

# F.E. / F.T. SEM - I

**F.E./F.T. Semester – I/II**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME-2020)**

B.E./B.Tech. (All Branches)					F.E./F.T. (SEM: I/II)					
Course Name: Physics					Course Code: BSC101					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (100)		Practical/ Oral (25)	Term Work (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	
3	1	2	6	5	20	20	60	25	25	150
<b>ISE: In-Semester Examination - Paper Duration – 1 Hour</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
<b>Prerequisite:</b> 10+2 level of Science knowledge related to crystalline solids, Semiconductors, Modern Physics, Wave theory of light, Magnetism										

**Course Objective:** The course intends to impart fundamental concepts and principles of crystallography, semiconductor, quantum mechanics, lasers and smart materials which can solve the engineering problems.

**Course Outcomes:** Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Analyze Fermi Dirac Distribution function to semiconductor and variation of Fermi level with temperature, impurity concentration,	L1, L2, L3
2	Apply the semiconductor physics behind the Electronic Materials, understand the use of various Photodetectors.	L1, L2, L3
3	Understand the principles of quantum mechanics and its key.	L1, L2, L3
4	Understand the Interference of light and its applications, diffraction of light and its types, diffraction grating.	L1, L2, L3
5	Understand different types of LASERS with their various applications and compare different types of superconductors, it's applications.	L1, L2, L3

6	Derive all 4 Maxwell's equations of electromagnetic waves in free space as well as in vacuum.	L1, L2, L3.
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**Detailed Syllabus (Total No. of Hours: 45):**

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
<b>1.0</b>	<b>Semiconductors</b> Intrinsic and extrinsic semiconductors, Fermi Dirac distribution function, Dependence of Fermi level on carrier-concentration, and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, Hall Effect and its applications	<b>7</b>	L1, L2, L3.
<b>2.0</b>	<b>Electronic Materials and Light Semiconductor Interaction</b> Free electron theory, Energy band diagrams, Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, E-k diagram, Direct and indirect band gaps, Types of electronic materials: metals, semiconductors, and insulators, Density of states, Effective mass, Phonons. Types of semiconductor photodetectors -p-n junction, PIN, and Avalanche --- and their structure, materials, working principle, and characteristics, Noise limits on performance; Solar cells, Optical transitions in bulk semiconductors: absorption, spontaneous emission and stimulated emission, Joint Density of states, Density of states for photons, Optical loss and gain, Photovoltaic effect, Exciton.	<b>8</b>	L1, L2, L3.

<b>3.0</b>	<b>Quantum Mechanics</b>  de-Broglie hypothesis, Heisenberg's uncertainty principle, Applications of uncertainty principle (Absence of electron inside Nucleus), wave packet, group velocity and phase velocity; Wave function, Physical interpretation of wave function; Time Dependent Schrodinger's Equation (TDSE) , Time Independent Equation (TISE), Application of TISE - Particle in box and Potential well, Simple Harmonic Oscillator.	<b>7</b>	L1, L2, L3.
<b>4.0</b>	<b>Wave Optics</b>  Interference of light by amplitude splitting, Thin film, Wedge shaped film, Newton's rings, Interference applications. Fresnel and Fraunhofer diffraction, Diffraction gratings and their resolving power.	<b>9</b>	L1, L2, L3.
<b>5.0</b>	<b>Lasers and Superconductivity</b>  Interaction of photon with matter- Absorption, Spontaneous Emission, Stimulated Emission, Pumping, Population Inversion, Active Medium, Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne),  Solid state lasers- Nd-YAG Semiconductor diode lasers; Properties of laser beams, applications of lasers –Holography, Industrial applications.  Superconducting materials and its properties and basic parameters, Temperature dependence of critical magnetic fields, Meissner effect, Type I and II superconductors. Their applications in superconducting magnets and Maglev.	<b>7</b>	L1, L2, L3

<b>6.0</b>	<b>Faraday's law and Maxwell's Equations of Electromagnetic Waves</b>  Faraday's law in terms of EMF produced by changing magnetic flux; equivalence of Faraday's law and motional EMF; Lenz's law; Differential form of Faraday's law expressing curl of electric field in terms of time-derivative of magnetic field and energy stored in a magnetic field  Continuity equation for current densities; Modifying equation for the curl of magnetic field to satisfy continuity equation; displacement current and magnetic field arising from time dependent electric field, Maxwell's equation in vacuum and non-conducting medium; Energy in an electromagnetic field.	<b>7</b>	L1, L2, L3
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**Suggested List of Practical/ Experiments:**

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Basic Experiments</b>	Study the characteristics of Light Emitting Diode (LED)	2	L1, L2, L3, L4
2		Determination of Hall Coefficient of semiconductor material using Hall Effect phenomenon.	2	L1, L2, L3
3		Determination of energy band gap of a semiconductor using Four Probe Method	2	L1, L2, L3
4		Study the characteristics of photodiode	2	L1, L2, L3, L4
5	<b>Advanced Experiments</b>	Determination of radius of curvature of Plano Convex lens using Newton's Rings.	3	L1, L2, L3
6		Study of Laser diode characteristics	2	L1, L2, L3
7	<b>Basic Experiments</b>	Determination of unknown wavelength of	3	L1, L2, L3

		laser using diffraction grating.		
8		Study of resonance phenomena in LCR circuits using LCR Kit	3	L1, L2, L3
9	<b>Design Experiments</b>	Design based experiment to study characteristics of solar cell	3	L1, L2, L3
10		Design based experiment to calculate carrier concentration, mobility, conductivity, resistivity of semiconductor material	2	L1, L2, L3
11	<b>Project Based Experiments- Group Activity)</b> (Students should complete any one project. Based experiment from the list or any other project in discussion with Faculty Incharge)	Based on semiconductor, Solar cell, LED, Photodiode. Based on Optics, lasers, and superconductors	6	L1, L2, L3
<b>Total</b>			<b>30</b>	

**Books and References:**

SN	Title	Authors	Publisher	Edition	Year
1	Engineering Physics	Bhattacharya D K and Tandon	New Delhi, Oxford Press	1 <sup>st</sup>	2015
2	A textbook of Engineering Physics.	Kshirsagar M. N. and Avadhanulu P.G.	S.Chand	10 <sup>th</sup>	2014
3	Engineering Physics	Malik H K, Singh A K	Mac-Graw Hill	2 <sup>nd</sup>	2018
4	Lasers: Fundamentals and Applications	Ghatak and Thyagarajan	Springer	2 <sup>nd</sup>	2011

5	Quantum Physics of Atoms, Molecules and Solids	Robert Eisberg & Robert Resnick	Wiley Publications.	2 <sup>nd</sup>	2006
6	Semiconductor Optoelectronics: Physics and Technology	J. Singh	McGraw-Hill		1995
7	Semiconductor Devices: Physics and Technology.	S. M. Sze	Wiley	Student Edition.	2008
8	Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL	-	-	-	-
9	Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL	-	-	-	-
10	Introduction to Electrodynamics	David Griffiths	Mac-Graw Hill	3 <sup>rd</sup>	2011
11	Engineering Mechanics	MK Harbola	Cengage.	2 <sup>nd</sup>	2013

### **Online References:**

Sr. No	Website Name	URL	Modules Covered
1	DECOR--The Database of Educational Crystallographic	<a href="https://decor.cst.temple.edu/">https://decor.cst.temple.edu/</a>	M1
2	NPTEL	Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL	M2

3	Phys.org	<a href="https://phys.org/news/2020-06-physicists-quantum-inspired-optical-sensor.html">https://phys.org/news/2020-06-physicists-quantum-inspired-optical-sensor.html</a>	M3
4	Coursera	<a href="https://www.coursera.org/specializations/optical-engineering">https://www.coursera.org/specializations/optical-engineering</a>	M4
5	Btech blog	<a href="https://allbtechblog.files.wordpress.com/2016/08/dielectrics-lecture-notes.pdf">https://allbtechblog.files.wordpress.com/2016/08/dielectrics-lecture-notes.pdf</a>	M5
6	NPTEL	Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL	M6
7	Online library	<a href="https://onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)2195-1071.Photodetectors">https://onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)2195-1071.Photodetectors</a>	M6



**F.E. Semester –I**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E. /B.Tech. (All Branches)					F.E./F.T. (SEM: I)				
Course Name: Mathematics-I					Course Code: BSC103				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (00)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW
4	1	-	5	5	20	20	60	-	25
<p style="text-align: center;">ISE: In-Semester Examination - Paper Duration – 1 Hour IE: Innovative Examination ESE: End Semester Examination - Paper Duration - 2 Hours</p> <p style="text-align: center;">The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)</p>									
Prerequisite: 10+2 level Mathematics									

**Course Objective:** The Course intends to develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology.

**Course Outcomes:** Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Apply the fundamentals of calculus	L1, L2
2	Apply the concept of partial derivatives in its application part.	L1, L2, L3
3	Apply the concepts of complex numbers and sequence-series	L1, L2, L3
4	Evaluate the rank of a matrix and its application to solve the system of equations.	L1
5	Apply the concept of Gamma and Beta function to evaluate the area and volume	L1, L2, L3
6	Identify analytic functions and methods for evaluating it.	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 60):**

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Calculus-I</b>	9	L1, L2
	(Pre-requisite: Limits, Continuity, Differentiability, Sequence & Series) Mean value theorems (Rolle's, Lagrange's and Cauchy's Theorem), Taylor's series, Maclaurin series for exponential, trigonometric and logarithm functions, Maclaurin theorems with remainders, Indeterminate forms, Convergence of sequence and series, D'Alembert's ratio test, Cauchy's nth root test		
2	<b>Multivariable Calculus (Differentiation)</b>	11	L1, L2, L3
	(Pre-requisite: Differentiability, Vectors) Partial derivatives (first and higher order), composite function, Total derivative, Euler's Theorem on homogeneous functions in two variables, Maxima, minima and saddle points, Gradient, directional derivative (Self-Study: curl and divergence)		
3	<b>Complex Number</b>	7	L1, L2, L3
	(Pre-requisite: Basics of Complex Numbers, De'Moivre's theorem) Power of complex expressions, Root of an equation using De'Moivres theorem, Hyperbolic functions, Inverse Hyperbolic functions, Separation into real and imaginary parts, Logarithm of complex number		
4	<b>Matrices I</b>	12	L1
	(Pre-requisite: Types of matrices) Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, Orthogonal Matrices and Unitary Matrices, Rank, Row-Echelon form, Normal form, Non-Homogeneous system of linear algebraic equations, Homogeneous system of linear algebraic equations, Linear dependence and independence of vectors (Self-Study: Rank-Nullity theorem (without proof))		

