circuit elements: Resistors, Inductors, Capacitors Their properties, units, symbols



	1.4 Resistors in series and parallel 1.5 Capacitors in series and parallel  <b>Course Outcome: CO1      Teaching Hours : 04      Marks: R- NA, U-NA, A-NA</b>
2	<b>DC Circuits</b> 2.1 Direct current definition and waveform, Difference between AC and DC 2.2 DC series circuit: Concept, Equation for equivalent resistance connected in series, Voltage division rule, Application of series circuit. 2.3 DC Parallel circuit: Concept, Equation for equivalent resistance connected in parallel, Current division rule, Application of Parallel circuit 2.4 Series parallel circuit, Application of series parallel circuit. 2.5 Definition of Circuit, Parameter, Linear circuit, Nonlinear circuit, Bilateral circuit, Unilateral circuit, Electric network, Passive-Network, Active network, Node, Branch, Loop, Mesh. 2.6 Kirchhoff's current law, Kirchhoff's voltage law, signs convention.  <b>Course Outcome: CO2      Teaching Hours : 06      Marks: R- NA, U-NA, A-NA</b>
3	<b>AC circuits</b> 3.1 Performance of AC when it passes through Pure R, Pure L and Pure C 3.2 Concept of inductive reactance and capacitive reactance and impedance. 3.3 Circuit diagram, phasor diagram and waveform for RL, series, RC series and RLC series circuit. Impedance and Impedance Triangle. 3.4 Active power, Reactive power and apparent power, power factor. (only Definitions) 3.5 Transformer: Faraday's law of electromagnetic induction, Fleming's right hand rule, Lenz's law (Only statements), Working principal and main parts of transformer, types of transformer based on transformation ratio (k)  <b>Course Outcome: CO1      Teaching Hours : 05      Marks: R- NA, U-NA, A- NA</b>
4	<b>Semiconductor Devices</b> 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) 4.3 Transistors: 4.3.1 BJT: NPN, PNP transistors (symbol, working, necessity of biasing, biasing methods, Active, cut off, saturation region. 4.3.2 FET: N channel, P channel (symbol, working) 4.4 Difference between BJT and FET 4.5. MOSFET (symbol, working, applications)  <b>Course Outcome: CO3      Teaching Hours : 06      Marks: R- NA, U-NA, A- NA</b>
5	<b>Optoelectronic Devices</b> 5.1 LED, LASER diodes, 7 segment display 5.2 Photodiode 5.3 Photovoltaic or solar cells 5.4 Phototransistor



	5.5 Optocoupler (Only Symbols, working and Applications of all these devices)
	<b>Course Outcome: CO5      Teaching Hours : 03      Marks: R- NA, U-NA, A- NA</b>
<b>6</b>	<b>Applications of Semiconductor Devices</b> 6.1. Rectifiers and filters: Half Wave Rectifier, Full Wave Rectifier and Bridge rectifier with RC, LC, $\pi$ filter (Circuits, waveforms, applications, comparison, No mathematical analysis) 6.2. Diode as clipper : Series diode clipper, Parallel diode clipper (Circuits, waveform, working), Positive clipper, Negative clipper) 6.3. Diode as clamper: Positive clamper, Negative clamper 6.4. Zener diode as a voltage regulator 6.5. Transistor as an amplifier 6.6. Transistors as a switch  <b>Course Outcome: CO4      Teaching Hours : 06      Marks: R- NA, U-NA, A- NA</b>

**List of experiments: First six experiments are compulsory. Any 4 experiments out of 7 to 13. Mini project is compulsory.**

