



### COURSE INFORMATION SHEET

<b>PROGRAMME:</b> B.Tech.	<b>DEGREE:</b> Mechanical Engineering
<b>SEMESTER:</b> II	<b>BATCH:</b> 2020-2024
<b>COURSE NAME:</b> VECTOR CALCULUS, DIFFERENTIAL EQUATIONS & TRANSFORMS	<b>COURSE CODE:</b> MAT 102
<b>COURSE MODULE:</b> 5	<b>COURSE TYPE:</b> Core
<b>CONTACT HOURS (L-T-P):</b> 3-1-0	<b>CREDITS:</b> 4
<b>FACULTY NAME:</b> Suryakala S	

#### SYLLABUS:

MODULE	TOPICS	HOURS
<b>1</b>	<b>(Calculus of vector functions)</b> - Vector valued function of single variable, derivative of vector function and geometrical interpretation, motion along a curve-velocity, speed and acceleration. Concept of scalar and vector fields , Gradient and its properties, directional derivative , divergence and curl, Line integrals of vector fields, work as line integral, Conservative vector fields , independence of path and potential function(results without proof)	<b>9</b>
<b>2</b>	<b>( Vector integral theorems)</b> - Green's theorem (for simply connected domains, without proof) and applications to evaluating line integrals and finding areas. Surface integrals over surfaces of the form $z = g(x, y)$ , $y = g(x, z)$ or $x = g(y, z)$ , Flux integrals over surfaces of the form $z = g(x, y)$ , $y = g(x, z)$ or $x = g(y, z)$ , divergence theorem (without proof) and its applications to finding flux integrals, Stokes' theorem (without proof) and its applications to finding line integrals of vector fields and work done.	<b>9</b>
<b>3</b>	<b>( Ordinary differential equations)</b> - Homogenous linear differential equation of second order, superposition principle, general solution, homogenous linear ODEs with constant coefficients-general solution. Solution of Euler-Cauchy equations (second order only). Existence and uniqueness (without proof). Non homogenous linear ODEs-general solution, solution by the method of undetermined coefficients (for the right hand side of the form $x^n$ , $e^{ax}$ , $\sin ax$ , $\cos ax$ , $e^{ax}\sin ax$ , $e^{ax}\cos ax$ and their linear combinations), methods of variation of parameters. Solution of higher order equations-homogeneous and non-homogeneous with constant coefficient using method of undetermined coefficient.	<b>9</b>
<b>4</b>	<b>(Laplace transforms)</b> - Laplace Transform and its inverse ,Existence theorem ( without proof) , linearity, Laplace transform of basic functions, first shifting theorem, Laplace transform of derivatives and integrals, solution of differential equations using Laplace transform, Unit step function, Second shifting theorems. Dirac delta function and its Laplace transform, Solution of ordinary differential equation	<b>10</b>

	involving unit step function and Dirac delta functions. Convolution theorem(without proof)and its application to finding inverse Laplace transform of products of functions.	
<b>5</b>	<b>(Fourier Tranforms)-</b> Fourier integral representation, Fourier sine and cosine integrals. Fourier sine and cosine transforms, inverse sine and cosine transform. Fourier transform and inverse Fourier transform, basic properties. The Fourier transform of derivatives. Convolution theorem (without proof)	<b>8</b>
		<b>TOTAL HOURS</b>
		<b>45</b>

#### TEXT/REFERENCE BOOKS:

TYPE (T/R)	BOOK TITLE/AUTHORS/PUBLICATION/EDITION
T	H. Anton, I. Biven S.Davis, "Calculus", Wiley, 10th edition, 2015
T	Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley, 10th edition, 2015
R	J. Stewart, Essential Calculus, Cengage, 2nd edition, 2017
R	G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9 th Edition, Pearson,Reprint, 2002.
R	Peter O Neil, Advanced Engineering Mathematics, 7th Edition, Thomson, 2007.
R	Louis C Barret, C Ray Wylie, "Advanced Engineering Mathematics", Tata McGraw Hill, 6th edition, 2003.
R	VeerarajanT."Engineering Mathematics for first year", Tata McGraw - Hill, 2008.
R	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th edition , 2010.
R	Srimanta Pal, Subodh C. Bhunia, "Engineering Mathematics", Oxford University Press, 2015
R	Ronald N. Bracewell, "The Fourier Transform and its Applications", McGraw - Hill International Editions, 2000.

#### COURSE PRE-REQUISITES:

COURSE CODE	COURSE NAME	DESCRIPTION	SEMESTER
<b>MAT 101</b>	<b>LINEAR ALGEBRA AND CALCULUS</b>	Calculus of single and multi variable functions.	<b>1</b>

#### COURSE OBJECTIVES:

<p><b>Course Objectives:</b></p> <ul style="list-style-type: none"> <li>To introduce the concepts and applications of differentiation and integration of vector valued functions, differential equations, Laplace and Fourier Transforms.</li> </ul>
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- To familiarize the prospective engineers with some advanced concepts and methods in Mathematics which include the Calculus of vector valued functions, ordinary differential equations and basic transforms such as Laplace and Fourier Transforms which are invaluable for any engineer's mathematical tool box.

### COURSE OUTCOMES:

CO. No.	CO DESCRIPTION	COGNITIVE LEVEL
MAT 102.1	After the completion of the course the student will be able to Compute the derivatives and line integrals of vector functions and learn their applications	Apply
MAT 102.2	After the completion of the course the student will be able to evaluate surface and volume integrals and learn their inter-relations and applications.	Apply
MAT 102.3	After the completion of the course the student will be able to solve homogeneous and non-homogeneous linear differential equation with constant coefficients	Apply
MAT 102.4	After the completion of the course the student will be able to compute Laplace transform and apply them to solve ODEs arising in engineering	Apply
MAT 102.5	After the completion of the course the student will be able to determine the Fourier transforms of functions and apply them to solve problems arising in engineering	Apply

### CO-PO AND CO-PSO MAPPING:

PO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O 1	PSO 2
MAT 102.1	3	3	3	3	2	1	-	-	1	2	-	2	-	-
MAT 102.2	3	3	3	3	2	1	-	-	1	2	-	2	-	-
MAT 102.3	3	3	3	3	2	1	-	-	1	2	-	2	-	-
MAT 102.4	3	3	3	3	2	1	-	-	1	2	-	2	-	-
MAT 102.5	3	3	3	3	2	1	-	-	1	2	-	2	-	-

### CO- PO AND CO-PSO MAPPING JUSTIFICATION:

CO	PO/ PSO	Level of correlation	Justification
MAT 102.1	PO1	3	Mapped substantially because the concept of vector function will give thorough knowledge in the application problems.
	PO2	3	Mapped substantially because it will help to analyse problems in vector functions.
	PO3	3	Mapped substantially because it will help to design the solutions of derivatives and line integrals of vector functions and learn their applications.
	PO4	3	Mapped substantially because it will help to solve complex problems in applications of vector functions.
	PO5	3	Mapped substantially because it will help in modern tools which are useful in modelling and analysing physical phenomena.
	PO6	1	Mapped slightly because it will help the engineer and the individual in everyday life.
	PO9	1	Mapped slightly because the basic knowledge of vector function will help the Individual and team work
	PO10	2	Mapped moderately because the basic knowledge of vector function will help in communication engineering.
	PO12	2	Mapped moderately because the basic knowledge of vector function will help in application in engineering
MAT 102.2	PO1	3	Mapped substantially because the concept of surface and volume integrals will help in analysing various engineering problems.
	PO2	3	Mapped substantially because it helps in easier formulation of various problems.
	PO3	3	Mapped substantially because it helps in designing solutions of complex problems easily.
	PO4	3	Mapped substantially because it will help to solve complex problems in applications of surface and volume integrals.
	PO5	3	Mapped substantially because it will help in modern tools which are useful in modeling and analyzing physical phenomena.

	PO6	1	Mapped slightly because it will help the engineer and the individual in everyday life.
	PO9	1	Mapped slightly because it will help the in application in engineering.
	PO10	2	Mapped moderately because the basic knowledge of surface and volume integral will help in communication engineering.
	PO12	2	Mapped moderately because the basic knowledge of surface and volume integral will help in application in engineering.
MAT 102.3	PO1	3	Mapped substantially because the concept of differential equation will give thorough knowledge in the application problems.
	PO2	3	Mapped substantially because fundamental knowledge in differential equation can be used to formulate engineering principles.
	PO3	3	Mapped substantially because it helps in designing solutions of complex problems easily.
	PO4	3	Mapped substantially because it will help to solve complex problems homogeneous and nonhomogeneous differential equations.
	PO5	3	Mapped substantially because it will help in modern tools which are useful in modelling and analysing physical phenomena
	PO6	1	Mapped slightly because it will help the engineer and the individual in everyday life.
	PO9	1	Mapped slightly because the basic knowledge of differential equation will help in application in engineering.
	PO10	2	Mapped moderately because the basic knowledge of differential equation will help in communication engineering
	PO12	2	Mapped moderately because the basic knowledge of differential equations will help in application in engineering.
MAT 102.4	PO1	3	Mapped substantially because the concept of Laplace transforms will give thorough knowledge in the application problems

	PO2	3	Mapped substantially because it help students in solving differential equations.
	PO3	3	Mapped substantially because it help students in using in data interpolation.
	PO4	3	Mapped substantially because it will help to solve complex mathematical problems.
	PO5	3	Mapped substantially because student can use in communication system.
	PO6	1	Mapped slightly because it will help the engineer and the individual in everyday life.
	PO9	1	Mapped slightly because it will help in the application in engineering.
	PO10	2	Mapped moderately because it will help in communication engineering
	PO12	2	Mapped moderately because it will help in application in engineering.
MAT 102.5	PO1	3	Mapped substantially because the concept of Fourier transforms will give thorough knowledge in the application problems
	PO2	3	Mapped substantially because it will help formulate engineering principles.
	PO3	3	Mapped substantially because it helps in designing solutions of complex problems in signals and image processing.
	PO4	3	Mapped substantially because it will help to solve complex mathematical problems
	PO5	3	Mapped substantially because student can use in communication system.
	PO6	1	Mapped slightly because it will help the engineer and the individual in everyday life.
	PO9	1	Mapped slightly because it will help in application in engineering.
	PO10	2	Mapped moderately because it will help in communication engineering.

