

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

ICET DEPARTMENT OF ENGINEERING SCIENCES AND HUMANITIES (ES&H) Choice Based Credit Grading System (CBCGS) Under TCET Autonomy

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./I	F.T. (SEM: I/II)	1		
	Course Name: Physics							Course	e Code: BSC10)1
Teaching Scheme (Program Specific)				Ex	amin	ation S	Scheme (Forn	native/ Summa	ative)	
Modes	of Teachin	ng / Learni	ng / Weig	htage	M	odes (of Con	tinuous Asses	sment / Evalu	ation
	Hou	irs Per Wee	ek]	Theor	y	Practical/	Term	Total
						(100))	Oral (25)	Work (25)	
Theory	Tutorial	Practical	Contact	Credits	ISE	IE	ESE	PR	TW	
			Hours							
3	1	2	6	5	20	20	60	25	25	150
	<u> </u>	ISE: In-S	Semester I	Examinat	ion - F	' aper	Durat	ion – 1 Hour		-
			IE:	Innovativ	ve Exa	mina	tion			
	ESE: End Semester Examination - Paper Duration - 2 Hours									
The weig	ghtage of r	narks for c	ontinuous	s evaluatio	on of T	Гerm	work/	Report: Form	native (40%), 7	Timely
	cor	npletion of	practical (40%) and	Attend	lance	/Learni	ing Attitude (2	20%)	

Prerequisite: 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.

<u>Course Outcomes:</u> Upon completion of the course students will be able to:

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



6	Derive all 4 Maxwell's equations of electromagnetic waves in free	L1, L2, L3.
	space as well as in vacuum.	

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

Module			Cognitive levels of
No	Topics	Hrs.	attainment as per
INU.			Bloom's Taxonomy
1.0	Semiconductors		
	Intrinsic and extrinsic semiconductors, Fermi Dirac	7	
	distribution function, Dependence of Fermi level on carrier-	/	L1, L2, L3.
	concentration, and temperature (equilibrium carrier		
	statistics), Carrier generation and recombination, Carrier		
	transport: diffusion and drift, Hall Effect and its applications		
2.0	Electronic Materials and Light Semiconductor		
	Interaction	o	
	Free electron theory, Energy band diagrams, Kronig-Penny	o	L1, L2, L3.
	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.		

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3.0	Quantum Mechanics		
	de-Broglie hypothesis Heisenberg's uncertainty principle	7	L1, L2, L3.
	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		
	Porticle in how and Detential well Simple Hermonia		
	Oscillator		
4.0		0	
4.0	wave optics	9	L1, L2, L3.
	Interference of light by amplitude splitting, 1 hin film, wedge		
	shaped film, Newton's rings, Interference applications.		
	Freshel and Fraunhofer diffraction, Diffraction gratings and		
	their resolving power.		
5.0	Lasers and Superconductivity	7	L1, L2, L3
	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.		

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6.0	Faraday's law and Maxwell's Equations of	7	L1, L2, L3
	Electromagnetic Waves		
	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.		

Suggested List of Practical/ Experiments:

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

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

Books and References:

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

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5	Quantum Physics	Robert Eisberg&	Wiley	2 nd	2006
	of Atoms,	Robert Resnick	Publications.		
	Molecules and				
	Solids				
6	Semiconductor	J. Singh	McGraw-Hill		1995
	Optoelectronics: Physics				
	and Technology				
7	Semiconductor Devices:	S. M. Sze	Wiley	Student	2008
	Physics and Technology.			Edition.	
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	David Griffiths	Mac-Graw Hill	3 rd	2011
	Electrodynamics				
11	Engineering Mechanics	MK Harbola	Cengage.	2 nd	2013
L					

Sr. No	Website Name	URL	Modules
			Covered
1	DECORThe Database	https://decor.cst.temple.edu/	M1
	of Educational		
	Crystallographic		
2	NPTEL	Online course: "Semiconductor Optoelectronics" by	M2
		M R Shenoy on NPTEL	

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

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F.E.	Semester	-I
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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 C	Code: BSC103			
Teaching Scheme (Program Specific)				Ε	xami	nation	Scheme (Format	tive/ Summat	ive)	
Modes of Teaching / Learning / Weightage				ghtage	N	lodes	s of Co	ntinuous Assessn	nent / Evaluat	tion
Hours Per Week]	Theor (100	у)	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	125
		ISE: Iı	n-Semeste	r Examin	ation	- Pap	er Du	ration – 1 Hour		
	IE: Innovative Examination ESE: End Semester Examination - Paper Duration - 2 Hours									
The w	The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
Prerequ	isite: 10+2	2 level Math	nematics							

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.