Sr. No.	Unit No	CO	List of Experiments	Hours
1	1	CO1	Measure voltages and currents in series and parallel resistive circuit and verify voltage division rule and current division rule.	02
2	2	CO2	Verify KCL and KVL	02
3	4 & 6	CO3 CO4	To construct and test half wave rectifier. Observe and measure input and output waveforms (Amplitude, frequency)	02
4	4 & 6	CO3 CO4	To construct and test Zener voltage regulator. Find out load and line regulation.	02
5	5	CO5	To construct electronic circuit using optocoupler and test it.	02
6	3	CO1	Measure the phase relation between voltage and current in pure resistive, inductive and capacitive circuit.	02
7	1	CO1	Measure amplitude, frequency of a sinusoidal waveform on oscilloscope	02
8	3	CO1	Determine impedance, phase angle, active, reactive and apparent power in RL series circuit.	02
9	6	CO3 CO4	To construct and test full wave rectifier. Observe and measure input and output waveforms (Amplitude, frequency)	02
10	6	CO3 CO4	To construct and test Bridge rectifier. Observe and measure input and output waveforms (Amplitude, frequency)	02
11	6	CO3 CO4	To construct and test transistor as a switch.	02
12	6	CO4	To construct and see the waveforms of any type of clipper	02
13	6	CO4	To construct and see the waveforms of any type of clamper	02
14	4,5,6	CO1 to CO5	Mini Project (Electronic hobby kit)	04
<b>Total</b>				<b>30</b>

**References/ Books:**

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

**E-References:**

1. [www.electricaltechnology.org](http://www.electricaltechnology.org)
2. [www.electronics-tutorials.ws](http://www.electronics-tutorials.ws)
3. [www.allaboutcircuits.com](http://www.allaboutcircuits.com)
4. [www.alldatasheet.com](http://www.alldatasheet.com)
5. [www.electronics.wisc-online.com](http://www.electronics.wisc-online.com)
6. [www.vlab.co.in](http://www.vlab.co.in)

**CO Vs PO and CO Vs PSO Mapping (Information Technology)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
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

**CO Vs PO and CO Vs PSO Mapping (Computer Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
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

**Industry Consultation Committee:**

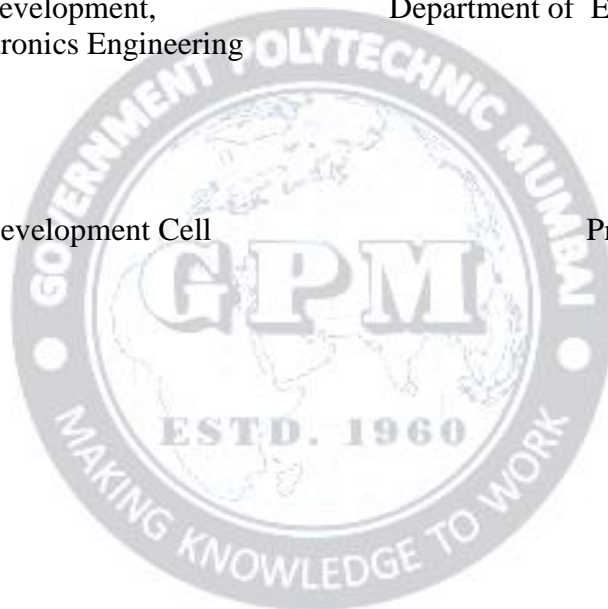
Sr. No	Name	Designation	Institute/Organisation
1	Mr. Sandeep Dongare	General Manager	HCL Technologies
2	Mrs. B. S. Motling	Head of Electrical Department	K. J. Somaiya Polytechnic Mumbai
3	Mrs. S. N. Nagargoje	Lecturer in Electronics	Govt. Polytechnic Thane
4	Dr. R. A. Patil	Sel. Gr. Lecturer in Electronics,	Govt. Polytechnic Mumbai
5	Dr. P. N. Padghan	Sel. Gr. Lecturer in Electronics,	Govt. Polytechnic Mumbai

Coordinator  
Curriculum Development,  
Department of Electronics Engineering

Head of Department  
Department of Electronics Engineering

I/C, Curriculum Development Cell

Principal



Programme : <b>Diploma in Information Technology and Computer Engineering (sandwich Pattern)</b>										
Course Code: <b>IT19202</b>				Course Title: <b>Logic Development using C Programming</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs 30min)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
<b>3</b>	<b>4</b>	<b>--</b>	<b>7</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>50*</b>		<b>25</b>	<b>175</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination

**Note:** For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill tests are to be conducted. First skill test at midterm and second skill test at the end of the term

### 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.

**Course Outcomes:** Student should be able to

CO1	Illustrate the Flowchart and describe an algorithm for a given program.
CO2	Use Conditional and iterative statements in C programs.
CO3	Demonstrate the use of user defined functions to solve real time problems
CO4	Describe C Programs using pointers and to allocate memory using dynamic memory management functions
CO5	Develop programs using input and output operations
CO6	Use of constants, variables, data types and operators and arrays in programs.