	PO12	2	Mapped moderately because it will help in application in engineering
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Correlation Level: 1- Slight 2-Moderate 3- Substantial

**GAPS IN THE SYLLABUS:**

SI. No.	DESCRIPTION	RELEVANT CO	PROPOSED ACTIONS*
	NIL		

\*PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST

LECTURER/NPTEL etc

**WEB SOURCE REFERENCES:**

SI. No.	TOPIC	LINKS
1	Nptel Videos	<a href="https://nptel.ac.in/courses/112/105/112105129/">https://nptel.ac.in/courses/112/105/112105129/</a>
2		

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

LECTURES	<input checked="" type="checkbox"/>	ASSIGNMENT	<input type="checkbox"/>	TUTORIALS	<input checked="" type="checkbox"/>
LABORATORY	<input type="checkbox"/>	SEMINARS	<input checked="" type="checkbox"/>	PROJECT	<input type="checkbox"/>
ICT ENABLED TEACHING	<input type="checkbox"/>	WEB RESOURCES	<input type="checkbox"/>	ADD-ON COURSES	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

ASSIGNMENT	<input checked="" type="checkbox"/>	INTERNAL EXAMS	<input checked="" type="checkbox"/>	QUIZ	<input type="checkbox"/>
LAB PRACTICES	<input type="checkbox"/>	VIVA	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input checked="" type="checkbox"/>				

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**ASSESSMENT METHODOLOGIES-INDIRECT:**

**COURSE EXIT SURVEY**



**Course Coordinator**

**Module Coordinator**

**Head of the Department**





### COURSE INFORMATION SHEET

<b>PROGRAMME: B.Tech.</b>	<b>DEGREE: Mechanical Engineering</b>
<b>SEMESTER: 2</b>	<b>BATCH: 2020-2024</b>
<b>COURSE NAME: Engineering Physics B</b>	<b>COURSE CODE: PHT110</b>
<b>COURSE MODULE: 5</b>	<b>COURSE TYPE: Basic</b>
<b>CONTACT HOURS (L-T-P): 3-1-0</b>	<b>CREDITS: 4</b>
<b>FACULTY NAME: Gayathri R</b>	

#### SYLLABUS:

MODULE	TOPICS	HOURS
1	Harmonic oscillations, Damped harmonic motion-Derivation of differential equation and its solution ,Over damped, Critically damped and Under damped Cases, Quality factor-Expression, Forced oscillations-Differential Equation-Derivation of expressions for amplitude and phase of forced oscillations, Amplitude Resonance-Expression for Resonant frequency, Quality factor and Sharpness of Resonance, Electrical analogy of mechanical oscillators. Wave motion- Derivation of one dimensional wave equation and its solution, Three dimensional wave equation and its solution (no derivation), Distinction between transverse and longitudinal waves, Transverse vibration in a stretched string, Statement of laws of vibration.	9
2	Interference of light-Principle of superposition of waves, Theory of thin films - Cosine law (Reflected system), Derivation of the conditions of constructive and destructive Interference, Interference due to wedge shaped films -Determination of thickness and test for optical planeness, Newton's rings -Measurement of wavelength and refractive index, Antireflection coatings. Diffraction of light, Fresnel and Fraunhofer classes of diffraction, Diffraction grating-Grating equation, Rayleigh criterion for limit of resolution, Resolving and Dispersive power of a grating with expression (no derivation)	9
3	Introduction for the need of Quantum mechanics, Wave nature of Particles, Uncertainty principle, Applications-Absence of electrons inside a nucleus and Natural line broadening Mechanism, Formulation of time dependent and independent Schrodinger wave equations Physical Meaning of wave function, Particle in a one dimensional box-Derivation for normalised wave function and energy eigen values, Quantum Mechanical Tunnelling (Qualitative) Introduction to nanoscience and technology, Increase in surface to volume ratio for nanomaterials Quantum confinement in one dimension, two dimension and three dimension-Nano sheets, Nano wires and Quantum dots, Properties of nanomaterials-mechanical,	9

	electrical and optical, Applications of nanotechnology (qualitative ideas)	
<b>4</b>	Acoustics, Classification of sound-Musical sound-Noise,Characteristics of Musical Sounds-Pitch or frequency-Loudness or Intensity Measurement of Intensity level-Decibel-Quality or timbre, Absorption coefficient, Reverberation-Reverberation time-Significance-Sabine’s formula (no derivation), Factors affecting architectural acoustics and their remedies. Ultrasonics- Production- Magnetostriction effect and Piezoelectric effect, Magnetostriction oscillator and Piezoelectric oscillator – Working, Detection of ultrasonic waves - Thermal and Piezoelectric methods, Ultrasonic diffractometer- Expression for the velocity of ultrasonic waves in a liquid, Applications of ultrasonic waves - SONAR,NDT and Medical	<b>9</b>
<b>5</b>	Properties of laser, Absorption and emission of radiation, Spontaneous and stimulated emission, Einstein’s coefficients (no derivation), Population inversion, Metastable states, basic components of laser, Active medium, Pumping mechanism, Optical resonant cavity, working principle, Construction and working of Ruby laser and Helium neon laser ,Construction and working of semiconductor laser(Qualitative), Applications of laser, Holography, Difference between hologram and photograph, Recording of hologram and reconstruction of image, Applications Optic fibre-Principle of propagation of light, Types of fibres-Step index and Graded index fibres, Numerical aperture Derivation, Fibre optic communication system (block diagram), Industrial, Medical and Technological applications, Fibre optic sensors- Intensity Modulated and Phase modulated sensors	<b>9</b>
<b>TOTAL HOURS</b>		<b>45</b>

**TEXT/REFERENCE BOOKS:**

<b>TYPE (T/R)</b>	<b>BOOK TITLE/AUTHORS/PUBLICATION/EDITION</b>
<b>T</b>	M. N. Avadhanulu, P.G. Kshirsagar, TVS Arun Murthy“ A Text book of Engineering Physics”, S.Chand &Co., Revised Edition, 2019.
<b>T</b>	H.K.Malik , A.K. Singh, “Engineering Physics” McGraw Hill Education, Second Edition, 2017.
<b>R</b>	Arthur Beiser, “Concepts of Modern Physics ”, Tata McGraw Hill Publications, 6th Edition 2003
<b>R</b>	D.K. Bhattacharya, Poonam Tandon, “Engineering Physics”, Oxford University Press, 2015
<b>R</b>	Aruldas G., “Engineering Physics”, PHI Pvt. Ltd., 2015
<b>R</b>	Ajoy Ghatak, “Optics”, Mc Graw Hill Education, Sixth Edition, 2017
<b>R</b>	T. Pradeep, “Nano: The Essentials’’, McGraw Hill India Ltd, 2007
<b>R</b>	B. B. Laud, “Lasers and Non linear optics”, New age International Publishers, 2nd Edition ,2005
<b>R</b>	Premlet B., “Advanced Engineering Physics”, Phasor Books,10th edition ,2017
<b>R</b>	I. Dominic and. A. Nahari, “A Text Book of Engineering physics”, Owl Books Publishers, Revised edition, 2016

**COURSE PRE-REQUISITES:**

<b>COURSE CODE</b>	<b>COURSE NAME</b>	<b>DESCRIPTION</b>	<b>SEMESTER</b>
<b>PHT110</b>	<b>Engineering Physics B</b>	Higher secondary level Physics, Mathematical course on vector calculus, differential equations and linear algebra	<b>2</b>

**COURSE OBJECTIVES:****Course Objectives:**

- To impart students a solid background in the fundamentals of Physics
- To impart knowledge in engineering disciplines.
- To develop scientific attitudes and enable the students to correlate the concepts of Physics with the core programmes
- To equip the students with skills in scientific enquiry, problem solving and laboratory techniques.

**COURSE OUTCOMES:**

<b>CO. No.</b>	<b>CO DESCRIPTION</b>	<b>COGNITIVE LEVEL</b>
PHT110.1	Compute the quantitative aspects of waves and oscillations in engineering systems.	<b>Apply</b>
PHT110.2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.	<b>Apply</b>
PHT110.3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.	<b>Apply</b>
PHT110.4	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment.	<b>Apply</b>
PHT110.5	Apply the comprehended about laser and fibre optic communication systems in various engineering applications.	<b>Apply</b>

**CO-PO AND CO-PSO MAPPING:**

PO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
PHT110.1	3	2	-	-	-	-	-	1	2	-	-	1	-	-
PHT110.2	3	2	-	-	-	-	-	1	2	-	-	1	-	-
PHT110.3	3	2	-	-	-	-	-	1	2	-	-	1	-	-
PHT110.4	3	0	-	-	-	-	-	1	2	-	-	1	-	-
PHT110.5	3	2	-	-	-	-	-	1	2	-	-	1	-	-

**CO- PO AND CO-PSO MAPPING JUSTIFICATION:**

CO	PO/ PSO	Level of correlation	Justification
PHT110.1	PO1	3	Mapped substantially because compute the quantitative aspects of waves and oscillations in engineering systems like natural frequency, damped frequency, forced frequency, resonant frequency, band-width, Q-factor, wavelength, wave-velocity, frequency etc.
	PO2	2	Mapped moderately because to review research literature to identify physics behind current and relevant innovations in the respective branch.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch
PHT110.2	PO1	3	Mapped substantially because apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
	PO2	2	Mapped moderately because to review research literature to identify physics behind current and relevant innovations in the respective branch.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.

	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch
PHT110.3	PO1	3	Mapped substantially because analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices
	PO2	2	Mapped moderately because to review research literature to identify physics behind current and relevant innovations in the respective branch.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch.
PHT110.4	PO1	3	Mapped moderately because apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch.
PHT110.5	PO1	3	Mapped substantially because apply the comprehended about laser and fibre optic communication systems in various engineering applications.
	PO2	2	Mapped moderately because to review research literature to identify physics behind current and relevant innovations in the respective branch.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters

	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch.

Correlation Level: 1- Slight 2-Moderate 3- Substantial

**GAPS IN THE SYLLABUS:**

Sl. No.	DESCRIPTION	RELEVANT CO	PROPOSED ACTIONS*
	NIL		

\*PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL etc

**WEB SOURCE REFERENCES:**

Sl. No.	TOPIC	LINKS
1		
2		
3		
4		
5		
6		
7		

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

LECTURES	<input checked="" type="checkbox"/>	ASSIGNMENT	<input checked="" type="checkbox"/>	TUTORIALS	<input checked="" type="checkbox"/>
LABORATORY	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>	PROJECT	<input type="checkbox"/>
ICT ENABLED TEACHING	<input type="checkbox"/>	WEB RESOURCES	<input type="checkbox"/>	ADD-ON COURSES	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

ASSIGNMENT	<input checked="" type="checkbox"/>	INTERNAL EXAMS	<input checked="" type="checkbox"/>	QUIZ	<input type="checkbox"/>
LAB PRACTICES	<input type="checkbox"/>	VIVA	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input checked="" type="checkbox"/>				

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**ASSESSMENT METHODOLOGIES-INDIRECT:**

**COURSE EXIT SURVEY**



**Course Coordinator**

**GAYATHRI R**

**Module Coordinator**

**SREEJA S**

**Head of the Department**

**BIJU DAS D**



### COURSE INFORMATION SHEET

<b>PROGRAMME:</b> Mechanical Engineering (UG)	<b>DEGREE:</b> B.Tech
<b>SEMESTER:</b> 2	<b>BATCH:</b> 2021-2025
<b>COURSE NAME:</b> Engineering Graphics	<b>COURSE CODE:</b> EST 110
<b>COURSE MODULE:</b> Design	<b>COURSE TYPE:</b> Theory
<b>CONTACT HOURS (L-T-P):</b> 2-0-2	<b>CREDITS:</b> 3
<b>FACULTY NAME:</b> Ajithmon Anto	