5	<b>Calculus-II</b>	10	L1, L2, L3
	<b>(Pre-requisite: Definite Integral)</b> Improper Integrals (Review), Beta and Gamma functions and their properties; Volumes of revolutions using single integral (Self-Study: Application of single integral in the evaluation of Surface area)		
6	<b>Complex Variable – Differentiation</b>	11	L1, L2, L3
	<b>(Pre-requisite: Complex Numbers)</b> Differentiation, Cauchy-Riemann equations (in cartesian and polar form), analytic functions, harmonic functions, Milne-Thompson method, finding harmonic conjugate, orthogonal trajectory (Self-Study: Elementary analytic functions (exponential, trigonometric, logarithm) and their properties)		

### **Books and References:**

SN	Title	Authors	Publisher	Edition	Year
1	Calculus and Analytic geometry	G.B. Thomas and R.L. Finney	Pearson	9th Edition	2002
2	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons	9th Edition	2006
3	Engineering Mathematics for first year	Veerarajan T	Tata McGraw-Hill, New Delhi	3rd Edition	2008
4	Higher Engineering Mathematics	Ramana B.V	Tata McGraw Hill, New Delhi	11th Edition	2010
5	Higher Engineering Mathematics	B.S. Grewal	Khanna Publishers	36th Edition	2010
6	A text book of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications	9th Edition	2008

**Online References:**

Sr. No	Website Name	URL	Module Covered
1.	Openstax	<a href="https://openstax.org/">https://openstax.org/</a>	M1-M6
2	Lumanlearning .com	<a href="https://courses.lumanlearning.com">https://courses.lumanlearning.com</a>	M1-M6
3	Engineering Mathematics Tutorial – Geeks for Geeks	<a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a>	M1-M6

**F.E./F.T. Semester –I**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

<b>B.E./B.Tech (All Branches)</b>					<b>F.E./ F.T (SEM: I)</b>				
<b>Course Name:</b> Engineering Graphics & Design					<b>Course Code:</b> ESC102				
<b>Teaching Scheme (Program Specific)</b>					<b>Examination Scheme (Formative/Summative)</b>				
<b>Modes of Teaching/Learning/Weightage</b>					<b>Modes of Continuous Assessment/Evaluation</b>				
<b>Hours Per Week</b>					<b>Theory (100)</b>		<b>Practical/ Oral(25)</b>	<b>Term Work (25)</b>	<b>Total</b>
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Contact Hours</b>	<b>Credits</b>	<b>ISE</b>	<b>IE</b>	<b>ESE</b>	<b>PR</b>	<b>TW</b>
2	-	4	6	4	20	20	60	25	25
<b>150</b>									
<b>ISE: In-Semester Examination - Paper Duration – 1.5 Hours</b>									
<b>IE: Innovative Examination</b>									
<b>ESE: End Semester Examination - Paper Duration - 3 Hours</b>									
<b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
<b>Prerequisite:</b> Basic geometrical terminology and simple constructional procedures of plane, solids and engineering curves									

**Course Objective:** The Course intends to introduce the universal language of engineers for effective communication through drafting exercises of geometrical solids along with the use of computer aided drafting software.

**Course Outcomes:** Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Use drawing instruments and apply standard dimensioning system to construct engineering curves like Ellipse, parabola, hyperbola Cycloid, Involute by different methods. Learners will also be able to use the basics software toolbars such as Draw, Modify, Dimension etc.	L1, L2, L3
2	Visualize and draw/construct the different types of lines and planes inclined to both reference planes.	L1, L2, L3
3	Represent 3D solid object on 2D plane with different angle of view. They will also be able to read the hidden parts as per different types of cutting plane. Learners will also be able to create computer-aided geometric design in 2D form with CAD software	L1, L2, L3
4	Know different types of standard solids and visualize projection of solid inclined to both the reference planes.	L1, L2, L3

5	Visualize sectional view of solids cut by different types of cutting planes and also learn the method to develop the lateral surfaces of sectioned solids	L1, L2, L3
6	Read and interpret the given 2-D views and convert it into the 3D Isometric view. Learners will also be able to create computer-aided geometric design in 3D form with CAD software	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 30):**

Module No.	Topics	Lectures	Cognitive levels of attainment as per Bloom's Taxonomy
<b>01</b>	<b>Introduction to Engineering Graphics &amp; Design</b>  Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Dimensioning, Ellipse, Parabola, Cycloid and Involute; Scales–Plain, Diagonal and Vernier Scales  <b>*Computer Graphics</b>  Engineering Graphics Software; Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Tool bars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.	05	L1, L2, L3
<b>02</b>	<b>Projection of Points, Lines and Planes</b>  Projections of Points and lines inclined to any one or both the reference planes; Projections of planes inclined to both the reference planes- Auxiliary Planes. Location of horizontal and vertical traces. (Only for problems of line lying in first quadrant) (Note: No side view of line)	05	L1, L2, L3



<b>03</b>	<b># Orthographic Projections</b> Principles of Orthographic Projections- Conventions- Draw the orthographic views of geometrical solids, objects from industry and dwellings. (1 <sup>st</sup> angle method of projection)	<b>04</b>	<b>L1, L2, L3</b>
	<b># Sectional Orthographic Projections</b> Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (Only Full Section) <b>*Annotations, layering &amp; other functions</b> Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/ lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies		
<b>04</b>	<b>Projections of Regular Solids</b> Solid (Prism, Cylinder, Pyramid, Cone) inclined to both the Planes @ Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Floor plan of college building.	<b>06</b>	<b>L1, L2, L3</b>
<b>05</b>	<b>Sections and Sectional Views of Right Angular Solids</b> Section views of Prism, Cylinder, Pyramid, Cone-Use change of position or Auxiliary plane method for True Shape of Section; Development of surfaces of Right Regular Solids- Prism, Pyramid, Cylinder and Cone; (Note: only cutting plane AIP and AVP will be considered)	<b>05</b>	<b>L1, L2, L3</b>

<b>06</b>	<p><b># Isometric Projections</b></p> <p>Principles of Isometric projection. Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa Conventions.</p> <p><b>*Customization &amp; CAD Drawing</b></p> <p>Consisting of set up of the drawing page and the printer, including scale settings, setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles</p> <p><b>*Introduction to 3D drawing in Graphics software</b></p> <p><b>*Demonstration of a simple team design project</b></p> <p>Creation of engineering models and their presentation in standard 2D blue print form</p>	<b>05</b>	L1, L2, L3
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@ - to be covered only as a part of Term-Work

\* - to be covered during Practical

**Suggested List of Practical/ Experiments:**

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Basic Experiments</b>	Engineering Curves	02	L1, L2, L3
2		Projection of Lines	02	L1, L2, L3
3		Projection of Solids	04	L1, L2, L3
4		Section of Solids	04	L1, L2, L3
5		Development of Lateral Surfaces	04	L1, L2, L3
6		Orthographic Projections	04	L1, L2, L3
7		Sectional Orthographic Projections	04	L1, L2, L3
8		Isometric Views (Flat Surface)	02	L1, L2, L3
9		Isometric Views (Curved Surface)	04	L1, L2, L3



10	Design Experiments	Basics of CAD Software	04	L1, L2
11		Orthographic Projections on CAD Software	06	L1, L2, L3
12		Sectional Orthographic Projections on CAD Software	06	L1, L2, L3
13		Reading Orthographic Projections on CAD Software	04	L1, L2, L3
14		Isometric Views on CAD Software	06	L1, L2, L3
15		Introduction to 3-D	04	L1, L2
Total			60	

### **Books and References:**

SN	Title	Authors	Publisher	Year
1	Engineering Drawing	Bhatt N.D., Panchal V.M. & Ingle P.R	Charotar Publishing House	2014
2	Engineering Drawing and Computer Graphics	Shah, M.B. & Rana B.C	Pearson education.	2008
3	Engineering Graphics	Agrawal B. & Agrawal C. M	TMH Publication	2012
4	Text book on Engineering Drawing	Narayana, K.L. & P Kannaiah	Sci-tech Publishers	2008

### **Online References:**

Sr. No.	Website Name	URL	Module covered
1	Bharatskills.Gov	<a href="https://www.google.com/url?sa=t&amp;source=web&amp;rct=j&amp;url=https://bharatskills.gov.in/pdf/E_books/Engineering_Drawing_1st_Sem_Final.pdf&amp;ved=2ahUKEwiDu7bWyIPsAhXHyzgGHcszBSsQFjAAegQIAhAB&amp;usg=AOvVaw2O9fIhYnp73593X8_Q8mW2">https://www.google.com/url?sa=t&amp;source=web&amp;rct=j&amp;url=https://bharatskills.gov.in/pdf/E_books/Engineering_Drawing_1st_Sem_Final.pdf&amp;ved=2ahUKEwiDu7bWyIPsAhXHyzgGHcszBSsQFjAAegQIAhAB&amp;usg=AOvVaw2O9fIhYnp73593X8_Q8mW2</a>	M1-M6
2	IIT-D	<a href="https://www.google.com/url?sa=t&amp;source=web&amp;rct=j&amp;url=http://web.iitd.ac.in/~achawla/public_html/201/lectures/sp46.pdf&amp;ved=2ahUKEwiA1vzfYYPsAhX5H7cAHec1DxUQFjAMegQIBBAB&amp;usg=AOvVaw2wKQuj2zCOK9jNoREpOoAl">https://www.google.com/url?sa=t&amp;source=web&amp;rct=j&amp;url=http://web.iitd.ac.in/~achawla/public_html/201/lectures/sp46.pdf&amp;ved=2ahUKEwiA1vzfYYPsAhX5H7cAHec1DxUQFjAMegQIBBAB&amp;usg=AOvVaw2wKQuj2zCOK9jNoREpOoAl</a>	M1-M6
3	NCTM	<a href="https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Isometric-Drawing-Tool/">https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Isometric-Drawing-Tool/</a>	M6

**F.E. Semester – I/II**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E./B.Tech. (All Branches)					F.E./F.T. (SEM: I/II)				
Course Name: Chemistry					Course Code: BSC102				
Contact Hours Per Week: 06					Credits: 05				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW
3	1	2	6	5	20	20	60	25	25
<b>ISE: In-Semester Examination - Paper Duration – 1 Hour</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
<b>Prerequisite:</b> Intermediate of Science level knowledge of Atomic Structure, chemical Bonding, Thermodynamics and Electrochemistry <b>RBT:</b> Revised Bloom's Taxonomy									

**Course Objectives:**

Sr. No.	Course Objectives	RBT level
1	To make them aware about importance of water treatment for domestic use and industrial use purpose.	Remember(R), Understand(U), Apply(A)
2	To develop the knowledge of latest method of instrumental analysis used in various chemical industries.	Remember(R), Understand(U), Apply(A)
3	To acquaint the knowledge of the principles of catalysis and its usefulness in maintaining green matrix of reactions.	Understand(U) Apply(A)
4	To make them understand and apply bulk properties and processes using thermodynamic considerations	Remember(R) Understand(U) Apply(A)
5	To develop understanding of electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques	Understand(U), Apply(A)
6	To discover Novel Chemical Entities [NCE] which ultimately results in design of new molecule [chemical data] and also for collecting, storing and analyzing the chemical data	Understand(U)-Apply(A)