### Course Content Details:

Unit No	Topics / Sub-topics
1	<b>Program Logic development</b> <b>1.1 Fundamentals of algorithms:</b> Notion of an algorithm. Pseudo-code conventions like assignment statements and basic control structures. <b>1.2 Algorithmic problems:</b> 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

	<p>prime numbers.</p> <p><b>1.3 Flow chart:</b> Draw flow charts for all algorithms developed</p> <p><b>Course Outcome- CO1      Teaching Hours – 05      Marks: 08 (R-02 U-02 A-04)</b></p>
2	<p><b>Basics of C programming</b></p> <p><b>2.1 Different approaches in programming:</b> Procedural approach, Object Oriented approach, Event Driven approach.</p> <p><b>2.2 Structure of C:</b> Header and body, Use of comments, Compilation of a program.</p> <p><b>2.3 Data Concepts:</b> 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.</p> <p><b>2.4 Operators in C:</b> Logical, Arithmetic, Bitwise, Relational, Assignment</p> <p><b>2.5 Basic Input output:</b> C program structure, Input and output using printf() and scanf(), character I/O. (Programs based on I/O)</p> <p><b>Course Outcome- CO2, CO5      Teaching Hours – 08      Marks: 10 (R-02 U-03 A-05)</b></p>
3	<p><b>Control Structures</b></p> <p><b>3.1 Decision making:</b> If Statement, If else statement, Nesting of if-else</p> <p><b>3.2 branching:</b> The switch statement</p> <p><b>3.3 Looping:</b> While loop, Do-while loop, For loop</p> <p>3.4 Ternary operator</p> <p>3.5 Go to statement</p> <p>3.6 Use of break and continue statements</p> <p><b>Course Outcome- CO6      Teaching Hours – 08      Marks: 08 (R-02 U-02 A-04)</b></p>
4	<p><b>Arrays and Strings</b></p> <p>4.1 One dimension, two dimension and multidimensional arrays</p> <p>4.2 Array declaration</p> <p>4.3 Array initialization</p> <p>4.4 calculating the length of an array</p> <p>4.5 Operation on array</p> <p>4.6 String input/output</p> <p>4.7 String operations</p> <p>4.8 Array of strings</p> <p><b>Course Outcome- CO2, CO5      Teaching Hours – 08      Marks: 10 (R-02 U-04 A-04)</b></p>
5	<p><b>Functions</b></p> <p>5.1 Concept of library functions</p> <p>5.2 String functions (comparison, concatenation, length)</p> <p>5.3 User-defined functions</p> <p>5.4 Local &amp; global variables</p> <p>5.5 Parameter passing</p> <p>5.6 Storage classes</p> <p><b>Course Outcome- CO3      Teaching Hours – 05      Marks: 08 (R-02 U-02 A-04)</b></p>
6	<p><b>Structure and Union</b></p> <p>6.1 Basic Concept</p> <p>6.2 Structure declaration, initialization</p> <p>6.3 Structure within structure</p> <p>6.4 Nested Structures</p> <p>6.5 Array of Structure</p>



	6.6 Union <b>Course Outcome- CO5, CO2    Teaching Hours:05    Marks:08 ( R-02 U-02 A-04)</b>
7	<b>Pointers</b> 7.1 Basic concept 7.2 Pointer & arrays 7.3 Pointer & functions 7.4 Pointer arithmetic <b>Course Outcome- CO4    Teaching Hours:06    Marks:08 (R-02 U-02 A-04)</b>

**Suggested Specifications Table with Hours and Marks (Theory):**

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Program Logic development	02	02	04	8
2	Basics of C programming	02	03	05	10
3	Control Structures	02	02	04	8
4	Arrays and Strings	02	04	04	10
5	Functions	02	02	04	8
6	Structure and Union	02	02	04	8
7	Pointers	02	02	04	8
<b>Total</b>		<b>14</b>	<b>17</b>	<b>29</b>	<b>60</b>

**Legends:** R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

**Notes:** This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

**List of experiments: First 7 Experiments are compulsory and any 3 experiments out of 8 to 14. Mini project is compulsory.**