### SYLLABUS:

MODULE	TOPICS	HOURS
1	Introduction: Relevance of technical drawing in engineering field. Types of lines, Dimensioning, BIScode of practice for technical drawing. Orthographic projection of Points and Lines: Projection of points in different quadrants, Projection of straight lines inclined to one plane and inclined to both planes. Trace of line. Inclination of lines with reference planes True length of line inclined to both the reference planes.	9
2	Orthographic projection of Solids: Projection of Simple solids such as Triangular, Rectangle, Square, Pentagonal and Hexagonal Prisms, Pyramids, Cone and Cylinder. Projection of solids in simple position including profile view. Projection of solids with axis inclined to one of the reference planes and with axis inclined to both reference planes.	8
3	Sections of Solids: Sections of Prisms, Pyramids, Cone, Cylinder with axis in vertical position and cut by different section planes. True shape of the sections. Also locating the section plane when the true shape of the section is given. Development of Surfaces: Development of surfaces of the above solids and solids cut by different section planes. Also finding the shortest distance between two points on the surface.	8
4	Isometric Projection: Isometric View and Projections of Prisms, Pyramids, Cone, Cylinder, Frustum of Pyramid, Frustum of Cone, Sphere, Hemisphere and their combinations.	6
5	Perspective Projection: Perspective projection of Prisms and Pyramids with axis perpendicular to the ground plane, axis perpendicular to picture plane. Conversion of Pictorial Views: Conversion of pictorial views into orthographic views. <b>SECTION B</b> (To be conducted in CAD Lab) Introduction to Computer Aided Drawing: Role of CAD in design and development of new products, Advantages of CAD. Creating two dimensional drawing with	14



	dimensions using suitable software. (Minimum 2 exercises mandatory) Introduction to Solid Modelling: Creating 3D models of various components using suitable modelling software. (Minimum 2 exercises mandatory)	
		<b>TOTAL HOURS</b>
		<b>45</b>

**TEXT/REFERENCE BOOKS:**

<b>TYPE (T/R)</b>	<b>BOOK TITLE/AUTHORS/PUBLICATION/EDITION</b>
<b>T</b>	Bhatt, N.D., Engineering Drawing, Charotar Publishing House Pvt. Ltd.
<b>T</b>	John, K.C. Engineering Graphics, Prentice Hall India Publishers.
<b>R</b>	Anilkumar, K.N., Engineering Graphics, Adhyuthnarayan Publishers
<b>R</b>	Agrawal, B. And Agrawal, C.M., Engineering Darwing, Tata McGraw Hill Publishers.
<b>R</b>	Benjamin, J., Engineering Graphics, Pentex Publishers- 3rd Edition, 2017
<b>R</b>	Duff, J.M. and Ross, W.A., Engineering Design and Visualisation, Cengage Learning.
<b>R</b>	Kulkarni, D.M., Rastogi, A.P. and Sarkar, A.K., Engineering Graphics with AutoCAD, PHI.
<b>R</b>	Luzaddff, W.J. and Duff, J.M., Fundamentals of Engineering Drawing, PHI.
<b>R</b>	Varghese, P.I., Engineering Graphics, V I P Publishers
<b>R</b>	Venugopal, K., Engineering Drawing and Graphics, New Age International Publishers.

**COURSE PRE-REQUISITES: Nil**

<b>COURSE CODE</b>	<b>COURSE NAME</b>	<b>DESCRIPTION</b>	<b>SEMESTER</b>

**COURSE OBJECTIVES:**

To enable the student to effectively perform technical communication through graphical representation as per global standards.
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**COURSE OUTCOMES:**

CO. No.	CO DESCRIPTION	COGNITIVE LEVEL
EST110.1	Draw the projection of points and lines located in different quadrants	Applying
EST110.2	Prepare multiview orthographic projections of objects by visualizing them in different positions	Applying
EST110.3	Draw sectional views and develop surfaces of a given object	Applying
EST110.4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.	Applying
EST110.5	Convert 3D views to orthographic views	Applying
EST110.6	Obtain multiview projections and solid models of objects using CAD tools	Applying

**CO-PO AND CO-PSO MAPPING:**

PO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O 1	PS O 2
EST110.1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
EST110.2	3	-	-	-	-	-	-	-	-	-	-	-	-	2
EST110.3	3	1	-	-	-	-	-	-	-	-	-	-	-	2
EST110.4	3	-	-	-	-	-	-	-	-	1	-	-	-	2
EST110.5	3	-	-	-	-	-	-	-	-	2	-	-	-	2
EST110.6	3	-	-	-	3	-	-	-	-	3	-	-	-	3

**CO- PO AND CO-PSO MAPPING JUSTIFICATION:**

CO	PO/PSO	LEVEL OF CORRELATION	JUSTIFICATION
EST110.1	PO1	3	Students will be able to use the basic knowledge in projections of objects to the solution of complex engineering problems.
EST110.2	PO1	3	Ability to draw the projections of solids shall be useful to the solution of engineering problems.
	PSO2	2	Students will be able to create drawings of components for industrial application.
EST110.3	PO1	3	Students will be able to use the basic knowledge in sections of objects to the solution of complex engineering problems.

	PO2	1	By the knowledge in developing sectional views and development of various objects, complex engineering problems can be analyzed
	PSO2	2	Students will be able to use the knowledge of sectional views in design concepts.
EST110.4	PO1	3	Students will be able to use the knowledge in isometric projections for the analysis and solution of complex engineering problems.
	PO10	1	Knowledge in perspective projections will help in communicating effectively the proposed views of various objects.
	PSO2	2	Students will be able to use the knowledge of isometric projections in design concepts.
EST110.5	PO1	3	Students will be able to use the basic knowledge to Convert 3D views to orthographic views of objects to solve complex engineering problems.
	PO10	2	Knowledge in conversion of 3D views to orthographic views will help in communicating effectively the proposed views of various objects.
	PSO2	2	Students will be able to use the knowledge of multi views projection in design concepts.
EST110.6	PO1	3	Students will be able to use the basic knowledge to Obtain multi view projections and solid models of objects using CAD tools
	PO5	3	Knowledge in CAD will help in creating and analyzing models of complex engineering problems.
	PO10	3	Knowledge in CAD will help in communicating effectively the proposed

			views of various objects.
	PSO2	3	Students will be able to draw 2D and 3D drawings of objects using CAD tools.

Correlation Level: 1- Low 2-Medium 3- High

**GAPS IN THE SYLLABUS:Nil**

SI. No.	DESCRIPTION	RELEVANT CO	PROPOSED ACTIONS*

**\*PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL etc**

**WEB SOURCE REFERENCES:**

SI. No.	TOPIC	LINKS
1	Introduction and geometric construction	<a href="http://nptel.ac.in/courses/112103019/">http://nptel.ac.in/courses/112103019/</a>
2	Engineering Drawings	<a href="http://www.engineeringdrawing.org/category/projection_of_lines">www.engineeringdrawing.org/category/projection_of_lines</a>
3	Projection of solids	<a href="https://nptel.ac.in/courses/112/103/112103019/">https://nptel.ac.in/courses/112/103/112103019/</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

LECTURES	<input checked="" type="checkbox"/>	ASSIGNMENT	<input type="checkbox"/>	TUTORIALS	<input type="checkbox"/>
LABORATORY	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>	PROJECT	<input type="checkbox"/>
ICT ENABLED TEACHING	<input type="checkbox"/>	WEB RESOURCES	<input type="checkbox"/>	ADD-ON COURSES	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

ASSIGNMENT	<input checked="" type="checkbox"/>	INTERNAL EXAMS	<input checked="" type="checkbox"/>	QUIZ	<input type="checkbox"/>
LAB PRACTICES	<input type="checkbox"/>	VIVA	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input checked="" type="checkbox"/>				

**ASSESSMENT METHODOLOGIES-INDIRECT:**

COURSE EXIT SURVEY

Course Coordinator

Module Coordinator

Head of the Department



### COURSE INFORMATION SHEET

<b>PROGRAM: BTECH</b>	<b>DEGREE: MECHANICAL ENGINEERING</b>
<b>SEMESTER:2</b>	<b>BATCH: 2020-2024</b>
<b>COURSE NAME: BASICS OF CIVIL ENGINEERING</b>	<b>COURSE CODE: EST120</b>
<b>COURSE MODULE:3</b>	<b>COURSE TYPE: THEORY</b>
<b>CONTACT HOURS (L-T-P): 2-0-0</b>	<b>CREDITS:4</b>
<b>FACULTY NAME: PRAVEENA S</b>	

#### SYLLABUS:

MODULE	TOPICS	HOURS
I	General Introduction to Civil Engineering: Relevance of Civil Engineering in the overall infrastructural development of the country. Responsibility of an engineer in ensuring the safety of built environment. Brief introduction to major disciplines of Civil Engineering like Transportation Engineering, Structural Engineering, Geo-technical Engineering, Water Resources Engineering and Environmental Engineering. Introduction to buildings: Types of buildings, selection of site for buildings, components of a residential building and their functions. Building rules and regulations: Relevance of NBC, KBR & CRZ norms (brief discussion only). Building area: Plinth area, built up area, floor area, carpet area and floor area ratio for a building as per KBR.	7
II	Surveying: Importance, objectives and principles. Construction materials, Conventional construction materials: types, properties and uses of building materials: bricks, stones, cement, sand and timber Cement concrete: Constituent materials, properties and types. Steel: Steel sections and steel reinforcements, types and uses. Modern construction materials:- Architectural glass, ceramics, Plastics, composite materials, thermal and acoustic insulating materials, decorative panels, waterproofing materials. Modern uses of gypsum, pre-fabricated building components (brief discussion only).	7
III	Building Construction: Foundations: Bearing capacity of soil (definition only), functions of foundations, types – shallow and deep (brief discussion only). Load bearing and framed structures (concept only). Brick masonry: - Header and stretcher bond, English bond & Flemish bond random rubble masonry. Roofs and floors: - Functions, types; flooring materials (brief discussion only). Basic infrastructure services: MEP, HVAC, elevators, escalators and ramps (Civil Engineering aspects only), fire safety for buildings. Green buildings:- Materials, energy systems, water management and environment for green buildings. (brief discussion only).	7
<b>TOTAL HOURS</b>		<b>21</b>

**CO- PO AND CO-PSO MAPPING JUSTIFICATION****TEXT/REFERENCE BOOKS:**

TYPE (T/R)	BOOK TITLE/AUTHORS/PUBLICATION/EDITION
T	Kandya A A, Elements of Civil Engineering, Charotar Publishing house
T	G Shanmugam, M S Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education; First edition, 2018
T	Mamlouk, M. S., and Zaniewski, J. P., Materials for Civil and Construction Engineering, Pearson Publishers
R	Chen W.F and Liew J Y R (Eds), The Civil Engineering Handbook. II Edition CRC Press (Taylor and Francis)

**COURSE PRE-REQUISITES: NIL****COURSE OBJECTIVES:**

- |  |
|--|
| <ol style="list-style-type: none"> <li>To provide an insight and inculcate the essentials of Civil Engineering discipline to the students of all branches of Engineering</li> <li>To provide the students an illustration of the significance of the Civil Engineering Profession in satisfying the societal needs.</li> </ol> |
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**COURSE OUTCOMES:**

CO. No.	CO DESCRIPTION	COGNITIVE LEVEL
EST120.1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.	Remembering
EST120.2	Explain different types of buildings, building components, building materials and building construction	Understanding
EST120.3	Describe the importance, objectives and principles of surveying.	Understanding
EST120.4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps	Understanding
EST120.5	Discuss the Materials, energy systems, water management and environment for green buildings.	Understanding