### Course Outcomes:

Sr. No.	Course Outcomes	RBT Levels
1	Importance of water treatment for domestic use and industrial use purpose.	Remember(R), Understand(U), Apply(A)
2	Apply the knowledge of instrumental method of analysis for analysis of various samples.	Remember(R), Understand(U), Apply(A)
3	Understand and apply principles of catalysis and its application in maintaining green matrix of reactions.	Understand(U) Apply(A)
4	Understand and apply bulk properties and processes using thermodynamic considerations	Remember(R) Understand(U) Apply(A)
5	Understand electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques	Understand(U), Apply(A)
6	Understand the computational way to design molecule and analyzing the data	Understand(U) Apply(A)

### Detailed Syllabus:

Module No.	Topics	Hrs.	RBT Levels
1.0	<b>Water Treatment &amp; Technology:</b> Introduction – Hard water and Soft water. Hardness of water – types – expression of hardness (numerical problems). Estimation of hardness of water by complex metric method (numerical problems). Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler troubles – scale and sludge, priming and foaming, caustic embrittlement and boiler corrosion. Treatment of boiler feed water – Internal treatment (Calgon conditioning, Phosphate conditioning and Colloidal conditioning). Softening of water by Lime soda process, Zeolite process & Ion exchange process (numerical problems).	9	Remember (R), Understand (U), Apply (A)

2.0	<b>Instrumental Methods of Analysis</b> Introduction to Chromatography, Types of Chromatography (Adsorption and partition chromatography), Thin Layer Chromatography (Theory, Principle, technique and applications), Gas Chromatography – (Introduction, theory, instrumentation., working) High Performance Liquid Chromatography, – introduction, theory, instrumentation. Interpretation of Gas/HPLC Chromatogram and TLC plate of various samples.	5	Remember (R), Understand (U), Apply(A)
3.0	<b>A. Green Chemistry</b> Introduction to Green Chemistry, The 12 principles of Green Chemistry, Prevention of waste, Atom Economy, Less hazardous Chemical synthesis, Safer solvent and Auxiliary, Design for energy efficiency, use of renewable feedstock, Reduction of derivatives, Catalysis, Design for degradation, Real time analysis (Uses of electronic devices and sensors for process control), inherently safer chemistry for accident prevention. Design of Greener route of synthesis over conventional route, Numerical based on calculation of Atom economy  <b>B. Catalysis</b> Role of Catalyst in making the chemical process Green, Relevance and examples, Homogeneous and heterogeneous catalysis, Theory of Heterogeneous Catalysis (Adsorption Theory), Catalytic Converters, Acid Base catalysis, Solid Acid Catalysis, Solid Base Catalysis, Transition metal Catalysis, Metal and supported metal catalysis, Catalyst design through artificial intelligence and computer modelling	7	Remember (R), Understand (U), Apply(A)

4.0	<p><b>Electrochemistry and its Application</b></p> <p><b>A. Electrochemistry</b></p> <p>Introduction, Concept of electrode potential, Concept of Electrochemical cell, EMF of Cell, Cell potentials by Nernst equation, Relation of free energy with EMF of Cell, Numerical based on EMF and its feasibility prediction.</p> <p><b>B. Corrosion:</b></p> <p>Introduction of Corrosion, Fundamental reason, Mechanism of corrosion-i) Electrochemical/Wet Corrosion mechanism a) Evolution of hydrogen gas and b) Absorption of oxygen gas, ii) Direct Chemical/Dry/ Atmospheric Corrosion a) Due to oxygen b) Due to other gases Factors affecting the rate of corrosion, Types of corrosion-Galvanic cell corrosion, Concentration cell corrosion (Differential aeration principle) Pitting Corrosion, Stress corrosion, intergranular corrosion, waterline corrosion methods to minimize the corrosion- I) Material selection and Proper design, II) Cathodic protection i) Sacrificial anodic protection ii) Impressed current method III) Anodic protection, IV) Metallic coating i) Anodic coating (Galvanization) ii) Cathodic coating (Tinning)</p>	10	Remember (R), Understand (U), Apply(A)
5.0	<p><b>Spectroscopic techniques and applications</b></p> <p>Electromagnetic radiation, electromagnetic spectrum, Interaction of electromagnetic radiation with matter, Beer-Lambert's law (mathematical expression and derivation, Numerical expected), UV Visible Spectrophotometer: Principle, Instrumentation (Single beam and double beam spectrophotometer), and Application. Vibrational Spectroscopy: Principle, Instrumentation and Application. Identification of functional group of compound based on IR spectroscopy.</p>	7	Remember (R), Understand (U) Apply(A)

6.0	<b>Computational Chemistry</b>	7	Remember (R), Understand (U), Apply(A)
	Introduction to cheminformatics History and Evolution of Cheminformatics, Molecular Modelling and Structure elucidation, Introduction to Marvin Sketch, Chemaxon, ChEMBL: A Small molecule screening and Cheminformatics resource database, Representation of molecules and chemical reactions, Nomenclature, Different types of notations, SMILES coding, Matrix representations, Structure of Molfiles and Sdfiles, Libraries and toolkits, Different electronic effects, Reaction classification. Searching chemical structures: Full structure search, substructure search, basic ideas, similarity search, three-dimensional search methods, basics of computation of physical and chemical data and structure descriptors, data visualization.		

**Suggested List of Practical/ Experiments:**

Practical Number	Practical/ Experiment Topic	Hrs.	RBT Levels
1	To study the effect of the change in temperature or viscosity of a lubricating oil by using a redwood viscometer no. 1.	2	Understand (U) Apply(A)
2	Determination of surface tension using Drop number method by Stalagmometer	2	Understand (U) Apply(A)
3	Separation of organic binary mixture using Thin layer chromatography	2	Understand (U) Apply(A)
4	Determination of Total hardness of water by complexometric titration using EDTA	2	Understand (U) Apply(A)
5	Determination of Permanent hardness of water by complexometric titration using EDTA	2	Understand (U) Apply(A)
6	Estimation Saponification value of an lubricating oil.	2	Understand (U) Apply(A)
7	Estimation of Acid value of used lubricating oil.	2	Understand (U) Apply(A)



8	To determine the turbidity of given unknown water sample.	2	Understand (U) Apply(A)
9	Synthesis of a Meta dinitrobenzene (drug intermediate).	2	Understand (U) Apply(A) and Create(C)
10	To determine $\lambda_{\text{max}}$ and Molar extinction coefficient of given solution of $\text{KMnO}_4$ using Colorimeter.	2	Understand (U) Apply(A)
11	To determine $\lambda_{\text{max}}$ and Molar extinction coefficient of given solution of $\text{CuSO}_4 - \text{NH}_3$ complex using Colorimeter.	2	Understand (U) Apply(A)
12	Removal of Hardness of water by using Ion Exchange Colum	2	Understand (U) Apply(A)
13	Inorganic Preparation: Preparation of Tetraamine coppe (II) Sulphate	2	Understand (U) Apply(A)
14	Determination of Percentage of Iron in Plain Carbon Steel.	2	Apply(A)
15	Demonstration of Column Chromatography	2	Understand (U) Apply(A)

### Practical Outcomes

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

Sr. No.	Laboratory Outcome	RBT Levels
PO-1	Estimate Hardness and some other important properties of water to be used for various industrial and domestic uses.	Understand (U) Apply (A)
PO-2	Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.	Understand (U) Apply (A)
PO-3	Synthesize a small drug molecule using principle of Green Chemistry	Understand (U) Apply (A) and Create(C)
PO-4	Estimate the some important properties of lubricating oil to understand its suitability for industrial application	Understand (U) Apply (A)

PO-5	Use the Spectrophotometric/Colorimetric device for measurement of concentration of unknown solution	Understand (U) Apply (A)
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### **Books and References:**

#### **Reference/Textbooks:**

Sr. No.	Name of Book	Author Name	Edition
1	An Introduction to Cheminformatics	Andrew R Leach	-
2	Physical Chemistry I & II	Dr. Hrishikesh Chatterjee	2 <sup>nd</sup>
3	Physical Chemistry	Atkins	8 <sup>th</sup>
4	Principle of Instrumental Analysis	Skoog, Holler Gauch	7 <sup>th</sup>
5	Vogels Textbook of quantitative chemical Analysis	Vogel	8 <sup>th</sup>
6	Organic Chemistry	Morrison Boyd	7 <sup>th</sup>
7	QSAR and Molecular Modelling	S.P Gupta	-

### **Online References:**

Sr. No	Website Name	URL	Modules Covered
1.	Free Open Source simulator Project	<a href="http://www.hplcsimulator.org/">http://www.hplcsimulator.org/</a>	M-2
2.	Thin Layer Chromatography Simulation	<a href="https://elearning.cpp.edu/learning-objects/organic-chemistry/tlc/?page=simulation.html">https://elearning.cpp.edu/learning-objects/organic-chemistry/tlc/?page=simulation.html</a>	M-2
3.	Gas Chromatography: Simulation & Optimization software	<a href="https://www.gc-sos.com/download">https://www.gc-sos.com/download</a>	M-2
4.	IIT B Virtual Lab (Column Chromatography)	<a href="http://vlab.amrita.edu/?sub=2&amp;brch=191&amp;sim=341&amp;cnt=1">http://vlab.amrita.edu/?sub=2&amp;brch=191&amp;sim=341&amp;cnt=1</a>	M-2
5.	Simulation of UV-Visible Photometer	<a href="https://terpconnect.umd.edu/~toh/models/UVVis.html">https://terpconnect.umd.edu/~toh/models/UVVis.html</a>	M-5
6.	IIT B Virtual Lab (CFSE Calculation)	<a href="http://vlab.amrita.edu/?sub=2&amp;brch=193&amp;sim=610&amp;cnt=1">http://vlab.amrita.edu/?sub=2&amp;brch=193&amp;sim=610&amp;cnt=1</a>	M-1
7.	IIT B Virtual Lab (Hardness of Water)	<a href="http://vlab.amrita.edu/?sub=2&amp;brch=193&amp;sim=1548&amp;cnt=1">http://vlab.amrita.edu/?sub=2&amp;brch=193&amp;sim=1548&amp;cnt=1</a>	M-1
8.	IIT B Virtual Lab (UV-	<a href="http://vlab.amrita.edu/?sub=2&amp;brch=190&amp;sim=33">http://vlab.amrita.edu/?sub=2&amp;brch=190&amp;sim=33</a>	M-5



	Visible Spectroscopy)	8&cnt=1	
9.	IIT B Virtual Lab (EMF Measurement)	<a href="http://vlab.amrita.edu/?sub=2&amp;brch=190&amp;sim=361&amp;cnt=1">http://vlab.amrita.edu/?sub=2&amp;brch=190&amp;sim=361&amp;cnt=1</a>	M-4
10.	IIT B Virtual Lab (IR Spectroscopy)	<a href="http://ccnsb06-iiith.vlabs.ac.in/Experiments.html?domain=%20Chemical%20Sciences">http://ccnsb06-iiith.vlabs.ac.in/Experiments.html?domain=%20Chemical%20Sciences</a>	M-5
11	Mervin Sketch	<a href="https://chemaxon.com/products/marvin">https://chemaxon.com/products/marvin</a>	M-6
12	ChEMBL	<a href="https://data.broadinstitute.org/chembank/assay/index.html">https://data.broadinstitute.org/chembank/assay/index.html</a>	M-6

### FE/FT. Semester –I/II

**Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS-HME)**  
**Approved by BOS and Academic Council Under TCET Autonomy scheme (w. e. f. A.Y. 2019-20)**

B.E./B.Tech. (All Branches)					F.E./F.T. (SEM: I/II)				
Course Name : Basic Electrical Engineering					Course Code : ESC101				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)	Practical/Oral (25)	Term Work (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW
3	1	2	6	5	20	20	40	25	25
<b>ISE: In-Semester Examination - Paper Duration – 1 Hour</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration – 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
<b>Prerequisite:</b> 10+2 level knowledge of basic physics and mathematics									

**Course Objective:** The Course intends to provide comprehensive idea about AC and DC circuit analysis, energy generation, working principles and applications of basic machines and control devices in electrical engineering.