Sr. No.	Unit No	CO	List of Experiments	Hours
1	1	CO1	Write an <b>algorithm</b> and draw the <b>flow chart</b> 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
2	1,2	CO5	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
3	3	CO2	Program using control structures: Branching a) To find the greatest number among three numbers using nested if b) Program that asks user an arithmetic operator ('+', '-', '*', '/') and two operands and perform the corresponding calculation on the operands using switch case	4

4	3	CO2	Program using control structures: Looping(using loops) a) 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
5	4	CO6	Program to accept values in 2-Dimensional 3 by 3 arrays and displays the sum of all the elements.	4
6	5	CO3	Program using function(call by value) a) to swap to numbers b) to find square of a given number	4
7	7	CO4	Program using pointer.	4
8	4	CO6 CO3	Program using array of strings.	4
9	1.2.3	CO2	Program using control structures: <b>Decision making</b> a) To find whether the input number is even or odd. b) To find whether the number entered is positive or negative.	4
10	5	CO6 CO3	Program to perform different operations on string.	4
11	5	CO3	Program using function(call by value) a) to swap to numbers b) to find square of a given number	4
12	6	CO4 CO6	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
13	7	CO6	Program to compute the sum of all elements stored in an array using pointers	4
14	7	CO4	Program using pointer Arithmetic.	4
15	All	CO3	Mini Project	4
<b>Total</b>				<b>60</b>

**E-References:**

- 1 <https://www.w3schools.com/>      2 <https://www.tutorialspoint.com>  
 3. [www.cppinstitute.org/](http://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

**References/ Books:**

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



**CO Vs PO and CO Vs PSO Mapping (Information Technology)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	1	3			1	1	3	1	1
CO2	1		1	2				3	2	1
CO3	2	2			1		1	3	3	
CO4	1		2	2		2		3	2	1
CO5		2		3	2	3	1	2	2	
CO6	1	3	1			2		3		1

**CO Vs PO and CO Vs PSO Mapping (Computer Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	1	3			1	1	3	2	
CO2	1		1	2				3	2	
CO3	2	2			1		1	3	3	2
CO4	1		2	2		2		3	2	1
CO5		2		3	2	3	1	3	2	3
CO6	1	3	1			2		3	1	1

**Industry Consultation Committee:**

Sr. No	Name	Designation	Institute/Organisation
1	Mr. Vaibhav Wankhade	D.B.A	FIS solutions Pvt Ltd Pune
2	Mr. Mahendra Dabhade	Lecturer in Information Technology	Government Polytechnic, Thane
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Head of Department  
Department of Information Technology

I/C, Curriculum Development Cell

Principal

Programme : <b>Diploma in Computer Engineering (Sandwich Pattern)</b>										
Course Code: <b>CO19201</b>				Course Title: <b>Web Page Design</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
<b>1</b>	<b>--</b>	<b>2</b>	<b>3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>50*</b>	<b>--</b>	<b>25</b>	<b>75</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination

Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

### 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 student will learn about the mark-up languages HTML, XML the CSS standards for formatting and transforming web content, interactive graphics and multimedia content on the web page.

### Course Outcomes:

Student should be able to

<b>CO1</b>	Visualize the concept of Internet & scope of web technology.
<b>CO2</b>	Create interactive web page(s) using HTML
<b>CO3</b>	Design Web Page using CSS
<b>CO4</b>	Write client side script using JavaScript
<b>CO5</b>	Publish Website

**Course Content Details:**

<b>Unit No</b>	<b>Topics / Sub-topics</b>
<b>1</b>	<b>Introduction To Web Technology</b> 1.1 Careers in Web Technologies and Job Profiles 1.2 Web Site Design Principles – How the Website Works? Build a Web Site Development Team, Filenames and URLs, Directory Structure, Diagram the Site. 1.3 Planning Site Navigation – Creating Usable Navigation, Using Text Based Navigation, Using Graphics- Based Navigation.  <b>Course Outcome: CO1      Teaching Hours: 2 hrs</b>
<b>2</b>	<b>Working With Html 5</b> <b>2.1 HTML5 Page layout and navigation:</b> 2.1.1. 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 2.1.2. Creating division based layouts: HTML5, semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions.  <b>2.2 HTML5 Tables, Forms and Media:</b> 2.2.1 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, 2.2.2 Creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, 2.2.3 Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.  <b>Course Outcome: CO2      Teaching Hours: 7hrs</b>
<b>3</b>	<b>Working With CSS</b> <b>3.1 Cascading Style Sheets 2.0</b> 3.1.1 Introduction to CSS 3.1.2 Types of Style Sheets (Inline, Internal and External) 3.1.3 Creating Style Sheet 3.1.4 CSS Properties 3.1.5 CSS Styling(Background, Text Format, Controlling Fonts) 3.1.6 Working with block elements and objects 3.1.7 Working with Lists and Tables 3.1.8 CSS Id and Class