**CO-PO AND CO-PSO MAPPING:**

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
EST 120.1	3	-	-	-	-	3	2	2	-	-	-	-	-	-
EST 120.2	3	2	-	1	3	-	-	3	-	-	-	-	-	-
EST 120.3	3	2	-	-	3	-	-	-	2	-	-	-	-	-
EST 120.4	3	2	-	-	3	-	-	-	2	-	-	-	-	-
EST 120.5	3	2	-	-	3	2	3	-	2	-	-	-	-	-

**CO- PO AND CO-PSO MAPPING JUSTIFICATION**

<b>CO</b>	<b>PO/PSO</b>	<b>LEVEL OF CORRELATION</b>	<b>JUSTIFICATION</b>
<b>EST 120.1</b>	PO1	3	Mapped substantially because students will be able to understand the role of civil engineer and importance of various disciplines of civil engineering in finding solution to complex engineering problems.
	PO6	3	Mapped substantially because students will be able to understand the role and responsibilities of civil engineer in societal, health, safety, legal and cultural issues
	PO7	2	Mapped moderately because students will be able to understand the role of civil engineer in professional engineering solutions in societal and environmental contexts.
	PO8	2	Mapped moderately because students will be able to understand the ethical principles and commitment to professional ethics and responsibilities.
<b>EST 120.2</b>	PO1	3	Mapped substantially because students will be able to apply the knowledge of types of buildings, building components, building materials and building construction to the solution of complex engineering problems.
	PO2	2	Mapped moderately because students will be able to analyse complex buildings, building components, building materials and building construction.
	PO4	1	Mapped slightly because students will be able to do analysis and interpretation of data, and synthesis of the information related to building materials, components and building construction
	PO5	3	Mapped substantially because students will be able to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools with better understanding of building construction, materials, etc.
	PO8	3	Mapped substantially because students will be able to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>EST 120.3</b>	PO1	3	Mapped substantially because students have to apply the knowledge of mathematics, science, engineering fundamentals, in conducting surveying.

**CO- PO AND CO-PSO MAPPING JUSTIFICATION**

	PO2	2	Mapped moderately because students have to use first principles of mathematics, natural sciences, and engineering sciences in order to analyse complex engineering problems
	PO5	3	Mapped substantially because students apply the usage of modern engineering and IT tools including prediction and modelling to complex surveying activities.
	PO9	2	Mapped moderately as surveying enables to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>EST 120.4</b>	PO1	3	Mapped substantially because knowledge of basic infrastructure services involves the application of engineering fundamentals to the solution of complex engineering problems.
	PO2	2	Mapped moderately because students will be able to apply the knowledge on different infrastructure services to identify and analyse complex engineering problems reaching substantiated conclusions.
	PO5	3	Mapped substantially because students will be able to choose the best and economical techniques and IT tools related to various infrastructure services.
	PO9	2	Mapped moderately because students will be able to effectively as an individual, and as a member or leader in diverse teams.
<b>EST 120.5</b>	PO1	3	Mapped substantially because students will be able to apply the knowledge of engineering fundamentals in materials, energy systems & water management.
	PO2	2	Mapped moderately because students will be able to identify and analyse complex engineering problems related to materials, energy systems and water management
	PO5	3	Mapped substantially because students will be able to choose appropriate techniques, resources and IT tools in areas of materials, energy and water management.
	PO6	2	Mapped moderately because students will be able to assess energy and water management issues in society.
	PO7	3	Mapped substantially because students will be able to apply the concept of green buildings so as to achieve sustainable development.
	PO9	2	Mapped moderately because students will be able to effectively as an individual, and as a member or leader in diverse teams



**CO- PO AND CO-PSO MAPPING JUSTIFICATION**

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**GAPS IN THE SYLLABUS: NIL**

**WEB SOURCE REFERENCES: NIL**

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

LECTURES	<input checked="" type="checkbox"/>	ASSIGNMENT	<input checked="" type="checkbox"/>	TUTORIALS	<input type="checkbox"/>
LABORATORY	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>	PROJECT	<input type="checkbox"/>
ICT ENABLED TEACHING	<input checked="" type="checkbox"/>	WEB RESOURCES	<input type="checkbox"/>	ADD-ON COURSES	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

ASSIGNMENT	<input checked="" type="checkbox"/>	INTERNAL EXAMS	<input checked="" type="checkbox"/>	QUIZ	<input type="checkbox"/>
LAB PRACTICES	<input type="checkbox"/>	VIVA	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input checked="" type="checkbox"/>				

**ASSESSMENT METHODOLOGIES-INDIRECT:**

COURSE EXIT SURVEY	<input checked="" type="checkbox"/>
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**Course Coordinator**

**Module Coordinator**

**Head of the Department**



### COURSE INFORMATION SHEET

<b>PROGRAMME:</b> B.Tech. Mechanical Engineering	<b>DEGREE:</b> B. Tech
<b>SEMESTER:</b> 2	<b>BATCH:</b> 2020-2024
<b>COURSE NAME:</b> Basics of Mechanical Engineering	<b>COURSE CODE:</b> EST 120
<b>COURSE MODULE:</b> NA	<b>COURSE TYPE:</b> Engineering Science
<b>CONTACT HOURS (L-T-P):</b> 2-0-0	<b>CREDITS:</b> 4
<b>FACULTY NAME:</b> Dr. VIPIN NAIR	

#### SYLLABUS:

MODULE	TOPICS	HOURS
4	Analysis of thermodynamic cycles: Carnot, Otto, and Diesel cycle- Derivation of efficiency of these cycles, Problems to calculate heat added, heat rejected, net work and efficiency	4
	IC Engines: CI, SI, 2-Stroke, 4-Stroke engines. Listing the parts of different types of IC Engines, efficiencies of IC Engines (Description only)	2
	Air, Fuel, cooling and lubricating systems in SI and CI Engines, CRDI, MPFI. Concept of hybrid engines	2
5	Refrigeration: Unit of refrigeration, reversed Carnot cycle, COP, vapour compression cycle (only description and no problems)	1
	Definitions of dry, wet & dew point temperatures, specific humidity and relative humidity, Cooling and dehumidification, Layout of unit and central air conditioners.	1
	Description about working with sketches: Reciprocating pump, Centrifugal pump, Pelton turbine, Francis turbine and Kaplan turbine. Overall efficiency, Problems on calculation of input and output power of pumps and turbines (No velocity triangles)	4
	Description about working with sketches of: Belt and Chain drives, Gear and Gear trains, Single plate clutches	3
6	Manufacturing Process: Basic description of the manufacturing processes – Sand Casting, Forging, Rolling, Extrusion and their applications.	2
	Metal Joining Processes: List types of welding, Description with sketches of Arc Welding, Soldering and Brazing, and their applications	1
	Basic Machining operations: Turning, Drilling, Milling and Grinding Description about working with block diagrams of: Lathe, Drilling machine, Milling machine, CNC Machine	3
	Principle of CAD/CAM, Rapid and Additive manufacturing	1
	<b>TOTAL HOURS</b>	<b>24</b>

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**TEXT/REFERENCE BOOKS:**

<b>TYPE (T/R)</b>	<b>BOOK TITLE/AUTHORS/PUBLICATION/EDITION</b>
<b>T</b>	<b>Basic Mechanical Engineering by Navin Kumar, Pearson Education</b>
<b>T</b>	Basic Mechanical Engineering by J Benjamin, Pentex publishers
<b>R</b>	<b>Basic Mechanical Engineering by Basant Agarwal, Wiley Publishers</b>

**COURSE PRE-REQUISITES:**

<b>COURSE CODE</b>	<b>COURSE NAME</b>	<b>DESCRIPTION</b>	<b>SEMESTER</b>
NA			

**COURSE OBJECTIVES:**

<ul style="list-style-type: none"><li>• To explain basic principles of thermodynamic cycles and IC engine.</li><li>• To explain the working of hydraulic machines and power transmission elements,</li><li>• To explain the traditional manufacturing processes.</li></ul>
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**COURSE OUTCOMES:**

<b>CO. No.</b>	<b>CO DESCRIPTION</b>	<b>COGNITIVE LEVEL</b>
<b>EST 120.1</b>	Analyse thermodynamic cycles and calculate its efficiency	<b>Applying</b>
<b>EST 120.2</b>	Illustrate the working and features of IC Engines	<b>Applying</b>
<b>EST 120.3</b>	Explain the basic principles of Refrigeration and Air Conditioning	<b>Understanding</b>
<b>EST 120.4</b>	Describe the working of hydraulic machines	<b>Remembering</b>
<b>EST 120.5</b>	Explain the working of power transmission elements	<b>Understanding</b>
<b>EST 120.6</b>	Describe the basic manufacturing, metal joining and machining processes	<b>Remembering</b>

**CO-PO AND CO-PSO MAPPING:**

PO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
EST 120.1	3	1	-	-	-	-	-	-	-	-	-	-	3	
EST 120.2	3	1											3	
EST 120.3	3	1	-										2	
EST 120.4	3	1											2	
EST 120.5	3	1												2
EST 120.6	3													2

**CO- PO AND CO-PSO MAPPING JUSTIFICATION:**

CO	PO/ PSO	Level of correlation	Justification
EST 120.1	PO1	3	Mapped substantially because it involves application of engineering knowledge for analysing thermodynamic cycles
	PO2	1	Mapped slightly since analysis of thermodynamic cycles involves the use of first principles of engineering and mathematics, however, literature review and problem formulation were not conducted.
	PSO1	3	Mapped substantially because the concepts of thermodynamic cycles and fluid flow are important for the analysis of thermal systems.
EST 120.2	PO1	3	Mapped substantially because internal combustion engine involves engineering principles
	PO2	1	Mapped slightly since analysis of internal combustion engines involve the use of first principles of engineering and mathematics, however, literature review and problem formulation was not conducted.
	PSO1	3	Mapped substantially because internal combustion engine can be considered as a thermal system.
EST 120.3	PO1	3	Mapped substantially because the principles of refrigeration and air-conditioning involve engineering knowledge.
	PO2	1	Mapped slightly since concepts of refrigeration and air-conditioning involve the use of first principles of engineering, however, literature review and problem formulation were not conducted.
	PSO1	2	Mapped moderately since the knowledge of refrigeration and air conditioning is important for analysing thermal systems pertaining to refrigeration.

EST 120.4	PO1	3	Mapped substantially because the fluid machinery such as pumps and turbines involve engineering knowledge.
	PO2	1	Mapped slightly since concepts of fluid machinery involve the use of first principles of engineering, however, literature review and problem formulation was not conducted.
	PSO1	2	Mapped moderately (instead of substantially) since the fluid machinery by definition is not a thermal system, however, it is an important component of thermal systems.
EST 120.5	PO1	3	Mapped substantially because the power transmission elements such as gear drives, belt drives and clutches involve engineering knowledge.
	PO2	1	Mapped slightly since concepts of power transmission elements involve the use of first principles of engineering, however, literature review and problem formulation was not conducted.
	PSO2	2	Mapped moderately since power transmission elements are important for developing mechanical components.
EST 120.6	PO1	3	Mapped substantially because the manufacturing and machining processes involve engineering knowledge.
	PSO2	2	Mapped moderately since manufacturing processes are important for developing mechanical components, however, manufacturing processes were covered at basic level only.