**Course Outcomes:** Upon completion of the course students will be able to:

Sr. No.	Course Outcome	Revised Bloom Taxonomy Level
CO1	To make them understand basic theorem and how to apply them for analysis any DC circuit.	L1, L2, L3
CO2	To develop understanding of single phase and three phase AC supply voltage and analysis ac circuits.	L1, L2, L3
CO3	To understand the concept of energy generation and alternative sources of generation	L1, L2, L3
CO4	To acquaint the knowledge of the working of single phase transformer.	L1, L2, L3
CO5	To articulate various type of electrical machine and their working principles.	L1, L2, L3
CO6	To illustrate the application of SCR in various power electronics circuits.	L1, L2

**Detailed Syllabus (Total No. of Hours: 45):**

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>D.C. CIRCUITS:</b> Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, Mesh and Nodal analysis, Super Mesh and Super Node. Superposition, Thevenin's and Norton's Theorems. Introduction to Multisim software for DC circuit	09	L1, L2, L3
2	<b>A.C. CIRCUITS:</b> Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections. Introduction to Multisim software for AC circuit	09	L1, L2, L3
3	<b>POWER GENERATION:</b> Introduction to electrical power generation (block diagram), Energy for sustainable development, Introduction to renewable and non-renewable sources, Difference between renewable and non-renewable sources, Different energy alternatives, Energy storage device: Primary and secondary cell, Lithium-ion battery, Current energy scenario in India.	04	L1, L2
4	<b>TRANSFORMERS:</b> Principle & Construction of Transformer, Ideal and practical transformer, equivalent circuit, No-Load and On load Phasor diagram, losses in transformers, OC SC test, regulation and efficiency.	07	L1, L2, L3

<b>5</b>	<b>ELECTRICAL MACHINES:</b> Induction Motor: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic, starting and speed control of induction motor.  Stepping Motors: Principle of operation, Constructional features, Types of stepper Motors and working.	09	L1, L2, L3
<b>6</b>	<b>POWER CONVERTERS:</b> SCR, V-I characteristic of SCR, Single phase Phase-controlled Rectifier with R Load. Step-up and step down Chopper. duty ratio control. Single-phase source inverters.	07	L1, L2, L3

**Suggested List of experiments/demonstrations:**

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1.	<b>Basic Experiments</b>	Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope, resistors, capacitors and inductors	2	L1, L2, L3
2.		Verification of the concept of Mesh & Nodal Analysis.		
3.		Study of resonance in series R-L-C circuits.	2	L1, L2, L3
4.		Three-phase transformers: Voltage relationships in star and delta connections. Cumulative three-phase power in balanced three-phase circuits.	2	L1, L2, L3
5.	<b>Design based Experiments</b>	Verification of Thevenin's theorem & Maximum Power Transfer Theorem.	2	L1, L2, L3
6.		Verification of Superposition theorem		

7.		Demonstration of cut-out sections of machines: synchronous machine (field winding - slip ring arrangement)	2	L1, L2, L3
8.		Demonstration of cut-out sections of machines: induction machine (squirrel cage rotor)	2	L1, L2, L3
9.		Study V-I Characteristic of SCR	2	L1, L2, L3
10.		Demonstration of Speed control of AC Motor.	2	L1, L2, L3
11.		Designing of basic Electric circuits by Multisim Software	2	L1, L2, L3
<b>Total</b>			<b>22</b>	

**Suggested Text/Reference Books:**

SN	Title	Authors	Publisher	Edition	Year
1	Basic Electrical Engineering	D.P. Kothari and I.J. Nagrath	Tata McGraw Hill	Third edition	2010
2	Basic Electrical Engineering	D.C. Kulshreshtha	Tata McGraw Hill	-	2009
3	Fundamentals of Electrical Engineering	L.S. Bobrow	Oxford University Press	-	2011
4	Electrical and Electronics Technology	E. Hughes	Pearson	Tenth Edition	2010
5	Electrical Engineering Fundamentals	Vincent Deltoro	Prentice Hall India	Second Edition	1989
6	Reluctance Motor and their Controls,	T.J.E. Miller,	USA, Oxford University Press,		1995
7	Power Electronics: Circuits, Devices & Application	Muhammad H.Rashid	Pearson	Fourth Edition	
8	Renewable Energy Sources and Emerging Technologies	D.P. Kothari K.C. Singal, Rakesh Ranjan	PHI Learning	Third edition	2022

**Online References:**

Sr. No	Website Name	Online links	Modules
1.	NPTEL	<a href="https://nptel.ac.in/courses/108/105/108105053/">https://nptel.ac.in/courses/108/105/108105053/</a>	M1, M2, M4, M5
2.	NPTEL	<a href="https://nptel.ac.in/courses/108/105/108105066/">https://nptel.ac.in/courses/108/105/108105066/</a>	M6
3.	NPTEL	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ee68/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ee68/</a>	M1, M2, M4, M5

**F.E./F.T. Semester –I/II**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E./B.Tech (All Branches)								F.E./ F.T (SEM: I/II)				
Course Name: Programming for Problem Solving								Course Code: ESC103				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)							
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation							
Hours Per Week					Theory (100)			Practical/Oral (25)		Term Work (25)		Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR		TW		150
3	--	2	5	4	20	20	60	25		25		
ISE: In-Semester Examination - Paper Duration – 1 Hour IE: Innovative Examination ESE: End Semester Examination - Paper Duration - 2 Hours The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)												
Prerequisite: Fundamental Knowledge of Computer, Basics of Mathematics												

**Course Objective:** This course aims to provide an exposure in developing an algorithm, flowchart and writing efficient codes for user defined problem. The course will be taught using C programming language.

**Course Outcomes:** Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Demonstrate the fundamentals of computer programming and algorithm.	L1, L2
2	Use of primitive data types in a computer programming	L1, L2, L3
3	Apply conditional branching and looping to solve problems.	L1, L2, L3
4	Make use of functions and storage classes to implement programs	L1, L2, L3, L4
5	Understand and apply non primitive data types in computer programming	L1, L2, L3
6	Utilize structure, pointers and files to solve problems	L1, L2, L3



**Detailed Syllabus (Total No. of Hours: 45):**

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Introduction to Programming, Algorithm and Flowchart</b>	04	L1, L2
	What is a Problem, Problem Solving Aspects, Top Down Approach, Algorithm, Three construct of Algorithm and flowchart: Sequence, Decision (Selection) and Repetition, Characteristics of good algorithm, Real life examples of programming. Introduction to measures of an Algorithm: Time and Space		
2	<b>Fundamentals of C-Programming</b>	06	L1, L2, L3
	<b>Structure of C program</b> Character Set, Identifiers and keywords, Data types, Constants, Variables. <b>Operators</b> -Arithmetic, Relational, Logical, Assignment, Compound assignment, Bitwise, Unary and Conditional. Operator precedence <b>Data Input and Output</b> –printf( ), scanf( ), putchar( ), getchar( ), puts( ), gets( ).		
3	<b>Conditional Branching &amp; Loops</b>	10	L1, L2, L3
	<b>Branching/Selection</b> - if statement, if-else Statement, Multiway decision, Switch statement (Menu Driven Programs) <b>Iterative/Looping</b> – while, do-while, for <b>Jump Statements</b> - Continue statement, Break statement, goto statement, return statement <b>Calculation of time complexity of the problems</b>		
4	<b>Functions and Parameters</b>	07	L1, L2, L3, L4
	<b>Function</b> -Introduction to Function, Definition & Declaration of Function, accessing a Function, call by value, Recursion Vs. Iteration Library functions: math.h, ctype.h, time.h <b>Storage Classes</b> –Auto , Extern , Static, Register		
5	<b>Arrays and Strings</b>	09	L1, L2, L3
	<b>Array</b> -Concepts, Declaration, Definition, Accessing array element, One-dimensional and Multidimensional array. <b>String</b> - Basics of String, Library Functions. Operations on String without using Library functions from string.h		



6	<b>Structure, Pointers &amp; Files</b> <b>Structure:</b> Declaration, Initialization, structure within structure, Array of Structure, Operation on structures <b>Pointer:</b> Introduction to Pointers, Pointer Variables, Dereferencing Pointer. <b>File Handling:</b> Types of File, File operations, Programs on Files		
		09	L1, L2, L3

**List of Practical/ Experiments:**

Practical No.	Type of Experiment	Practical/Experiment Topic	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic Experiments	A) Design an algorithm and Draw a Flowchart to perform arithmetic operations. B) Design an algorithm and Draw a Flowchart to calculate gross salary of an employee [using formula: gross_sal = basic_sal+hra+da].	04	L1, L2, L3
2		A) Design an algorithm, Draw a Flowchart and implement a C program to find maximum value using conditional operator B) Design an algorithm, Draw a Flowchart and implement a C Program to test Relational, logical, and Compound Assignment operators. Read necessary inputs from the user using Input output functions.	02	L1, L2, L3
3		A) Write a Program to generate the result (display grade) if subject marks are given by user. B) Write a Program to find real roots of a quadratic equation. Read all necessary inputs using input methods and display the roots C) Write a menu driven to display the restaurant menu items, the price of each item and calculate the total.	02	L1, L2, L3
	Advanced Experiments	A) Write a program to print multiplication table of given number using for loop, while loop and do-while loop. B) Write a Program to find sum of	02	L1, L2, L3