	3.1.9 Box Model(Introduction, Border properties, Padding Properties, Margin properties) 3.1.10 CSS Color 3.1.11 Creating page Layout and Site Designs  <b>3.2Cascading Style Sheets (CSS 3.0)</b> 3.2.1 CSS Rounded Corners, 3.2.2 Border Images,Border Shadows, 3.2.3 CSS Gradients, CSS Background properties, 3.2.4 Text-Shadow Property, Text-Stroke Property  <b>Course Outcome: CO2                      Teaching Hours: 2hrs</b>
<b>4</b>	<b>Introduction To JavaScript</b> 4.1 Client side scripting, 4.2 What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition  <b>Course Outcome: CO 3                      Teaching Hours: 3hrs</b>
<b>5</b>	<b>Publishing And Maintaining Your Web Site</b> 5.1 Publishing Your Web Site 5.2 Testing Your Web Site 5.3 Refining and Updating Your Content 5.4 Attracting Notice to Your Web Site. 5.5 Create Web Sites and Publishing on free web servers (Joomla, Yola, Zohoetc)  <b>Course Outcome: CO 4                      Teaching Hours: 2hrs</b>

**Suggested Specifications Table (Theory): NA**

**List of Experiments/ Laboratory Activities**

Sr. No.	Unit No	CO	Experiments/ Laboratory Activities	Hours
1.	1	CO1	Prepare a report on latest web technologies.	2
2.	2	CO2	Create Student feed++back form (use textbox, text area, checkbox, radio button, select box etc.)	2
3.	3	CO3	Use Inline CSS to format your resume that you created.	2
4.	4	CO4	a. Develop a JavaScript to display today's date. b. Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript	2
5.	5	CO5	Publish a website on Internet by acquiring space on free hosting site.	2

6.	2	CO2	Create your resume using HTML tags also experiment with colors, text , link ,size and also other tags you studied.	2
7.	2	CO2	Design a web page of your home town with an attractive background color, text color, image, font etc.	2
8.	2	CO2	Insert audio & video files in your web page created for home town.	2
9.	2	CO2	Create class timetable using table tag.	4
10.	2	CO2	Design web pages for your college containing a description of the courses, departments, faculties, library etc, Use href, list tags.	4
11.	2	CO2	Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right hand side.	2
12.	2	CO2	Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.	2
13.	3	CO3	Use External CSS to format your class timetable as you created.	2
14.	ALL	ALL	Mini Project.	2
<b>Total</b>				32

**E-References:**

- 1 <http://www.w3schools.com/html>
- 2 <http://www.html.net/>
- 3 <http://www.2createawebsite.com>
- 4 <http://webdesign.about.com>

**CO Vs PO and CO Vs PSO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	--	--	1	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

**Industry Consultation Committee:**

Sr. No	Name	Designation	Institute/Organisation
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Department of Computer Engineering

Head of Department  
Department of Computer Engineering

I/C, Curriculum Development Cell

Principal



Programme : <b>Diploma in Computer Engineering (Sandwich Pattern)</b>										
Course Code: <b>CO19301</b>				Course Title: <b>Multimedia and Video Creation</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
<b>01</b>	<b>02</b>	<b>--</b>	<b>03</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>50*</b>	<b>--</b>	<b>25</b>	<b>75</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination  
 Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

### Rationale:

Nowadays 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 and much more. Content generation in the form of videos, podcasts, text and audio blogs has become very popular and a rich source of earning. This course is being introduced in Diploma in Computer Engineering to make the students aware of latest trends in multimedia. This course focuses on the use of various open source softwares and tools for designing and generation of different media which will be helpful to the students to earn their living with a small or almost zero capital.