*Correlation Level: 1- Slight 2-Moderate 3- Substantial*

#### **GAPS IN THE SYLLABUS:**

<b>SI. No.</b>	<b>DESCRIPTION</b>	<b>RELEVANT CO</b>	<b>PROPOSED ACTIONS*</b>
	<b>Nil</b>		

\*PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL etc

#### **WEB SOURCE REFERENCES:**

<b>SI. No.</b>	<b>TOPIC</b>	<b>LINKS</b>
<b>1</b>	<b>Carnot cycle, Otto cycle and diesel cycle</b>	<a href="https://nptel.ac.in/courses/112/106/112106133/">https://nptel.ac.in/courses/112/106/112106133/</a>
<b>2</b>	<b>Fluid machinery</b>	<a href="https://nptel.ac.in/courses/112/104/112104117/">https://nptel.ac.in/courses/112/104/112104117/</a>
<b>3</b>	<b>IC Engine</b>	<a href="https://auto.howstuffworks.com/inside-engines-roundup.htm">https://auto.howstuffworks.com/inside-engines-roundup.htm</a>
<b>4</b>	<b>Manufacturing processes</b>	<a href="https://www.youtube.com/watch?v=Um_g8sQ_p3Y">https://www.youtube.com/watch?v=Um_g8sQ_p3Y</a>

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**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

<b>LECTURES</b>	<input checked="" type="checkbox"/>	<b>ASSIGNMENT</b>	<input type="checkbox"/>	<b>TUTORIALS</b>	<input type="checkbox"/>
<b>LABORATORY</b>	<input type="checkbox"/>	<b>SEMINARS</b>	<input type="checkbox"/>	<b>PROJECT</b>	<input type="checkbox"/>
<b>ICT ENABLED TEACHING</b>	<input checked="" type="checkbox"/>	<b>WEB RESOURCES</b>	<input checked="" type="checkbox"/>	<b>ADD-ON COURSES</b>	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

<b>ASSIGNMENT</b>	<input checked="" type="checkbox"/>	<b>INTERNAL EXAMS</b>	<input checked="" type="checkbox"/>	<b>QUIZ</b>	<input type="checkbox"/>
<b>LAB PRACTICES</b>	<input type="checkbox"/>	<b>VIVA</b>	<input type="checkbox"/>	<b>SEMINARS</b>	<input type="checkbox"/>
<b>END SEMESTER EXAMINATION</b>	<input checked="" type="checkbox"/>				

**ASSESSMENT METHODOLOGIES-INDIRECT:**

**COURSE EXIT SURVEY**

**Dr VIPIN NAIR**  
Course Coordinator

**Prof BIJU DAS**  
Module Coordinator

**Dr Jayaprasad G**  
Head of the Department



### COURSE INFORMATION SHEET

PROGRAMME: B.Tech	DEGREE: Mechanical Engineering
SEMESTER: 2	BATCH: 2020-2024
COURSE NAME: Professional Communication	COURSE CODE: HUN 102
COURSE MODULE: 5	COURSE TYPE: Non-Core
CONTACT HOURS (L-T-P): 2-0-2	CREDITS: Nil
FACULTY NAME: Reena Antony	

#### SYLLABUS:

MODULE	TOPICS	HOURS
1	Use of language in communication: Significance of technical communication Vocabulary Development: technical vocabulary, vocabulary used in formal letters/emails and reports, sequence words, misspelled words, compound words, finding suitable synonyms, paraphrasing, verbal analogies. Language Development: subject-verb agreement, personal passive voice, numerical adjectives, embedded sentences, clauses, conditionals, reported speech, active/passive voice. Technology-based communication: Effective email messages, slide presentations, editing skills using software. Modern day research and study skills: search engines, repositories, forums such as Git Hub, Stack Exchange, OSS communities (MOOC, SWAYAM, NPTEL), and Quora; Plagiarism	7
2	Reading, Comprehension, and Summarizing: Reading styles, speed, valuation, critical reading, reading and comprehending shorter and longer technical articles from journals, newspapers, identifying the various transitions in a text, SQ3R method, PQRST method, speed reading. Comprehension: techniques, understanding textbooks, marking and underlining, Note-taking: recognizing non-verbal cues.	7
3	Oral Presentation: Voice modulation, tone, describing a process, Presentation Skills: Oral presentation and public speaking skills, business presentations, Preparation: organizing the material, self-Introduction, introducing the topic, answering questions, individual presentation practice, presenting visuals effectively. Debate and Group Discussions: introduction to Group Discussion (GD), differences between GD and debate; participating GD, understanding GD, brainstorming the topic, questioning and clarifying, GD strategies, activities to improve GD skills	7
4	Listening and Interview Skills Listening: Active and Passive listening, listening: for general content, to fill up information, intensive listening, for specific information, to answer, and to understand. Developing effective listening skills, barriers to effective listening,	7

	listening to longer technical talks, listening to classroom lectures, talks on engineering /technology, listening to documentaries and making notes, TED talks. Interview Skills: types of interviews, successful interviews, interview etiquette, dress code, body language, telephone/online (skype) interviews, one-to-one interview & panel interview, FAQs related to job interviews	
5	Formal writing: Technical Writing: differences between technical and literary style. Letter Writing (formal, informal and semi formal), Job applications, Minute preparation, CV preparation (differences between Bio-Data, CV and Resume), and Reports. Elements of style, Common Errors in Writing: describing a process, use of sequence words, Statements of Purpose, Instructions, Checklists. Analytical and issue-based Essays and Report Writing: basics of report writing; Referencing Style (IEEE Format), structure of a report; types of reports, references, bibliography.	7
<b>TOTAL HOURS</b>		<b>35</b>

**TEXT/REFERENCE BOOKS:**

TYPE (T/R)	BOOK TITLE/AUTHORS/PUBLICATION/EDITION
R	English for Engineers and Technologists (Combined edition, Vol. 1 and 2), Orient Blackswan 2010.
R	Meenakshi Raman and Sangeetha Sharma,"Technical Communication: Principles and Practice", 2nd Edition, Oxford University Press, 2011
R	Stephen E. Lucas, "The Art of Public Speaking", 10th Edition; McGraw Hill Education, 2012.
R	Ashraf Rizvi, "Effective Technical Communication", 2nd Edition, McGraw Hill Education, 2017.
R	William Strunk Jr. & E.B. White, "The Elements of Style", 4th Edition, Pearson, 1999.
R	David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004.
R	Goodheart-Willcox, "Professional Communication", First Edition , 2017.
R	Training in Interpersonal Skills: Tips for Managing People at Work, Pearson Education, India, 6 edition, 2015.
R	The Ace of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson Education; 1 edition, 2013.
R	Anand Ganguly, "Success in Interview", RPH, 5th Edition, 2016.
R	Raman Sharma, "Technical Communications", Oxford Publication, London, 2004.

**COURSE PRE-REQUISITES: Nil**

COURSE CODE	COURSE NAME	DESCRIPTION	SEMESTER

**COURSE OBJECTIVES:**

- The objective of this course is to equip students with the necessary skills to listen, read, write, and speak so as to comprehend and successfully convey any idea, technical



or otherwise, as well as give them the necessary polish to become persuasive communicators.

- Enhance the employability and maximize the potential of the students by introducing them to the principles that underlie personal and professional success
- Help the students acquire the skills needed to apply the principles of personal and professional success in their lives and careers

#### COURSE OUTCOMES:

CO. No.	CO DESCRIPTION	COGNITIVE LEVEL
HUN102.1	Develop Vocabulary and language skills relevant to engineering as a profession	Applying
HUN102.2	Analyse, interpret and effectively summarize a variety of textual content	Analyzing
HUN102.3	Create effective technical presentation	Creating
HUN102.4	Discuss a given technical/ non-technical topic in a group setting and arrive at generalizations/consensus.	Creating
HUN102.5	Identify drawbacks in listening patterns and apply listening techniques for specific needs.	Applying
HUN102.6	Create professional and technical documents that are clear and adhering to all the necessary conventions	Creating

#### CO-PO AND CO-PSO MAPPING:

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
HUN10 2.1	-	-	-	-	-	-	-	-	-	3	-	2	-	-
HUN10 2.2	-	-	-	-	-	-	-	-	-	1	-	3	-	-
HUN10 2.3	-	-	-	-	-	1	-	-	1	3	-	-	-	-
HUN10 2.4	-	-	-	-	-	-	-	-	-	3	-	1	-	-
HUN10 2.5	-	1	-	-	-	-	-	-	2	3	-	-	-	-
HUN10 2.6	1	-	-	-	-	1	-	-	1	3	-	-	-	-

#### CO- PO AND CO-PSO MAPPING JUSTIFICATION:

CO	PO/PSO	LEVEL OF CORRELATION	JUSTIFICATION
HUN 102.1	PO10	3	Mapped substantially because vocabulary and grammar acts as a foundation for effective

			<b>communication</b>
	<b>PO12</b>	<b>2</b>	<b>Mapped moderately because life long learning of language is achieved because of grip in lexical resources and grammar skills</b>
<b>HUN 102.2</b>	<b>PO10</b>	<b>1</b>	<b>Mapped slightly because comprehending and presenting information helps to analyse any complex problem</b>
	<b>PO12</b>	<b>3</b>	<b>Mapped substantially because knowledge of language skills helps to critically analyse and comprehend a given set of data in the future situations also</b>
<b>HUN 102.3</b>	<b>PO6</b>	<b>1</b>	<b>Mapped slightly because technical presentation helps to address societal issues and responsibilities relevant to the professional engineering practice.</b>
	<b>PO9</b>	<b>1</b>	<b>Mapped slightly because team activities require proper and contextual assimilation and presentation of ideas</b>
	<b>PO10</b>	<b>3</b>	<b>Mapped substantially because technical presentation/seminar can be done only by using effective communication strategies.</b>
<b>HUN 102.4</b>	<b>PO10</b>	<b>3</b>	<b>Mapped substantially because the communication skills develop the ability to understand and communicate points in a technical or non-technical group discussion</b>
	<b>PO12</b>	<b>1</b>	<b>Mapped slightly because it helps to recognize the need for, and have the</b>

			ability to overcome physical and mental inhibitions to engage in effective group discussions/activities.
HUN 101.5	PO2	1	Mapped slightly because problem solving requires understanding the context though listening
	PO9	2	Mapped moderately because proper and contextual listening skills are a necessary prerequisite to function effectively as a member or leader in a team/group.
	PO10	3	Mapped substantially because listening skills helps to develop the ability to understand and utilize multiple listening techniques to filter out extraneous information and focus only on the relevant data.
HUN 102.6	PO1	1	Mapped slightly because technical papers and official documents require an expertise of the written word.
	PO6	1	Mapped slightly because technical documents need to be framed by proper societal and cultural contexts
	PO9	1	Mapped slightly because the technical writing skills helps in generating standard documents required in a multidisciplinary setting/group.
	PO10	3	Mapped substantially because technical writing facilitates effective communication using the written word; for both technical and non-

			technical document
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Correlation Level: 1- Slight 2-Moderate 3- Substantial