4		<p>following Series.</p> $1!+1/2!+1/3!+1/4! \dots 1/n!$ <p>C) Write a Program to print the following pattern:</p> <pre>       A      A  B     A  B  C    A  B  C  D </pre>		
5		<p>A) Write a Program to find the maximum and minimum of given three numbers using functions</p> <p>B) Write a recursive function to find the Nth term in the Fibonacci series</p> <p>C) Write a program to test math.h , ctype.h and time.h library functions</p>	04	L1, L2, L3
6	<b>Design Experiments</b>	<p>A) Write a program to sort the given element of an array in ascending/descending order.</p> <p>B) Write a program to Perform Binary Search Operation.</p>	04	L1, L2, L3
7		<p>A) Write a program to find the transpose of a Square Matrix without using another matrix</p> <p>B) Write a Program that reads two matrices values A (m x n ) and B(p x q ) Display Matrix Addition in proper matrix format</p>	04	L1, L2, L3
8		<p>A) Write a Program that Implements string handling functions with and without using string library function.</p> <p>B) Write a Program to check whether the given string is palindrome or not.</p>	02	L1, L2, L3
9		<p>A) Implement a C Program to accept two numbers from the user and swap them. Pass the values to be swapped to the function using call by reference method.</p> <p>B) A sport club of cricket needs to maintain data about players. Description of it is given below. Club want to maintain player's name, age, no of matches played, no of runs, and average. For above description declare a structure and Display data in the descending order of number of runs made. Implement a C Program for above problem.</p>	04	L1, L2, L3

10	<b>Mini project</b>	A) Design a puzzle game B) Draw the basic shapes using graphics.h library function	02	L1, L2, L3
		<b>Total</b>	30	

**Note:** Practice Questions from competitive Examinations like GATE and standard technical Quiz competitions shall be discussed at the end of each module as a practice for “Program Based Examination”

### **Books and References:**

Sr. No.	Title	Authors	Publisher	Edition	Year
1	MASTERING C	K. R. Venugopal and Sudeep R. Prasad	McGraw Hill	2 <sup>nd</sup> Edition	2006
2	Programming in ANSI C	E Balaguruswamy	McGraw Hill	8 <sup>th</sup> Edition	2018
3	Programming in C	Pradeep Dey and Manas Gosh	Oxford University Press	2 <sup>nd</sup> Edition	2011
4	Let Us C	Yashwant Kanetkar	BPB	16 <sup>th</sup> Edition	2018
5	Data Structures using C	Aaron M. Tenenbaum	Pearson	7 <sup>th</sup> Edition	2009

### **Online References:**

Sr. No.	Website Name	URL	Modules Covered
1	Javapoint	<a href="https://www.javatpoint.com/c-programming-language-tutorial">https://www.javatpoint.com/c-programming-language-tutorial</a>	M1 – M6
2	Programiz	<a href="https://www.programiz.com/c-programming">https://www.programiz.com/c-programming</a>	M1 – M6
3	Tutorials Point	<a href="http://www.tutorialspoint.com/cprogramming/c_overview.htm">http://www.tutorialspoint.com/cprogramming/c_overview.htm</a>	M1 – M6

**F.E./F.T. Semester –I**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E. & B.Tech (All Branches)					F.E./ F.T (SEM: I)					
Course Name: Workshop & Manufacturing Practices – I					Course Code: ESC105					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (50)		Practical/Oral (25)	Term Work (00)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	
1	-	2	3	2	10	10	30	25	-	75
<b>ISE: In-Semester Examination - Paper Duration – 1 Hour</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
<b>Prerequisite:</b> Basic knowledge of Manufacturing Techniques										

**Course Objective:** The course intends to give exposure to different Manufacturing Practices / Techniques and thereby understand how to fabricate components using different materials. Also, it is important to have basic knowledge of Assembling and dismantling of different components.

**Course Outcomes:** Upon completion of the course students will be able to:

Sr. No	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
CO1	Identify tools, equipment and safety rules of workshop & manufacturing practice	L1, L2
CO2	Understand tools and process of carpentry, wood turning machine.	L1, L2
CO3	Identify the terms used for plastic moulding, metal casting and glass cutting.	L1, L2
CO4	Understand the terms on additive manufacturing and CNC's Machining.	L1, L2
CO5	Identify the types of welding, plumbing process and its different joints.	L1, L2
CO6	Understand the various equipment for electrical and electronics.	L1, L2

**Detailed Syllabus (Total No. of Hours: 15):**

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
01	Manufacturing Methods- Metal casting, forming, machining, joining, Non-Conventional manufacturing methods	03	L1, L2
02	Carpentry, Fitting operations & Power tools	03	L1, L2
03	Plastic molding, Glass manufacturing, Glass Cutting Tools & Process	02	L1, L2
04	CNC: CNC Machining, CNC Code, CNC Manufacturing Process Additive manufacturing: Introduction, Manufacturing Process, Benefits and defects	03	L1, L2
05	Welding: Introduction, Terminologies, Types of Welding, Arc Welding & its types, Shielded Metal Arc Welding (SMAW) Gas Welding, Soldering & Brazing	02	L1, L2
06	Electrical: Introduction, Method & Types of Electrical Wiring System, Electronic Components. Electronics: Introduction, Printed Circuit Board, Multimeter, Resistor.	02	L1, L2

**Suggested List of Practical/ Experiments:**

Practical Number	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	To make a Square Job	10	L1, L2
2	To make a Square Paper Weight	10	L1, L2, L3
3	External Threading on Pipe	4	
4	Internal Threading on Pipe	2	
5	Assembly of Plumbing Component and Pipe	2	

6	Preparation of Domestic Pipe Line	2	
<b>Total</b>		<b>30</b>	

**Books and References:**

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Elements of Workshop Technology	Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K	Media promoters and publishers private limited, Mumbai	1/2	2008 & 2010
2	Manufacturing Engineering and Technology	Kalpajian S. And Steven S. Schmid	Pearson education.	4	2002
3	Manufacturing Technology	Gowri P. Hariharan and A. Suresh Babu	Pearson Education	-	2008
4	Processes and Materials of Manufacture	Roy A. Lindberg	Prentice Hall India	4	1998
5	Manufacturing Technology	Rao P.N	Tata McGraw Hill House	-	2017

**Online References:**

Sr. No.	Website Name	URL	Module covered
1	Plastic process	<a href="https://www.pds.gov.in/downloads/PLASTIC_PROCESSING_TECHNIQUE.pdf">https://www.pds.gov.in/downloads/PLASTIC_PROCESSING_TECHNIQUE.pdf</a>	M-3
2	Additive Manufacturing	<a href="https://additivemanufacturing.com/basics/">https://additivemanufacturing.com/basics/</a>	M-4
3	Welding & Brazing	<a href="https://www.lucasmilhaupt.com/EN/Brazing-Academy/Brazing-vs-Welding.htm">https://www.lucasmilhaupt.com/EN/Brazing-Academy/Brazing-vs-Welding.htm</a>	M-5



**F.E./F.T. Semester – I/II**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E./B.Tech (All Branches)								F.E./ F.T (SEM: I/II)		
Course Name: Presentation Skills-I (Presentation or Life Skills)								Course Code: HME- PS101		
Contact Hours Per Week: 02								Credits: 01		
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (00)			Presentation (50)	Report (25)	Total
Theory	Tutorial	Integrated Theory and Practice (ITP)	Contact Hours	Credits	ISE	IE	ESE			75
-	-	2	2	1	-	-	-			50
ISE: In-Semester Examination - NA IE: Innovative Examination - NA ESE: End Semester Examination - NA The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
Pre-requisite- Basic knowledge of English language, Grammar, Vocabulary and Computer Skills										
RBT: Revised Bloom’s Taxonomy										

**Course Objective:** The course will be able to make students efficient in making effective power point presentations with advanced knowledge of MS Excel and graphics.

**Course Outcomes:** Upon completion of the course students will be able to:

<b>Sr. No.</b>	<b>Course Outcomes</b>	<b>Cognitive Levels of Attainment as per Bloom's Taxonomy</b>
1	Understand key competencies to build confidence and communication	L1, L2, L3
2	Learn and practice skills necessary to deliver effective presentation	L1, L2, L3
3	Equip students with knowledge of power point Presentation	L1, L2, L3
4	Enhance technical skills like MS Word, MS Excel to organize data	L1, L2, L3
5	Become skilled to use videos, graphics and images in presentation	L1, L2, L3
6	Learn steps of preparing and delivering effective power point presentation	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 30):**

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1.0	<b>Key Competencies</b>	04	L1, L2, L3
	1.1 Analyze the audience with content knowledge 1.2 Managing Nervous Symptoms 1.3 Communicate key points and structure the content 1.4 Refine your verbal and non-verbal delivery:		
	Body language, Choice of diction, Intonation, emphasis, pacing, pauses, etc.		
2.0	<b>Essential of Presentation Skills</b>	04	L1, L2
	2.1 Preparing presentation: Types of presentation 2.2 Methods for highlighting and emphasizing key messages: Design effective audio-visual aids, colors, fonts, size, etc. 2.3 Respond Confidently to Challenging Questions 2.4 Techniques to engage your audience		
3.0	<b>Introduction to MS Power Point Presentation</b>	07	L1, L2, L3
	3.1 Getting started with PowerPoint 3.2 Creating a new presentation 3.3 Modifying presentation themes 3.4 Add and edit text to slides, new slides to a presentation 3.5 Use of ICT tools in presentations. (Various applications like Excel, Word, Flipgrid, Nearpod etc.) 3.6 Performing Advanced Text Editing Operations 3.7 Tools for effective presentation like Prezi, Canva, etc		
4.0	<b>Introduction to MS Excel</b>	05	L1, L2, L3
	4.1 Quick Review on MS Excel Options, Ribbon, Worksheets and Tools 4.2 Using Excel Shortcuts with full List of Excel Shortcuts, copy, cut, paste, hide, unhide, delete and link the data in Rows, columns and Sheets 4.3 Conditional formatting, importing data and text to columns 4.4 Functions: Mathematical; String; IF, AND,		



	OR; Searching; match, search 4.5 <b>Case Study:</b> Managing personal finance using Microsoft Excel		
5.0	<b>Adding Graphical Elements to Presentation</b>	05	L1, L2
	5.1 Inserting clipart images and shapes to slides 5.2 Inserting and modify tables and charts 5.3 Adding sound and video to a slide presentation 5.4 Inserting and editing animations and slide transitions 5.5 Adding Tables and Charts		
6.0	<b>Delivering Presentation</b>	05	L1, L2, L3
	6.1 PDCA Cycle 6.2 Reviewing 6.3 Printing 6.4 Presenting Confidently, Professionally, and Effectively 6.5 Power point presentation on any selected topic (technical topic)		

**Suggested List of Practical/ Experiments:**

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels
1	<b>Basic Experiments</b>	Group Activities to build confidence	2	L1, L2, L3
2		Speech Practice	2	L1, L2, L3
3		Practice of using PowerPoint Presentation	2	L1, L2, L3
4		Practice of MS Excel	2	L1, L2, L3
5		Practice using graphics, videos and images in presentation	2	L1, L2, L3