**Course Outcomes:** Student should be able to

CO1	Identify different types of licenses such as Copyrighted, Public Domain, Creative Commons, etc.
CO2	Use different open tools and software to create content like Digital Images, Audio and Video.
CO3	Create videos

### Course Content Details:

Unit No	Topics / Sub-topics
1	<b>Introduction to Multimedia</b> 1.1 Definition of Multimedia and Hypermedia. 1.2 Objects of Multimedia: Text, Image, Audio, Video 1.3 Media Players: Image Viewers, Audio Players, Video Players 1.4 Multimedia File Formats



	<p>1.4.1 Image: bmp, jpg, jpeg, png</p> <p>1.4.2 Audio: mp3, wma</p> <p>1.4.3 Video: mp4, mp4a, mpeg, mkv</p> <p>1.5 The Licenses for the content such as Copyrighted, Public Domain, Creative Commons, GNU Free Documentation, Open Publication, etc</p> <p>1.6 Roles and Responsibilities of for the Subscriber, Publisher, Editor, Author, and Reviewer while Content Creation</p> <p><b>Course Outcome: CO1      Teaching Hours: 2 hrs      Marks: --</b></p>
2	<p><b>Digital Images</b></p> <p>2.1 Steps for Digital Image Processing</p> <p>2.2 Human Visual Perception: Structure of Human Eye and Brightness Adaptation and Discrimination</p> <p>2.3 Pixels and Coordinate System for Digital Images</p> <p>2.4 Relationship between Pixels</p> <p>2.5 Neighboring pixels, Adjacency, Connectivity, Regions, Boundaries</p> <p>2.6 Number of Bits per Pixel, Aspect Ratio, Image Size</p> <p>2.7 Black and White Images</p> <p>2.8 Gray Scales and Gray Scale Images</p> <p>2.9 Image Negative, Image Subtraction, Image Histogram</p> <p>2.10 Color Models for Digital Images</p> <p>2.11 Color Image Representation</p> <p>2.12 Resolution</p> <p>2.12.1 Pixel Resolution</p> <p>2.12.2 Pixel Density and Density Independent Pixels</p> <p>2.12.3 Screen Resolutions: SD, HD, Full HD, Ultra HD/ 4K, 8K and higher</p> <p><b>Course Outcome: CO2      Teaching Hours: 3 hrs      Marks: --</b></p>
3	<p><b>Digital Audio</b></p> <p>3.1 Audio Basics</p> <p>3.2 Analog to Digital Conversion of Audio</p> <p>3.3 Characteristics of Audio: Amplitude, Wavelength, Frequency, Timbre</p> <p>3.4 Noise in Audio, Signal to Noise Ratio (SNR), Noise Removal</p> <p>3.5 Channels in an Audio file</p> <p>3.6 Data Rates, bit rate, sampling rate/ frequency of an Audio</p> <p><b>Course Outcome: CO2, CO 3      Teaching Hours: 4 hrs      Marks: --</b></p>
4	<p><b>Digital Video</b></p> <p>4.1 Digital Video Basics: Key Frames, Shot, Group, Scene, Video</p> <p>4.2 Shot Boundaries</p> <p>4.3 Frame rate, bit rate, Live streaming, progressive download</p> <p>4.4 Animation Effects: Fade In, Fade Out, Wipe, Dissolve</p>

	<p>4.5 Demonstration of OpenShot Open Source Video Editor</p> <p>4.6 Screen casting: creating screen casts using Screencast-o-matic</p> <p>4.7 Introduction to Open Broadcaster Software (OBS) Studio</p> <p>4.8 Creating Videos and uploading them to YouTube under Creative Commons License</p> <p><b>Course Outcome: CO2, CO 3    Teaching Hours: 6 hrs    Marks: --</b></p>
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**Suggested Specification Table (Theory): NA**