**GAPS IN THE SYLLABUS: Nil**

Sl. No.	DESCRIPTION	RELEVANT CO	PROPOSED ACTIONS*

\*PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL etc

**WEB SOURCE REFERENCES:**

Sl. No.	TOPIC	LINKS
1	Life Skills	<a href="https://swayam.gov.in/nd2_cec19_hs05/">https://swayam.gov.in/nd2_cec19_hs05/</a>
2	TED talks	<a href="https://www.ted.com/talks/julian_treasure_5_ways_to_listen_better?language=en">https://www.ted.com/talks/julian_treasure_5_ways_to_listen_better?language=en</a>
3	Reading method	<a href="https://www.swic.edu/wp-content/uploads/2017/08/SSReadingPQRSTtan.pdf">https://www.swic.edu/wp-content/uploads/2017/08/SSReadingPQRSTtan.pdf</a>
4	Listening	<a href="https://www.mindtools.com/CommSkill/ActiveListening.htm">https://www.mindtools.com/CommSkill/ActiveListening.htm</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

LECTURES	<input checked="" type="checkbox"/>	ASSIGNMENT	<input type="checkbox"/>	TUTORIALS	<input type="checkbox"/>
LABORATORY	<input type="checkbox"/>	SEMINARS	<input checked="" type="checkbox"/>	PROJECT	<input type="checkbox"/>
ICT ENABLED TEACHING	<input type="checkbox"/>	WEB RESOURCES	<input type="checkbox"/>	ADD-ON COURSES	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

ASSIGNMENT	<input checked="" type="checkbox"/>	INTERNAL EXAMS	<input checked="" type="checkbox"/>	QUIZ	<input type="checkbox"/>
LAB PRACTICES	<input type="checkbox"/>	VIVA	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input checked="" type="checkbox"/>				

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**ASSESSMENT METHODOLOGIES-INDIRECT:**

**COURSE EXIT SURVEY**



**Course Coordinator**

**Module Coordinator**

**Head of the Department**



### COURSE INFORMATION SHEET

<b>PROGRAMME: UG - MECHANICAL ENGINEERING</b>	<b>DEGREE: B.TECH</b>
<b>SEMESTER: S2</b>	<b>BATCH: 2019-23</b>
<b>COURSE NAME: PROGRAMMING IN C</b>	<b>COURSE CODE: EST 102</b>
<b>COURSE MODULE:</b>	<b>COURSE TYPE: Core</b>
<b>CONTACT HOURS (L-T-P): 2-1-2</b>	<b>CREDITS:4</b>

**FACULTY NAME: ARUN P KUTTAPPAN**

#### SYLLABUS:

MODULE	TOPICS	HOURS
1	Basics of Computer Architecture: processor, Memory, Input & Output devices Application Software & System software: Compilers, interpreters, High level and low level languages Introduction to structured approach to programming, Flow chart Algorithms, Pseudo code (bubble sort, linear search - algorithms and pseudo code).	7
2	Basic structure of C program: Character set, Tokens, Identifiers in C, Variables and Data Types , Constants, Console IO Operations, printf and scanf Operators and Expressions: Expressions and Arithmetic Operators, Relational and Logical Operators, Conditional operator, size of operator, Assignment operators and Bitwise Operators. Operators Precedence Control Flow Statements: If Statement, Switch Statement, Unconditional Branching using goto statement, While Loop, Do While Loop, For Loop, Break and Continue statements.(Simple programs covering control flow).	8
3	Arrays Declaration and Initialization, 1-Dimensional Array, 2-Dimensional Array String processing: In built String handling functions (strlen, strcpy, strcat and strcmp, puts, gets) Linear search program, bubble sort program, simple programs covering arrays and strings	6
4	Working with functions Introduction to modular programming, writing functions, formal parameters, actual parameters Pass by Value, Recursion, Arrays as Function Parameters structure, union, Storage Classes, Scope and life time of variables, simple programs	7
5	Pointers and Files Basics of Pointer: declaring pointers, accessing data through pointers, NULL pointer, array access using pointers, pass by reference effect File Operations: open, close, read, write, append Sequential access and random access to files: In built file handling functions (rewind() ,fseek(), ftell(), feof(), fread(), fwrite()), simple programs covering pointers and files.	7
<b>TOTAL HOURS</b>		<b>35</b>

**TEXT/REFERENCE BOOKS:**

TYPE (T/R)	BOOK TITLE/AUTHORS/PUBLICATION/EDITION
T	Schaum Series, Gottfried B.S.,Tata McGraw Hill,Programming with C
T	E. Balagurusamy, Mcgraw Hill,Programming in ANSI C
T	Asok N Kamthane, Pearson,Programming in C
T	Anita Goel, Pearson, Computer Fundamentals
R	Anita Goel and Ajay Mittal, Pearson, Computer fundamentals and Programming in C
R	Brian W. Kernighan and Dennis M. Ritchie, Pearson, C Programming Language
R	Rajaraman V, PHI, Computer Basics and Programming in C
R	Yashavant P, Kanetkar, BPB Publications, Let us C Course Contents and Lecture

**COURSE PRE-REQUISITES: NIL****COURSE OBJECTIVES:**

The objective of the course is to prepare the Engineering Graduates capable of writing readable C programs to solve computational problems that they may have to solve in their professional life. The course content is decided to cover the essential programming fundamentals which can be taught within the given slots in the curriculum

**COURSE OUTCOMES:**

CO. No.	CO DESCRIPTION	COGNITIVE LEVEL
EST 102.1	Analyze a computational problem and develop an algorithm/flowchart to find its solution	Understand
EST 102.2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators	Apply
EST 102.3	Write readable C programs with arrays, structure or union for storing the data to be processed	Apply
EST 102.4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem	Apply
EST 102.5	Write readable C programs which use pointers for array processing and parameter passing and Develop readable C programs with files for reading input and storing output	Apply

readable\* - readability of a program means the following:

1. Logic used is easy to follow
2. Standards to be followed for indentation and formatting
3. Meaningful names are given to variables
4. Concise comments are provided wherever needed

**CO-PO AND CO-PSO MAPPING:**

CO PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O 1	PS O 2
EST 102.1	3	3	3	2	-	1	-	-	-	1	1	2	-	-
EST 102.2	2	2	2	1	1	-	-	-	-	1	-	2	-	-
EST 102.3	2	2	2	1	2	-	-	-	-	1	-	2	-	-
EST 102.4	3	3	3	2	2	-	-	-	-	1	1	2	-	-
EST 102.5	3	3	-	-	3	-	-	-	-	1	-	2	-	-

**CO- PO AND CO-PSO MAPPING JUSTIFICATION:**

CO	PO/ PSO	Level of correlation	Justification
EST10 2.1	PO1	3	Mapped substantially because study the fundamentals of programming by analyzing a problem and developing an algorithm/ flowchart to find its solution.
	PO2	3	Mapped substantially because it helps to analyze a given complex problem and understand the problem in depth to write an algorithm/ flowchart
	PO3	3	Mapped substantially because will be able to develop and design solution to complex problems and express the solution using flowchart/ algorithm/ pseudocode
	PO4	2	Mapped moderately because engineers can use the skills of algorithm design in design of experiments and interpretation of data
	PO6	1	Mapped slightly because it helps to write algorithms / draw flowchart for a solution catering to the needs of the society.
	PO 10	1	Mapped slightly because engineers will be able to communicate the idea of their solution effectively in a step by step manner using algorithm or pictorially by using a flowchart.
	PO11	1	Mapped slightly because the engineers can write algorithm / draw flowchart for a solution catering to the needs of the society.
	PO12	2	Mapped moderately because algorithm writing / flowchart drawing skills helps the need to design solutions to complex real life problems.



EST10 2.2	PO1	2	Mapped moderately because the concepts of branching, looping and operators are fundamental to our engineering specialization of problem solving.
	PO2	2	Mapped moderately because the concepts of branching, looping and operators are needed in analyzing complex engineering problems.
	PO3	2	Mapped moderately because the concepts of branching, looping and operators are inevitable when designing solutions to complex problems.
	PO4	1	Mapped slightly because the concepts of branching, looping and operators are used in the design of experiments and data interpretation.
	PO5	1	Mapped slightly because the concepts of branching, looping and operators are useful in usage of different tools since every tool makes use of these fundamentals.
	PO10	1	Mapped slightly because the concepts of branching, looping and operators are used in the design of solutions which is efficient for communicating the design to others.
	PO12	2	Mapped moderately because the concepts of branching, looping and operators are used in all areas of research as well as industry.
CE306. 3	PO1	2	Mapped moderately because the concepts of arrays and structure for data storage are fundamental to our engineering specialization of problem solving.
	PO2	2	Mapped moderately because the concepts of arrays and structure for data storage are needed in analyzing complex engineering problems.
	PO3	2	Mapped moderately because the concepts of arrays and structure for data storage are inevitable when designing solutions to complex problems.
	PO4	1	Mapped slightly because the concepts of arrays and structure for data storage are used in the design of experiments and data interpretation.
	PO5	2	Mapped moderately because the concepts of arrays and structure for data storage are useful in usage of different tools since every tool makes use of these fundamentals.
	PO10	1	Mapped slightly because the concepts of arrays and structure for data storage are used in the design of solutions which is efficient for communicating the design to others.

	PO12	2	Mapped moderately because the concepts of arrays and structure for data storage are used in all areas of research as well as industry.
EST10 2.4	PO1	3	Mapped substantially because the concepts of dividing the complex problem into modules forming multi function programs and the concept of recursive functions are fundamental to our engineering specialization of problem solving.
	PO2	3	Mapped substantially because the concepts of dividing the complex problem into modules forming multi function programs and the concept of recursive functions are needed in analyzing complex engineering problems.
	PO3	3	Mapped substantially because the concepts of dividing the complex problem into modules forming multi function programs and the concept of recursive functions are inevitable when designing solutions to complex problems.
	PO4	2	Mapped moderately because the concepts of dividing the complex problem into modules forming multi function programs and the concept of recursive functions are used in the design of experiments and data interpretation.
	PO5	2	Mapped moderately because the concepts of dividing the complex problem into modules forming multi function programs and the concept of recursive functions are useful in usage of different tools since every tool makes use of these fundamentals.
	PO10	1	Mapped slightly because the concepts of dividing the complex problem into modules forming multi function programs and the concept of recursive functions are used in the design of solutions which is efficient for communicating the design to others.
	PO11	1	Mapped slightly because the concepts of dividing the complex problem into modules forming multi function programs and the concept of recursive functions are fundamental to any application related to engineering.
	PO12	2	Mapped moderately because the concepts of dividing the complex problem into modules forming multi function programs and the concept of recursive functions are used in all areas of research as well as industry.

EST10 2.5	PO1	3	Mapped substantially because the concepts of pointers for array processing and parameter passing are fundamental to our engineering specialization .and files are very helpful in manipulating large amount of data input and output of complex problems.
	PO2	3	Mapped substantially because the concepts of pointers and files are needed in analyzing complex engineering problems
	PO5	3	Mapped substantially because the concepts of pointers and file concepts are useful in modern tool usage and helps in modeling and predicting complex engineering problems.
	PO10	1	Mapped slightly because the concepts of pointers and files giving more clear instructions to the user and thereby enabling effective communication.
	PO12	2	Mapped moderately because the concept of pointers and files for data input and output is an inevitable concept that can be used with almost every real life engineering problem and this helps to manipulate data effectively.