**Books and References:**

Sr. No	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Exploring Microsoft PowerPoint	Mary Anne Poatsy, Rebecca Lawson, Cynthia Krebs, Robert T. Grauer	Paperback	1 <sup>st</sup> Edition Kindle	2016
2	Building Financial Models with Microsoft Excel	K. Scott Proctor	John Willey & Sons	2004 Edition	2004

3	Excel: Quick Start Guide from Beginner to Expert (Excel, Microsoft Office)	Willam fischer	-	2016 Edition	2016
4	Communication Skills	Peter Simon	Ramesh Publishing House	4 <sup>th</sup> Edition	2013
5	The Power of your Subconscious Mind	Joseph Murphy	Bantam	2011 Reprint of 1963 Edition	2001
6	Communication Skills	Sanjay Kumar & Pushp Lata	Oxford University Press	1 <sup>st</sup> Edition	2011

**Online References:**

Sr. No.	Website Name	URL	Modules Covered
1	Coursera	<a href="https://www.coursera.org/learn/slides">https://www.coursera.org/learn/slides</a>	M 1-M 6
2	NPTEL	<a href="https://nptel.ac.in/courses/109/106/109106067/">https://nptel.ac.in/courses/109/106/109106067/</a>	M 1-M 6
3	Dale Carnegie	<a href="https://www.dalecarnegie.com/en/courses-v2/191?">https://www.dalecarnegie.com/en/courses-v2/191?</a>	M 1-M 6

**F.E./F.T. Semester – I/II**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E./B.Tech. (All Branches)							F.E./F.T. (SEM: I/II)			
Course Name: Professional Skills – I/II (Logic Building & Aptitude)							Course Code: HME-PS102			
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (100)		Presentation (50)	Report (25)	Total	
Theory	Tutorial	Integrated Theory and Practice (ITP)	Contact Hours	Credits	IA	ESE			75	
--	--	02	02	01	--	--	50	25		
IA: In-Semester Assessment - Paper Duration - NA										
ESE: End Semester Examination - Paper Duration - NA										
The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
Prerequisite: Computer Basics, fundamental knowledge of Mathematics										

**Course Objective:** This course aims to build a solid foundation for programming by learning basic logic and exploring how logic forms the foundation of computer programs.

**Course Outcomes:** Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	The basics of critical thinking	L1, L2
2	How to break down problems into simpler tasks	L1, L2, L3
3	How to use an algorithm to solve problems	L1, L2, L3
4	Develop an action plan to implement the best solution	L1, L2, L3
5	Ability to describe computer programs (e.g. recursive functions) in a formal mathematical manner	L1, L2, L3, L4
6	Define sets using the list or set builder notation and relate symbolic laws of logic to determine the truth value of unquantified sentences using logical rules.	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 30):**

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Introduction to Computers</b>	05	L1
	Computer Systems, Computer Languages, Software Development, Operating System, Number Systems and their conversion, Introduction to Scratch		
2	<b>Logic Building Techniques</b>	04	L1, L2, L3
	Different Techniques to improve logic- Keep Moving, Face new problem, Check solutions by others, Work on problems, Crypt Arithmetic Problems, Pseudocode and Flowchart		
3	<b>Critical thinking and logical reasoning</b>	06	L1, L2, L3
	Critical Thinking: What does it mean to think critically? An overview of definition, induction, and deduction, Computer programming and logical thinking: Types of Logical reasoning – Verbal and non - verbal Reasoning, Analytical Reasoning, Analytical vs Logical Reasoning		
4	<b>Greedy and Dynamic Techniques</b>	05	L1, L2, L3
	Problem definition, Problem decomposition, Abstraction, Greedy Method, Divide and Conquer. Difference between Greedy and Divide and Conquer with various examples.		
5	<b>Problem Solving Techniques</b>	06	L1, L2, L3, L4, L5
	Searching Techniques: Linear and Binary search Sorting Techniques: Bubble, Selection, Insertion, Merge, and Quick Sort Hashing Techniques techniques and their applications		
6	<b>Latest tools and Emerging Techniques</b>	04	L1, L2, L3
	User Interface Designing, Machine Learning, Artificial Intelligence, Ubiquitous Computing, IOT		

### **Books & References**

SN	Title	Authors	Publisher	Edition	Year
1	Think Smarter: Critical Thinking to Improve Problem-Solving and Decision-Making Skills	Michael Kallet	Wiley	1st Edition	2014
2	How to Solve it By Computer	R. G. Dromy	Pearson Education	1st Edition	2006
3	Computational Thinking	Karl Beecher	BCS, The Chartered Institute for IT	1st Edition	2017
4	A First Course in Mathematical Logic and Set Theory	Michael L. O'Leary	Wiley	1st Edition	2015
5	Introduction to Algorithm	Thomas Corman	PHI	3rd Edition	2010

### **Online References:**

Sr. No.	Website Name	URL	Modules Covered
1	www.tutorialspoints.com	<a href="http://www.tutorialspoint.com/basics_of_computers/basics_of_computers_introduction.htm">http://www.tutorialspoint.com/basics_of_computers/basics_of_computers_introduction.htm</a>	M1
2	www.indeed.com	<a href="http://www.indeed.com/career-advice/career-development/strengthen-logical-thinking-skills">www.indeed.com/career-advice/career-development/strengthen-logical-thinking-skills</a>	M2
3	www.plato.stanford.edu	<a href="http://www.plato.stanford.edu/entries/critical-thinking/">www.plato.stanford.edu/entries/critical-thinking/</a>	M3
4	www.geeksforgeeks.org	<a href="http://www.geeksforgeeks.org/greedy-approach-vs-dynamic-programming/">www.geeksforgeeks.org/greedy-approach-vs-dynamic-programming/</a>	M4
5	<a href="https://www.thevectorimpact.com">https://www.thevectorimpact.com</a>	<a href="https://www.thevectorimpact.com/problem-solving-techniques/">https://www.thevectorimpact.com/problem-solving-techniques/</a>	M5
6	<a href="http://pfister.ee.duke.edu">http://pfister.ee.duke.edu</a>	<a href="http://pfister.ee.duke.edu/courses/ece586/notes_ch1">http://pfister.ee.duke.edu/courses/ece586/notes_ch1</a>	M6

**F.E./F.T. Semester – I**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E./B.Tech. (All Branches)								F.E./F.T. (SEM: I/II)			
Course Name: Activity Based Learning I (Society Outreach)								Course Code: HME- ABL101			
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)						
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation						
Hours Per Week					Theory (00)			Presentation (50)	Report (25)	Total	
Theory	Tutorial	Integrated Theory and Practice	Contact Hours	Credits	ISE	IE	ESE			75	
-	-	2	2	1	-	-	-	50	25		
ISE: In-Semester Examination - NA IE: Innovative Examination - NA ESE: End Semester Examination - NA The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)											

**Course Objective:** The Course intends to understand the importance of physical and mental fitness by participating in activities related to self-development and community building.

**Course Outcomes:** Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Demonstrate yogic exercises such as basic kriyas and asanas with ease	L1, L2, L3
2	Demonstrate yogic exercises such as pranayama and mudras for well being	L1, L2, L3
3	Understand the socio-economic conditions of community in which they work. Identify the needs and problems of the community and involve them in day to day problem-solving	L1, L2
4	Develop competence required for group-living and sharing of responsibilities. Acquire leadership qualities and democratic attitudes.	L1, L2, L3
5	Develop capacity to meet health related emergencies and natural disasters and practice national integration and social harmony	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 30):**

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Orientation:</b> <ul style="list-style-type: none"> <li>Discussions on Healthy Diet plan</li> <li>Impact of Daily routine on Health</li> </ul>	06	L1, L2, L3
	<b>Introduction about physical fitness:</b> <ul style="list-style-type: none"> <li>Introduction to Yoga, Benefits of yoga, Jogging and running, Introduction to different Suksham asana, cyclic asanas and different mudras</li> </ul>		
2	<b>Basic asanas:</b> Sitting postures, Padmaasan, Bhadrasan, Paschimottanasan, Vakrasan, Vajrasan, Kurmasan etc. Demonstration and Practice session	05	L1, L2, L3
3	<b>Introduction to basic asanas (Standing, Reclining and Sleeping postures):</b> Taadasan, Trikonasana, Vraishasan Shalabhasan, Bhujangasan, Dhanurasan Shavaasaan, Supta Vajrasana etc. Surya Namaskar and its benefits. Demonstration and Practice session	05	L1, L2, L3
4	<b>Introduction of society outreach, Orientation related to HEALTH domain,</b> Group discussion on Health Domain, Discussion on activities, Group formation (6 Groups consisting of 5 students each).	04	L1
	<b>Poster/Slogan:</b> Selection of topic, Placards, Poster (A3 size), Poster/Placards Presentation/Street play on awareness about Health domain.		
5	<b>Survey:</b> Questionnaire preparation, Community interaction, awareness about Health domain, Data collection.	06	L1, L2, L3
	<b>Impact:</b> Use of technology in Compilation of collected data, Analysis of data, Solution of their identified health related problems, Predicted Outcomes.		
6	<b>Presentation:</b> Presentation based on activities performed under ABL -I	04	L1, L2, L3
	Demonstration		



### **Books and References:**

SN	Title	Authors	Publisher	Edition	Year
1	Light on Yoga	B. K. S. Iyengar	Allen & Unwin	-	-
2	Yoga for Everyone: A Step-by-Step Illustrated Guide to Iyengar Yoga	B.K.S. Iyengar	Dorling Kindersley	-	2018
3	Social Work The Basics	Mark Doel	Routledge Taylor & Francis Group	-	-
4	Handbook of Health Social Work	Sarah Gehlert & Teri Browne	John Wiley & Sons	2nd Edition	-
5	101 Careers in Social Work, Second Edition	Dr. Jessica A. Ritter, BSW, MSSW	Springer Publishing Company	-	-
6	National Service Scheme in India	M. B. Dilshad	Trust Publications	-	2001

### **Online References:**

Sr. No.	Website Name	URL	Module covered
1	Coursera	<a href="https://www.coursera.org/lecture/engineering-health-yoga-physiology/welcome-and-introductions-b4dTww">https://www.coursera.org/lecture/engineering-health-yoga-physiology/welcome-and-introductions-b4dTww</a>	M1-M3
2	Coursera	<a href="https://www.coursera.org/lecture/engineering-health-yoga-physiology/yoga-and-nervous-system-health-aFD8h">https://www.coursera.org/lecture/engineering-health-yoga-physiology/yoga-and-nervous-system-health-aFD8h</a>	M1-M3
3	Pinterest	<a href="https://www.pinterest.ca/doyogawithme/">https://www.pinterest.ca/doyogawithme/</a>	M1-M3
4	NCBI	<a href="https://www.ncbi.nlm.nih.gov/books/NBK222137/">https://www.ncbi.nlm.nih.gov/books/NBK222137/</a>	M4-M6
5	Study.Com	<a href="https://study.com/academy/lesson/health-services-definition-types-providers.html">https://study.com/academy/lesson/health-services-definition-types-providers.html</a>	M4-M6

# F.E. / F. T. SEM-II

**F.E./F.T. Semester – II**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E./B.Tech. (All Branches)					F.E./F.T. (SEM: I/II)				
Course Name: Mathematics-II					Course Code: BSC104				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (00)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW
3	1	-	4	4	20	20	60	-	25
<b>ISE: In-Semester Examination - Paper Duration – 1 Hour</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
<b>Prerequisite:</b> 10+2 level Mathematics									

**Course Objective:** This course intends to introduce some basic mathematical tools and techniques which emphasize the development of rigorous logical thinking and analytical skills, critical thinking, Modeling – problem solving and effective uses of technology.