**List of experiments:**

Sr. No.	Unit No	COs	Title of the Experiments	Hours
1	1	CO1, CO2	<p><b>1.1 Survey of Open Source Multimedia Processing Software</b></p> <ul style="list-style-type: none"> <li>i Search for Open Source Multimedia Processing Software on Internet.</li> <li>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.</li> <li>iii Note the hardware and software requirements for them.</li> <li>iv Make a report of your survey.</li> </ul> <p><b>1.2 Survey of different licenses available for content</b></p> <ul style="list-style-type: none"> <li>i List the different licenses with their details</li> <li>ii Browse any 10 website/ video/ audio resources on Internet and identify their licenses.</li> <li>iii Create your own content such as bio data, photos, audio, video, etc. and license it.</li> <li>iv Make a report of your survey</li> </ul>	4
2	2	CO2	<p><b>2.1 Image Editing</b></p> <p>Suggested open source image editing software: GIMP/ Synfig Studio.</p> <p>Capture a color picture of any place, nature, etc. using a digital camera device (you can use your mobile phone for the same) and do the following:</p> <ul style="list-style-type: none"> <li>i Import the picture into your computer.</li> <li>ii Note the properties of the picture like resolution, size, etc.</li> <li>iii Resize it to increase or decrease the size.</li> <li>iv Invert its Aspect Ratio.</li> <li>v Change the contrast and brightness.</li> <li>vi Change the sharpness.</li> <li>vii Crop the edges of the picture.</li> <li>viii Make an Image Negative.</li> </ul> <p><b>2.2 Poster Making</b></p>	6

			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	3	CO2	<b>Audacity I</b> <ul style="list-style-type: none"> <li>3.1 Learn to create, save and export the Audacity Project,</li> <li>3.2 Import an Audio into the Project</li> <li>3.3 Perform Mic Check.</li> <li>3.4 Choose any topic, prepare a short script and record it in your own voice.</li> <li>3.5 Perform Audio Editing: Audio Clipping, Cutting, Copying, Pasting a clip</li> <li>3.6 Apply effects: Inversion, Compression, Fade In Fade Out, Noise Removal</li> <li>3.7 Split Stereo Track into two tracks viz. left and right.</li> <li>3.8 Convert Stereo to Mono and Mono to Stereo</li> <li>3.9 Change pitch, tempo and speed of an Audio</li> <li>3.10 Make precise adjustments to the audio speed (tempo) while maintaining pitch in order to run for a predetermined length of time</li> <li>3.11 Combine the track again to stereo after changes</li> <li>3.12 Export the project to mp3 format.</li> </ul>	6
4	3	CO2	<b>Audacity II (Creating Karaoke)</b> <ul style="list-style-type: none"> <li>4.1 Import a song of your choice into an Audacity Project.</li> <li>4.2 Perform the steps to remove vocals from the track.</li> <li>4.3 Export the track to mp3 format.</li> </ul>	2
5	4	CO2, CO3	<b>Video Editing using OpenShot</b> <ul style="list-style-type: none"> <li>5.1 Download and install OpenShot.</li> <li>5.2 Import a video into OpenShot</li> <li>5.3 Explore the various options in OpenShot.</li> <li>5.4 Edit the video. Remove undesired clips.</li> <li>5.5 Add suitable background music.</li> <li>5.6 Apply different effects for different clips in the video.</li> <li>5.7 Add some subtitles to the video.</li> </ul>	4
6	All	CO1, CO2, CO3	<b>Mini Project</b> <ul style="list-style-type: none"> <li>1. Choose any topic from any course in your curriculum.</li> <li>2. Study the topic well and prepare a script for narration.</li> <li>3. You can prepare a presentation or show a demo on any relevant software.</li> </ul>	8

			<p>4. Make a screen cast of the presentation/ demo using Screencast-o-matic or OBS Studio.</p> <p>5. 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).</p> <p>6. 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.</p> <p>7. Sign into YouTube and upload your video on it under Creative Commons License. The video should not exceed 10 minutes.</p>	
<b>Total</b>				<b>30</b>

**E-References:**

1. [https://www.newscred.com/wp-content/themes/newscred/assets/downloads/guide/NewsCred\\_Guide\\_Licensed\\_Content.pdf](https://www.newscred.com/wp-content/themes/newscred/assets/downloads/guide/NewsCred_Guide_Licensed_Content.pdf)
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6.

**CO Vs PO and CO Vs PSO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	-	2	1	3	2	3	3
CO2	1	3	3	2	3	1	2	3	3	3
CO3	1	3	3	3	2	2	1	3	3	3

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