#### DELIVERY/INSTRUCTIONAL METHODOLOGIES:

LECTURES	<input checked="" type="checkbox"/>	ASSIGNMENT	<input checked="" type="checkbox"/>	TUTORIALS	<input checked="" type="checkbox"/>
LABORATORY	<input checked="" type="checkbox"/>	SEMINARS	<input type="checkbox"/>	PROJECT	<input type="checkbox"/>
ICT ENABLED TEACHING	<input type="checkbox"/>	WEB RESOURCES	<input type="checkbox"/>	ADD-ON COURSES	<input type="checkbox"/>

#### ASSESSMENT METHODOLOGIES-DIRECT:

ASSIGNMENT	<input checked="" type="checkbox"/>	INTERNAL EXAMS	<input checked="" type="checkbox"/>	QUIZ	<input checked="" type="checkbox"/>
LAB PRACTICES	<input checked="" type="checkbox"/>	VIVA	<input checked="" type="checkbox"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input checked="" type="checkbox"/>				

#### ASSESSMENT METHODOLOGIES-INDIRECT:

COURSE EXIT SURVEY

**Course Coordinator**

**Module Coordinator**

**Head of the Department**



### COURSE INFORMATION SHEET

<b>PROGRAMME: B.Tech.</b>	<b>DEGREE: Mechanical Engineering</b>
<b>SEMESTER: 2</b>	<b>BATCH: 2020-2024</b>
<b>COURSE NAME: Engineering Physics Lab</b>	<b>COURSE CODE: PHL120</b>
<b>COURSE MODULE: 5</b>	<b>COURSE TYPE: Basic</b>
<b>CONTACT HOURS (L-T-P): 0-0-2</b>	<b>CREDITS: 1</b>
<b>FACULTY NAME: Gayathri R</b>	

#### SYLLABUS:

MODULE	TOPICS
<b>1</b>	Develop analytical/experimental skills and impart prerequisite hands on experience forengineering laboratories
<b>2</b>	Understand the need for precise measurement practices for data recording
<b>3</b>	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
<b>4</b>	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
<b>5</b>	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

#### TEXT/REFERENCE BOOKS:

TYPE (T/R)	BOOK TITLE/AUTHORS/PUBLICATION/EDITION
<b>R</b>	S.L.Gupta and Dr.V.Kumar, "Practical physics with viva voice", Pragati PrakashanPublishers, RevisedEdition, 2009
<b>R</b>	M.N. Avadhanulu, A.A.Dani and Pokely P.M, "Experiments in Engineering Physics", S.Chand&Co,2008
<b>R</b>	S. K. Gupta, "Engineering physics practicals", Krishna Prakashan Pvt. Ltd., 2014
<b>R</b>	P. R. Sasikumar "Practical Physics", PHI Ltd., 2011.

**COURSE PRE-REQUISITES:**

COURSE CODE	COURSE NAME	DESCRIPTION	SEMESTER
PHL120	Engineering Physics Lab	Higher secondary level Physics	2

**COURSE OBJECTIVES:****Course Objectives:**

- To make the students gain practical knowledge to co-relate with the theoretical studies
- To develop practical applications of engineering materials and use the principle in the right way to implement the modern technology.
- To develop the experimental skills of the students.

**COURSE OUTCOMES:**

CO. No.	CO DESCRIPTION	COGNITIVE LEVEL
PHL120.1		
PHL120.2		
PHL120.3		
PHL120.4		
PHL120.5		

**CO-PO AND CO-PSO MAPPING:**

PO \ CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
PHL120.1														
PHL120.2														
PHL120.3														
PHL120.4														
PHL120.5														

**CO- PO AND CO-PSO MAPPING JUSTIFICATION:**

CO	PO/ PSO	Level of correlation	Justification

PHT110.1	PO1	3	Mapped substantially because compute the quantitative aspects of waves and oscillations in engineering systems like natural frequency, damped frequency, forced frequency, resonant frequency, band-width, Q-factor, wavelength, wave-velocity, frequency etc.
	PO2	2	Mapped moderately because to review research literature to identify physics behind current and relevant innovations in the respective branch.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch
PHT110.2	PO1	3	Mapped substantially because apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
	PO2	2	Mapped moderately because to review research literature to identify physics behind current and relevant innovations in the respective branch.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch
PHT110.3	PO1	3	Mapped substantially because analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices
	PO2	2	Mapped moderately because to review research literature to identify physics behind current and relevant innovations in the respective branch.

	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch.
PHT110.4	PO1	3	Mapped moderately because apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch.
PHT110.5	PO1	3	Mapped substantially because apply the comprehended about laser and fibre optic communication systems in various engineering applications.
	PO2	2	Mapped moderately because to review research literature to identify physics behind current and relevant innovations in the respective branch.
	PO8	1	Mapped slightly because Professional punctuality and understanding professional ethics by self-reading posters
	PO9	2	Mapped moderately because effectively function individually and as a team in various presentations such as winning team and by flip class room etc.
	PO12	1	Mapped slightly because capture the current and relevant innovations in the respective branch.

*Correlation Level: 1- Slight 2-Moderate 3- Substantial*

**GAPS IN THE SYLLABUS:**

Sl. No.	DESCRIPTION	RELEVANT CO	PROPOSED ACTIONS*
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	NIL		

**\*PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL etc**

**WEB SOURCE REFERENCES:**

Sl. No.	TOPIC	LINKS
1		
2		
3		
4		
5		
6		
7		

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

LECTURES	<input checked="" type="checkbox"/>	ASSIGNMENT	<input checked="" type="checkbox"/>	TUTORIALS	<input checked="" type="checkbox"/>
LABORATORY	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>	PROJECT	<input type="checkbox"/>
ICT ENABLED TEACHING	<input type="checkbox"/>	WEB RESOURCES	<input type="checkbox"/>	ADD-ON COURSES	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

ASSIGNMENT	<input checked="" type="checkbox"/>	INTERNAL EXAMS	<input checked="" type="checkbox"/>	QUIZ	<input type="checkbox"/>
LAB PRACTICES	<input type="checkbox"/>	VIVA	<input type="checkbox"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input checked="" type="checkbox"/>				

**ASSESSMENT METHODOLOGIES-INDIRECT:**

COURSE EXIT SURVEY

Course Coordinator

Module Coordinator

Head of the Department

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**GAYATHRI R**

**SREEJA S**

**BIJU DAS D**



### COURSE INFORMATION SHEET

<b>PROGRAMME: UG</b>	<b>DEGREE: B. Tech</b>
<b>SEMESTER:2</b>	<b>BATCH:2020</b>
<b>COURSE NAME: CIVIL WORKSHOP</b>	<b>COURSE CODE: ESL 120</b>
<b>COURSE MODULE: 5</b>	<b>COURSE TYPE: PRACTICALS</b>
<b>CONTACT HOURS (L-T-P): 0-0-2</b>	<b>CREDITS:1</b>
<b>FACULTY NAME: PRAVEENA S</b>	

#### SYLLABUS:

MODULE	TOPICS	HOURS
1	Calculate the area of a built-up space and a small parcel of land- Use standard measuring tape and digital distance measuring devices Find the level difference between any two points using dumpy level	3
2	a) Use screw gauge and vernier calliper to measure the diameter of a steel rod and thickness of a flat bar (b) Transfer the level from one point to another using a water level (c) Set out a one room building with a given plan and measuring tape	3
3	Find the level difference between any two points using dumpy level	3
4	a) Construct a 1 thick brick wall of 50 cm height and 60 cm length using English bond. Use spirit level to assess the tilt of walls. (b) Estimate the number of different types of building blocks to construct this wall.	3
5	Exercise 5. (a) Introduce the students to plumbing tools, different types of pipes, type of connections, traps, valves ,fixtures and sanitary fittings. (b) Install a small rainwater harvesting installation in the campus	3
<b>TOTAL HOURS</b>		<b>15</b>

#### TEXT/REFERENCE BOOKS:

TYPE (T/R)	BOOK TITLE/AUTHORS/PUBLICATION/EDITION
T	Khanna P.N, "Indian Practical Civil Engineering Handbook", Engineers Publishers.
T	Kumar. S, "Building Construction", Standard Publishers
T	Bhavikatti. S, "Surveying and Levelling (Volume 1)", I.K. International Publishing House
T	Arora S.P and Bindra S.P, " Building Construction", Dhanpat Rai Publications
T	S. C. Rangwala, "Engineering Materials," Charotar Publishing House, Anand, 1993

**COURSE PRE-REQUISITES:**

COURSE CODE	COURSE NAME	DESCRIPTION	SEMESTER
NIL			

**COURSE OBJECTIVES:**

The course is designed to train the students to identify and manage the tools, materials and methods required to execute an engineering project. Students will be introduced to a team working environment where they develop the necessary skills for planning, preparing and executing an engineering project.

To enable the student to familiarize various tools, measuring devices, practices and different methods of manufacturing processes employed in industry for fabricating components.

**COURSE OUTCOMES:**

CO. No.	CO DESCRIPTION	COGNITIVE LEVEL
ESL120.1	Name different devices and tools used for civil engineering measurements.	REMEMBERING
ESL120.2	Explain the use of various tools and devices for various field measurements	UNDERSTANDING
ESL120.3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.	APPLYING
ESL120.4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing	APPLYING
ESL120.5	Compare different techniques and devices used in civil engineering measurements	APPLYING

**CO-PO AND CO-PSO MAPPING:**

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
ESL120.1	1				1	1			2	2				2
ESL120.2	1				1	1			2	2				2
ESL120.3	1				1	1		2	2	2	1			2
ESL120.4	1				1	1		2	2	2	1	1		2

<b>ESL12 0.5</b>	1				1	1		2	2	2	1	1		2
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**CO- PO AND CO-PSO MAPPING JUSTIFICATION:**

*Correlation Level: 1- Slight 2-Moderate 3- Substantial*

CO	PO/ PSO	Level of correlation	Justification
ESL120.1	PO1	1	Students will be able to apply basic knowledge of mathematics and science.
	PO5	1	Study of engineering tools and its limitation.
	PO6	1	Help to inculcate responsibilities relevant to the professional engineering practice
	PO9	2	Inculcate individual and team work.
	PO10	2	Report preparations and communication skills will be enhanced
	PSO 2	1	Various employment opportunities are identified and newer trends are also discussed.
ESL120.2	PO1	1	Students will be able to apply basic knowledge of mathematics and science.
	PO5	1	Study of engineering tools and its limitation.
	PO6	1	Help to inculcate responsibilities relevant to the professional engineering practice
	PO9	2	Inculcate individual and team work.
	PO10	2	Report preparations and communication skills will be enhanced
	PSO 2	1	Various employment opportunities are identified and newer trends are also discussed.
ESL120.3	PO1	1	Students will be able to apply basic knowledge of mathematics and science.
	PO5	1	Study of engineering tools and its limitation.
	PO6	1	Help to inculcate responsibilities relevant to the professional engineering practice
	PO8	2	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
	PO9	2	Inculcate individual and team work.
	PO10	2	Report preparations and communication skills will be enhanced
	PO11	1	Students develop a skill of project management.
	PSO 2	1	Various employment opportunities are identified and newer trends are also discussed.