**Course Outcomes:** Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	Form and solve ordinary differential equation in mathematical modelling.	L1, L2, L3
2	Evaluate second and higher order linear differential equation through various methods.	L1, L2, L3
3	Apply rank theory to find eigen values and vectors.	L1, L2, L3
4	Apply the concept of double integration to evaluate area, mass and density problems.	L1
5	Apply the concept of triple integration to evaluate volume.	L1, L2, L3
6	Evaluate real integral through complex integration.	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 45):**

Module No.	Topics	Hrs.	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	<b>Mathematical Modelling &amp; First order ordinary differential equations</b>	7	L1, L2, L3
	Exact and reducible to exact differential equation, Linear differential equation, Bernoulli's differential equation, Exponential decay model, Heating problem (Newton's law of cooling), RC & RL circuit model (Self-Study: Mixing problem)		
2	<b>Higher order linear differential equations</b>	7	L1, L2, L3
	Higher order linear differential equations with constant coefficients, method of variation of parameters for second order, Cauchy-Euler and Legendre's linear differential equation, Model of Free Oscillations (Self-Study: Bessel functions of the first kind, Power series solutions)		
3	<b>Matrices II</b>	6	L1, L2, L3
	Eigenvalues, eigenvectors, Caley Hamilton theorem, Diagonalization of matrix, Gram-Schmidt orthogonalization (Self-Study: Orthogonal transformation)		
4	<b>Multivariable Calculus I (Double Integration)</b>	8	L1
	Multiple Integration: Double integrals (Cartesian & Polar), Change of order of integration (Fubini's theorem without proof), Change to polar coordinates Applications: Area, Mass of a lamina (Self-Study: Center of mass and Gravity (constant and variable densities))		
5	<b>Multivariable Calculus II (Triple Integration)</b>	9	L1, L2, L3
	Triple integrals (Cartesian & Polar), Orthogonal curvilinear coordinates, <b>Application:</b> Volume on cartesian, spherical and cylindrical polar coordinates, Vector line integrals, Vector surface integrals (Self-Study: Scalar line integrals, Scalar surface integrals)		
6	<b>Complex Variable – Integration</b>	8	L1, L2, L3

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Taylor's series, Zeros of analytic functions, Singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof) (Self-Study: Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour)	
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**Books and References:**

SN	Title	Authors	Publisher	Edition	Year
1	Calculus and Analytic geometry	G.B. Thomas and R.L. Finney	Pearson	9th Edition	2002
2	Advanced Engineering Mathematics	Erwin kreyszig	John Wiley & Sons	9th Edition	2006
3	Elementary Differential Equations and Boundary Value Problems	W. E. Boyce and R. C. DiPrima	Wiley India	9th Edition	2009
4	Differential Equations	S. L. Ross	Wiley India	3rd Edition	1984
5	Higher Engineering Mathematics	B.S. Grewal	Khanna Publishers	36th Edition	2010
6	A text book of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications	10th Edition	2008
7	Complex Variables and Applications	J. W. Brown and R. V. Churchill	Mc-Graw Hill	7th Edition	2004
8	An Introduction to Ordinary Differential Equations	E. A. Coddington	Prentice Hall India	3rd Edition	1995

**Online References:**

Sr. No	Website Name	URL	Module Covered
1.	Openstax	<a href="https://openstax.org/">https://openstax.org/</a>	M1-M6
2	Lumanlearning .com	<a href="https://courses.lumanlearning.com">https://courses.lumanlearning.com</a>	M1-M6
3	Engineering Mathematics Tutorial - GeeksforGeeks	<a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a>	M1-M6

### F.E./F.T. Semester – II

#### Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)

B.E./B.Tech (All Branches)								F.E./ F.T (SEM: II)		
Course Name: Engineering Mechanics								Course Code: ESC104		
Teaching Scheme (Program Specific)					Examination Scheme (Formative/Summative)					
Modes of Teaching/Learning/Weightage					Modes of Continuous Assessment/Evaluation					
Hours Per Week					Theory (100)			Practical/Oral (00)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	150
3	--	2	5	4	20	20	60	25	25	
<p style="text-align: center;"><b>ISE: In-Semester Examination - Paper Duration – 1 Hour</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/ Learning Attitude (20%)</p>										
<p><b>Prerequisite:</b> Basics of Force, displacement, Velocity, acceleration &amp; related concept from Physics. Also required basics of mathematics like integration &amp; differentiation</p>										

**Course Objective:** This course aims to expound the basic fundamentals of force & its effects on static and dynamic systems and thereby provide a strong base for various engineering subjects.

**Course Outcomes:** Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	Find resultant/equilibrant of different types of coplanar force system and locate the centroid of plane lamina.	L1, L2
2	Construct free body diagram of a coplanar system and calculate the reactions for static equilibrium.	L1, L2, L3
3	Analyze problems related to friction for system containing block, wedge, ladder etc.	L1, L2, L3
4	Find resultant of different types of non-coplanar force system	L1, L2, L3
5	Analyze Projectile motion of the particle and draw motion curves. Locate instantaneous center of rotation and find linear and angular velocity for different links for rigid bodies having plane motion.	L1, L2, L3
6	Apply D'Alembert's principle, Work energy principle, Impulse momentum theorem in the problems based on Kinetics of Particles	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 45):**

Sr. No.	Topics	Lectures	Cognitive Levels of Attainment as per Bloom's Taxonomy
01	<b>System of Coplanar Forces:</b> Concept of Rigid and Deformed Bodies, Fundamental concepts and principles of mechanics: Newtonian Mechanics, Resolution of force, Moment of force about a point, Couple, Varignon's Theorem. Resultant of Coplanar system of forces, Force couple system. <b>Centroid</b> of composite plane lamina.	08	L1, L2
02	<b>Equilibrium of System of Coplanar Forces:</b> Free Body Diagram, Condition of Equilibrium. Equilibrium of system consisting of several forces. <b>Types of support:</b> Types of loads, Types of Beams, Determination of reactions at supports for various types of loads on beams. (Excluding problems on internal hinges) <b>Stresses &amp; Strains:</b> Tensile and Compressive Stresses, Strains, Modulus of elasticity, Bulk Modulus, Relation between elastic constants, Lateral strain, Poisson's ratio, Problems based on stresses and strains.	08	L1, L2, L3
03	<b>Friction:</b> Introduction to Laws of friction, angle of friction, angle of repose, cone of friction. Equilibrium of bodies on inclined plane, Application to problems involving blocks, wedges, ladders.	05	L1, L2, L3
04	<b>Forces in space:</b> Resultant & Equilibrium of concurrent force system, parallel force system and non-concurrent non-parallel force system in 3D space	06	L1, L2, L3



<b>05</b>	<b>Kinematics of a Particle:</b> Introduction to different types of motion, Projectile motion. <b>Kinematics of a Rigid Body:</b> Introduction to general plane motion, Instantaneous center of rotation for the mechanisms up to three links only.	09	L1, L2, L3
<b>06</b>	<b>Kinetics of a Particle:</b> <b>Force and Acceleration:</b> Newton's second law of motion, D'Alembert's Principle, Equations of dynamic equilibrium for rectilinear and curvilinear motion, <b>Work and Energy:</b> Principle of work and energy, Law of conservation of energy. <b>Impulse and Momentum:</b> Principle of linear impulse and momentum and its application, principle of conservation of momentum	09	L1, L2, L3

**Suggested List of Practical/ Experiments:**

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	<b>Basic Experiments</b>	Polygon law of coplanar forces using Universal Force Table.	3	L1, L2, L3
2		Law of Moments (Varignon's Theorem) using Bell Crank Lever	3	L1, L2, L3
3		Equilibrium of Simply Supported Beams	3	L1, L2, L3
4		Inclined plane (to determine coefficient of friction).	3	L1, L2, L3
5		Compound pendulum.	3	L1, L2, L3
6		Collision of Elastic Bodies using Law of conservation of momentum	3	L1, L2, L3
7	<b>Design</b>	Design of Flywheel	3	L1, L2, L3

8	<b>Experiments</b>	Finding Equilibrant using Universal Force Table	3	L1, L2, L3
9		Finding centroid of a composite plane area	3	L1, L2, L3
10	<b>Group Activities</b>	Mini Project	3	L1, L2, L3
<b>Total</b>			<b>30</b>	

### **Books and References:**

SN	Title	Authors	Publisher	Edition	Year
1	Engineering Mechanics	Irving H. Shames	Prentice Hall	4th Edition,	2006
2	Vector Mechanics for Engineers, Vol I - Statics, Vol II, – Dynamics	F. P. Beer and E. R. Johnston	McGraw Hill.	9th Edition,	2011
3	Engineering Mechanics	R. C. Hibbler	Pearson Press.	4th Edition	2006
4	A Text Book of Engineering Mechanics	Bansal R.K	Laxmi Publications.	6th Edition	2018

### **Online References:**

Sr. No.	Website Name	URL	Module
1	MIT	<a href="http://web.mit.edu/4.441/1_lectures/1_lecture7/1_lecture7.html">http://web.mit.edu/4.441/1_lectures/1_lecture7/1_lecture7.html</a>	M1 & M2
2	BRITANNICA	<a href="https://www.britannica.com/technology/tower">https://www.britannica.com/technology/tower</a>	M3 & M4
3	OCW-MIT	<a href="https://ocw.mit.edu/courses/mechanical-engineering/2-003j-dynamics-and-control-i-spring-2007/lecture-notes/lec08.pdf">https://ocw.mit.edu/courses/mechanical-engineering/2-003j-dynamics-and-control-i-spring-2007/lecture-notes/lec08.pdf</a>	M5 & M6

## F.E. Semester –II

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E./B.Tech. (All Branches)					F.E./F.T. (SEM: I/II)					
Course Name: English for Professional Communication					Course Code: HSMC 101					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment/ Evaluation					
Hours Per Week					Theory (100)		Practical/ Oral (25)	Term Work (00)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	OR	TW	
2	-	2	4	3	20	20	60	25	-	125
<p style="text-align: center;"><b>ISA: In-Semester Examination- Paper Duration – 1 Hours</b></p> <p style="text-align: center;"><b>IE: Innovative Examination</b></p> <p style="text-align: center;"><b>ESE: End Semester Examination - Paper Duration - 2 Hours</b></p> <p style="text-align: center;"><b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)</p>										
<b>Prerequisite-</b> Basic knowledge of English language, Grammar and Vocabulary										

**Course Objective:** The course will be able to develop communication skills with professional and technical writing skills.

**Course Outcomes:** Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	Produce appropriate vocabulary and correct words	L1, L2, L3
2	Communicate effectively by using structure of English language	L1, L2, L3
3	Write effective and coherent paragraphs professionally	L1, L2, L3
4	Enhance professional and technical writing skills	L1, L2, L3
5	Understand and apply the communication patterns in organization	L1, L2, L3

6	To improve speaking ability in English both in terms of fluency and comprehensibility	L1, L2, L3
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**Detailed Syllabus (Total No. of Hours: 30):**

Module No.	Topics	Hrs.	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	<b>Communication Foundation</b>	05	L1, L2, L3
	1.1 Concept and Meaning: Etymology, Definition and Process of Communication 1.2 Barriers: Linguistic, Semantic, Personal, Socio- Psychological, Physical, Environmental, Mechanical, Cross-Cultural 1.3 Methods of Communication: Verbal Communication 1.4 Methods of Communication: Non- Verbal Communication 1.5 Networks of communications: Understanding Organizational Communication		
2	<b>Word Formation</b>	05	L1, L2, L3
	2.1 Concept of Word Formation: Reduplicating; Clipping, Blending; Acronym 2.2 Conversion and Compounding 2.3 Root Words; Affixation. 2.4 Contrast of Meaning: Synonyms. Antonyms; homonyms; homophones; homographs 2.5 Standard Abbreviations and one-word substitution		
3	<b>Basic Language Skills</b>	08	L1, L2
	3.1 Listening: Types of Listening 3.2 Process of Listening; Hearing and Listening. 3.3 Exercises on Listening Skill (Video/ Audio) 3.4 Speaking: Art of Public Speaking; Activities on Speaking Skills 3.5 Reading: Concept and Methods 3.6 Types of Reading, Skimming, Scanning, Intensive Reading, Extensive Reading 3.7 Writing: Principles; Business Correspondence: Elements, 3.8 Types and Formats of Letter		

4	<b>Written Communication</b> 4.1 Types of writing (Expository, descriptive, persuasive and narrative) 4.2 Report Writing: Structure and Types 4.3 Notice Agenda and Minutes of meeting 4.4 Editing and Proofreading: Techniques for writing precisely, 4.5 Comprehension and Summarization	05	L1, L2, L3
5	<b>Professional Writing Skills</b> 5.1 Introduction to Technical Writing: Definition, Importance and Types of Technical Writing 5.2 Technical Proposal 5.3 Writing Instructions: Tips to Write Instructions; Writing User Manuals 5.4 Describing: Describing Technical Object 5.5 Writing Research Paper: Structure of Writing standard technical research paper: Exercises	05	L1, L2
6	<b>Oral Communication</b> 6.1 Intonation Pattern for effective presentation Common Everyday Situations: Conversation and Dialogues 6.2 Compeering, Hosting, Anchoring, Presentation on English language and Communication skills topics	02	L1, L2, L3

**Suggested List of Practical/ Experiments:**

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels
1	<b>Basic Experiments</b>	Introduction	2	L1, L2, L3
2		Public Speaking (Practice1)	2	L1, L2, L3
3		Public Speaking (Practice 2)	2	L1, L2, L3
4		Public Speaking (Practice 3)	2	L1, L2, L3
5		Activities based on Basic Language Skills.	2	L1, L2, L3
6		Writing	2	L1, L2, L3

7		Reading, Picture Reading	2	L1, L2, L3
8		Speaking	2	L1, L2, L3
9		Listening	2	L1, L2, L3
10		Practice Sessions in Language Lab (Consonants, Vowels, Diphthongs)	2	L1, L2, L3
11		Tests on Building Vocabulary, Conversation Starters	2	L1, L2, L3
12		Conducting meeting	2	L1, L2, L3
13		Watching Videos on Oratory	2	L1, L2, L3
14		Editing	2	L1, L2, L3
15		Proofreading	2	L1, L2, L3

**Books and References:**

Sr. No	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	Practical English Usage	Michael Swan	OUP	4th Edition	1995
2	Remedial English Grammar	F.T. Wood	Macmillan	2014 Edition	2007
3	On Writing Well	William Zinsser	Harper Resource Book	25th Anniversary Edition	2001
4	Study Writing	Liz Hamp- Lyons and Ben Heasley	Cambridge University Press	2nd Edition	2006

5	Communication Skills	Sanjay Kumar and PushpLata	OUP	1st Edition	2011
6	Exercises in Spoken English Parts. I-III	CIEFL	University Press	1997 Edition	1997

**Online References:**

Sr. No.	Website Name	URL	Modules Covered
1	Coursera	<a href="https://www.coursera.org/learn/speak-english-professionally">https://www.coursera.org/learn/speak-english-professionally</a>	M 1-M 6
2	NPTEL	<a href="https://nptel.ac.in/courses/109/106/109106129/">https://nptel.ac.in/courses/109/106/109106129/</a>	M 1-M 6
3	NPTEL	<a href="https://nptel.ac.in/courses/109/106/109106094/">https://nptel.ac.in/courses/109/106/109106094/</a>	M 1-M 6



**F.E./F.T. Semester – II**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**

B.E./B.Tech. (All Branches)							F.E./F.T. (SEM: I/II)			
Course Name: Activity Based Learning 2 (Yoga Practice & Society Outreach-II)							Course Code: HME-ABL 201			
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (00)		Presentation (50)	Report (25)	Total	
Theory	Tutorial	Activity Course (AC)	Contact Hours	Credits	IA	ESE			75	
-	-	2	2	1	-	-	50	25		
The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
Prerequisite: Social awareness										

**Course Objective:** This course intends to explain the importance of physical and mental fitness by participating in activities related to self-development and community building.

**Course Outcomes:** Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	Demonstrate yogic exercises such as basic kriyas and asanas with ease	L1, L2, L3
2	Demonstrate yogic exercises such as pranayama and mudras for well being	L1, L2, L3
3	Understand the socio-economic conditions of community in which they work. Identify the needs and problems of the community and involve them in day to day problem-solving	L1, L2
4	Develop competence required for group-living and sharing of responsibilities. Acquire leadership qualities and democratic attitudes.	L1, L2, L3
5	Develop capacity to meet emergencies and natural disasters and practice national integration and social harmony	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 30):**

Module No.	Topics	Hrs.	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	<b>Yoga in Modern Times:</b> Relevance of Yoga in Today's World, Stress management, type of Stress, Dimensions of Health: Physical, Mental, Social and Spiritual	06	L1, L2
2	<b>Breathing Awareness &amp; Yogic Breathing:</b> Pranayam and its types and Benefits of Pranayama: Kapal bharti, Anulom Vilom, Brahmri, Ujjayi, Bhastrika etc.,  Techniques and Importance of Dhyana, suitable place for Dhyana, Meditation and its types, Benefits of Meditation	05	L1, L2, L3
3	<b>Introduction to different asanas:</b> Ardhachakrasana, Padahasthasana, Parvottasana, Savasana, Matsyasana, Dhanurasana, Sarvangasana, Halasana, Pawanmuktasana, Setubandhasana, Swastikasana Cycling, Twisting, etc. Clapping Therapy	05	L1, L2, L3
4	<b>Orientation on Domain (Environment),</b> Discussion on different activities related to environment, Cleanliness drive, tree plantation activity, Group formation (6 Groups consisting of 5 students each).  <b>Poster / Slogan/ Street play</b> Selection of topic related to Environment, Placards, Poster (A3 size), Poster / Placards / Slogan Presentation,/Street play demonstration.	04	L1
5	<b>Survey</b> Questionnaire preparation, Identification of area, visit to specified area, Data collection  <b>Impact</b> Compilation of collected data, Analysis of data, Predicted Outcomes.	06	L1, L2, L3
6	<b>Project</b> Project based on environmental activities  <b>Demonstration</b>	04	L1, L2, L3

**Books and References:**

SN	Title	Authors	Publisher	Edition	Year
1	Light on Yoga	B. K. S. Iyengar	Allen & Unwin	-	-
2	Yoga for Everyone: A Step-by-Step Illustrated Guide to Iyengar Yoga	B.K.S. Iyengar	Dorling Kindersley	-	2018
3	Social Work the Basics	Mark Doel	Routledge Taylor & Francis Group	-	-
4	Handbook of Health Social Work	Sarah Gehlert & Teri Browne	John Wiley & Sons	2nd Edition	-
5	101 Careers in Social Work, Second Edition	Dr. Jessica A. Ritter, BSW, MSSW	Springer Publishing Company	-	-
6	National Service Scheme in India	M. B. Dilshad	Trust Publications	-	2001

**Online References:**

Sr. No.	Website Name	URL	Module covered
1	Coursera	<a href="https://www.coursera.org/lecture/engineering-health-yoga-physiology/welcome-and-introductions-b4dTW">https://www.coursera.org/lecture/engineering-health-yoga-physiology/welcome-and-introductions-b4dTW</a>	M1-M3
2	Coursera	<a href="https://www.coursera.org/lecture/engineering-health-yoga-physiology/yoga-and-nervous-system-health-aFD8h">https://www.coursera.org/lecture/engineering-health-yoga-physiology/yoga-and-nervous-system-health-aFD8h</a>	M1-M3
3	Pinterest	<a href="https://www.pinterest.ca/doyogawithme/">https://www.pinterest.ca/doyogawithme/</a>	M1-M3
4	Youtube	<a href="https://youtu.be/lbyHCkNEOKo">https://youtu.be/lbyHCkNEOKo</a>	M1-M3
5	You tube	<a href="https://youtu.be/v7AYKMP6rOE">https://youtu.be/v7AYKMP6rOE</a>	M1-M3
6	You tube	<a href="https://youtu.be/gEk6JLJNg0U">https://youtu.be/gEk6JLJNg0U</a>	M4-M6
7	Wikipedia	<a href="https://en.m.wikipedia.org/wiki/Environmental_protection">https://en.m.wikipedia.org/wiki/Environmental_protection</a>	M4-M6
9	DCCAE	<a href="https://www.dccae.gov.ie/en-ie/environment/topics/environmental-protection-and-awareness/Pages/default.aspx">https://www.dccae.gov.ie/en-ie/environment/topics/environmental-protection-and-awareness/Pages/default.aspx</a>	M4-M6