ESL120.4	PO1	1	Students will be able to apply basic knowledge of mathematics and science.
	PO5	1	Study of engineering tools and its limitation.
	PO6	1	Help to inculcate responsibilities relevant to the professional engineering practice
	PO8	2	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
	PO9	2	Inculcate individual and team work.
	PO10	2	Report preparations and communication skills will be enhanced
	PO11	1	Students develop a skill of project management.
	PO 12	1	Enhance life long learning.
	PSO 2	1	Various employment opportunities are identified and newer trends are also discussed.
ESL120.5	PO1	1	Students will be able to apply basic knowledge of mathematics and science.
	PO5	1	Study of engineering tools and its limitation.
	PO6	1	Help to inculcate responsibilities relevant to the professional engineering practice
	PO8	2	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
	PO9	2	Inculcate individual and team work.
	PO10	2	Report preparations and communication skills will be enhanced
	PO11	1	Students develop a skill of project management.
	PO 12	1	Enhance lifelong learning.
	PSO 2	1	Various employment opportunities are identified and newer trends are also discussed.

#### GAPS IN THE SYLLABUS:

SI. No.	DESCRIPTION	RELEVANT CO	PROPOSED ACTIONS*

\*PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL etc.

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**WEB SOURCE REFERENCES:**

Sl. No.	TOPIC	LINKS

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

LECTURES	<input checked="" type="checkbox"/>	ASSIGNMENT	<input checked="" type="checkbox"/>	TUTORIALS	<input type="checkbox"/>
LABORATORY	<input checked="" type="checkbox"/>	SEMINARS	<input type="checkbox"/>	PROJECT	<input checked="" type="checkbox"/>
ICT ENABLED TEACHING	<input type="checkbox"/>	WEB RESOURCES	<input type="checkbox"/>	ADD-ON COURSES	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

ASSIGNMENT	<input checked="" type="checkbox"/>	INTERNAL EXAMS	<input type="checkbox"/>	QUIZ	<input checked="" type="checkbox"/>
LAB PRACTICES	<input type="checkbox"/>	VIVA	<input checked="" type="checkbox"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input checked="" type="checkbox"/>				

**ASSESSMENT METHODOLOGIES-INDIRECT:**

COURSE EXIT SURVEY	<input checked="" type="checkbox"/>
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**Course Coordinator****Module Coordinator****Head of the Department**



### COURSE INFORMATION SHEET

PROGRAMME: Mechanical Engineering	DEGREE: B Tech
SEMESTER: I	BATCH: 2020-24 ME
COURSE NAME: Mechanical Workshop	COURSE CODE: ESL 120
COURSE MODULE: Practical	COURSE TYPE: Practical
CONTACT HOURS (L-T-P): 0-0-3	CREDITS: 1
FACULTY NAME: George K.V	

#### SYLLABUS:

MODULE	TOPICS	HOURS
I	General: Introduction to workshop practice, Safety precautions, Shop floor ethics, Basic First Aid knowledge. Study of mechanical tools, components and their applications: (a) Tools: screw drivers, spanners, Allen keys, cutting pliers etc. and accessories (b) bearings, seals, O-rings, circlips, keys etc..	3
II	Carpentry: Understanding of carpentry tools Minimum any one model 1. T – Lap joint 2. Cross lap joint 3. Dovetail joint 4. Mortise joints	6
III	-Foundry: Understanding of foundry tools Minimum any one model 1. Bench Molding 2. Floor Molding 3. Core making 4. Pattern making	6
IV	Sheet Metal: Understanding of sheet metal working tools Minimum any one model 1. Cylindrical shape 2. Conical shape 3. Prismatic shaped job from sheet metal	6
V	Fitting: Understanding of tools used for fitting Minimum any one model 1. Square Joint 2. V- Joint 3. Male and female fitting.	6
VI	Smithy: Understanding of tools used for smithy Demonstrating the forge-ability of different materials (MS, Al, alloy steel and cast steels) in cold and hot states. Observing the qualitative difference in the hardness of these materials Minimum any one exercise on smithy 1. Square prism 2. Hexagonal headed bolt 3. Hexagonal prism 4. Octagonal prism	6
VII	Welding: Understanding of welding equipment Minimum any one welding practice Making Joints using electric arc welding. bead formation in horizontal, vertical and overhead positions	6
<b>TOTAL HOURS</b>		<b>39</b>

#### TEXT/REFERENCE BOOKS:

TYPE (T/R)	BOOK TITLE/AUTHORS/PUBLICATION/EDITION
R	1. Mechanical Workshop Manuel..KC John
R	1. Elements of Workshop Technology..SKHajraChawdary 1.. Workshop Technology R S Khurmy
R	References Books: S. C. Rangwala, "Engineering Materials," Charotar Publishing House

COURSE PRE-REQUISITES: **NIL**



COURSE CODE	COURSE NAME	DESCRIPTION	SEMESTER

**COURSE OBJECTIVES:**

<p><b>1.</b> To develop knowledge on Safety precautions, Shop floor ethics, Basic First Aid knowledge. Study and understanding of mechanical tools, components and their applications:          To develop ability to prepare various joints in give dimension using tools and other instruments including precision measuring instruments          To impart knowledge on all mechanical workshop operations and to experience the same</p> <p><b>Carpentry:</b> Understanding of carpentry tools Minimum any one model 1. T –Lap joint 2. Cross Lap Joint 3. Dovetail joint 4. Mortise joints</p> <p><b>Foundry:</b> Understanding of foundry tools Minimum any one model Bench Molding Floor molding Core making Pattern making</p> <p><b>2. Sheet Metal:</b> Understanding of sheet metal working tools Minimum any one model 1. Cylindrical Shape 2. Conical shape 3. Prismatic shaped job from sheet metal</p> <p><b>Fitting:</b> Understanding of tools used for fitting Minimum any one model 1. Square Joint 2. V- Joint 3. Male and female fitting</p> <p><b>3. Smithy:</b> Understanding of tools used for smithy Demonstrating the forge-ability of different Materials (MS, Al, alloy steel and cast steels) in cold and hot states. Observing the qualitative difference .In the hardness of these materials Minimum any one exercise on smithy 1. Square prism 2. Hexagonal headed bolt 3. Hexagonal prism 4. Octagonal prism</p> <p><b>Welding:</b>          . Understanding of welding equipment Minimum any one welding practice Making Joints using electric          . arc welding. bead formation in horizontal, vertical and overhead positions</p>
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**COURSE OUTCOMES:**

CO No	on successful completion of the course the students will be able to	Cognitive level
CO1	Identify,tools,operations ,materials and to design& prepare various works, including joints in <b>Carpentry</b> and Moulds in <b>Foundry</b> Workshop	<b>Apply</b>

<b>CO2</b>	Identify, tools ,operations ,materials and to design and practice various works, developing the ability to prepare various joints in given dimension using tools in <b>Sheet metal</b> and <b>Fitting</b> Work shops	<b>Apply</b>
<b>CO3</b>	Identify, tools ,operations ,materials and to design and practice various works, developing the ability to prepare various shaped models in given dimension using tools in <b>Smithy</b> Work shopand joints in <b>Welding</b> Work shop	<b>Apply</b>

#### CO-PO AND CO-PSO MAPPING:

CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
<b>CO1</b>	1	1		-	-	-	-	-	1	1	-	-		<b>2</b>
<b>CO2</b>	1	1	-	-	-	-	-	-	1	1	-	-		<b>2</b>
<b>CO3</b>	1	1		-	-	-	-	-	1	1	-	-		<b>2</b>

#### JUSTIFICATION OF CO-PO/PSO MAPPING

CO	PO/ PSO	Level of correlation	Justification
ESL120-1	PO1	1	Knowledge of Engineering field is created, Achieved awareness in Workshop tools and its operation Developed ability to prepare various works in give specification using tools and other instruments
	PO2	1	Knowledge of Engineering field is created, Achieved awareness in Workshop tools and its operation Developed ability to prepare various works in give specification using tools and other instruments
	PO9	1	Developed skill to prepare simple models as per given dimensions
	PO10	1	Developed skill to prepare simple models as per given dimensions
	PSO2	2	Achieved the ability to incorporate the knowledge from the workshop to explore new trends and employment opportunities in Mechanical Engineering through methodical exposure to

			industry and experts
ESL120-2	PO1	1	Knowledge of Engineering field is created, Achieved awareness in Workshop tools and its operation Developed ability to prepare various works in give specification using tools and other instruments
	PO2	1	Knowledge of Engineering field is created, Achieved awareness in Workshop tools and its operation Developed ability to prepare various works in give specification using tools and other instruments
	PO9	1	Developed skill to prepare simple models as per given dimensions
	PO10	1	Developed skill to prepare simple models as per given dimensions
	PSO2	2	Achieved the ability to incorporate the knowledge from the workshop to explore new trends and employment opportunities in Mechanical Engineering through methodical exposure to industry and experts
ESL120-3	PO1	1	Knowledge of engineering field is created, Achieved awareness in Workshop tools and its operation Developed ability to prepare various works in give specification using tools and other instruments
	PO2	1	Knowledge of engineering field is created, Achieved awareness in Workshop tools and its operation Developed ability to prepare various works in give specification using tools and other instruments
	PO9	1	Developed skill to prepare simple models as per given dimensions
	PO10	1	Developed skill to prepare simple models as per given dimensions
	PSO2	1	Achieved the ability to incorporate the knowledge from the workshop to explore new trends and employment opportunities in Mechanical Engineering through methodical exposure to industry and experts

**GAPS IN THE SYLLABUS:Nil**

Sl. No.	DESCRIPTION	RELEVANT CO	PROPOSED ACTIONS*
1			
2			

\*PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL etc.

**WEB SOURCE REFERENCES:**

Sl. No	TOPIC	LINKS
1	<a href="#">Concept of Workshop Practice</a>	<a href="https://info2.magento.com/">https://info2.magento.com/</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

LECTURES	<input type="checkbox"/>	ASSIGNMENT	<input type="checkbox"/>	TUTORIALS	<input type="checkbox" value="*"/>
LABORATORY	<input type="checkbox" value="*"/>	SEMINARS	<input type="checkbox"/>	PROJECT	<input type="checkbox"/>
ICT ENABLED TEACHING	<input type="checkbox"/>	WEB RESOURCES	<input type="checkbox" value="*"/>	ADD-ON COURSES	<input type="checkbox"/>

**ASSESSMENT METHODOLOGIES-DIRECT:**

ASSIGNMENT	<input type="checkbox"/>	INTERNAL EXAMS	<input type="checkbox"/>	QUIZ	<input type="checkbox"/>
LAB PRACTICES	<input type="checkbox" value="*"/>	VIVA	<input type="checkbox" value="*"/>	SEMINARS	<input type="checkbox"/>
END SEMESTER EXAMINATION	<input type="checkbox" value="*"/>				

**ASSESSMENT METHODOLOGIES-INDIRECT:**

COURSE EXIT SURVEY

George K.VDrJayaprasad G

Course Coordinator

Module Coordinator

Head of the Department