<u>Course Outcomes:</u> 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	Topics	Hrs.	Cognitive levels of
No.			attainment as per
			Bloom's Taxonomy
1	Calculus-I		
	(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	9	L1, L2
2	Multivariable Calculus (Differentiation)		
	(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)	11	L1, L2, L3
3	Complex Number		
	(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	7	L1, L2, L3
4	Matrices I		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))	12	

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5	Calculus-II		
	(Pre-requisite: Definite Integral)		
	Improper Integrals (Review), Beta and		
	Gamma functions and their properties;		111213
	Volumes of revolutions using single	10	L1, L2, L3
	integral		
	(Self-Study: Application of single integral		
	in the evaluation of Surface area)		
6	Complex Variable – Differentiation		
	(Pre-requisite: Complex Numbers)		
	Differentiation, Cauchy-Riemann equations		
	(in cartesian and polar form), analytic		
	functions, harmonic functions, Milne-	11	111213
	Thompson method, finding harmonic	11	$\mathbf{L}_{1}, \mathbf{L}_{2}, \mathbf{L}_{3}$
	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	G.B. Thomas	Pearson	9th Edition	2002
	Analytic geometry	and R.L. Finney			
2	Advanced	Erwin Kreyszig	John Wiley &	9th Edition	2006
	Engineering		Sons		
	Mathematics				
3	Engineering	Veerarajan T	Tata McGraw-	3rd Edition	2008
	Mathematics for		Hill, New Delhi		
	first year				
4	Higher	Ramana B.V	Tata McGraw	11th	2010
	Engineering		Hill, New Delhi	Edition	
	Mathematics				
5	Higher	B.S. Grewal	Khanna	36th	2010
	Engineering		Publishers	Edition	
	Mathematics				
6	A text book of	N.P. Bali and	Laxmi	9th Edition	2008
	Engineering	Manish Goyal	Publications		
	Mathematics				



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

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: Engineering Graphics & Design						Course C	Code: ESC102			
Те	eaching Sc	heme (Pro	gram Specif	ic)		Exan	nination	Scheme (Formativ	ve/Summative)	
Mo	des of Tea	ching/Lear	ning/Weigh	tage		Mod	es of Cor	ntinuous Assessme	nt/Evaluation	
Hours Per Week					Theor (100)	у)	Practical/ Oral(25)	Term Work (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	
2	-	4	6	4	20	20	60	25	25	150
		ISE	: In-Semeste	er Exami	nation	- Paper	r Duratio	on – 1.5 Hours		
				IE: Inno	vative	Exami	nation			
		ESE	: End Seme	ester Exar	ninatio	n - Paj	per Dura	tion - 3 Hours		
The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion										
	of practical (40%) and Attendance/Learning Attitude (20%)									
Prerequ	isite: Basi	c geometric	al terminolo	gy and sin	nple co	nstructi	onal pro	cedures of plane, so	lids and engine	eering

<u>Course Objective</u>: 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 com	pletion of th	e course students	will be able to:
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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, Involutes 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	L1, L2, L3
	cutting planes and also learn the method to develop the lateral	
	surfaces of sectioned solids	
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):

Modulo			Cognitive levels of
No	Topics	Lectures	attainment as per
190.			Bloom's Taxonomy
01	Introduction to Engineering Graphics &	05	L1, L2, L3
	Design		
	Principles of Engineering Graphics and their		
	significance, usage of Drawing instruments,		
	lettering, Dimensioning, Ellipse, Parabola,		
	Cycloid and Involute; Scales–Plain, Diagonal		
	and Vernier Scales		
	*Computer Graphics		
	Engineering Graphics Software; Listing the		
	computer technologies that impact on		
	graphical communication, Demonstrating		
	[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.	0.7	
02	Projection of Points, Lines and Planes	05	L1, L2, L3
	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)		

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03	# Orthographic Projections	04	L1, L2, L3
	Principles of Orthographic Projections- Conventions- Draw the orthographic views of geometrical solids, objects from industry and dwellings. (1 st angle method of projection)		
	# Sectional Orthographic Projections		
	Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (Only Full Section)		
	*Annotations, layering & other functions		
	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		
04	Projections of Regular Solids	06	L1, L2, L3
	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.		
05	Sections and Sectional Views of Right Angular Solids	05	L1, L2, L3
	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)		

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06	# Isometric Projections	05	L1, L2, L3	1
	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.			
	*Customization & CAD Drawing			
	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			
	*Introduction to 3D drawing in Graphics software			
	*Demonstration of a simple team design project			
	Creation of engineering models and their presentation in standard 2D blue print form			

@ - to be covered only as a part of Term-Work

* - to be covered during Practical

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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	Basic	Engineering Curves	02	L1, L2, L3
2	Experiments	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	Basics of CAD Software	04	L1, L2		
11	Experiments	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	Charotar Publishing	2014
		V.M. & Ingle P.R	House	
2	Engineering Drawing	Shah, M.B. & Rana	Pearson education.	2008
	and Computer Graphics	B.C		
3	Engineering Graphics	Agrawal B. &	TMH Publication	2012
		Agrawal C. M		
4	Text book on	Narayana, K.L. & P	Sci-tech Publishers	
	Engineering Drawing	Kannaiah		2008

Sr. No.	Website Name	URL	Module covered
1	Bharatskills.Gov	https://www.google.com/url?sa=t&source=web&rct=j&url=https:/	M1-M6
		/bharatskills.gov.in/pdf/E_books/Engineering_Drawing_1st_Sem_	
		Final.pdf&ved=2ahUKEwiDu7bWyIPsAhXHyzgGHcszBSsQFjA	
		AegQIAhAB&usg=AOvVaw2O9fIhYnp73593X8_Q8mW2	
2	IIT-D	https://www.google.com/url?sa=t&source=web&rct=j&url=http://	M1-M6
		web.iitd.ac.in/~achawla/public_html/201/lectures/sp46.pdf&ved=2	
		ahUKEwiA1vzfyYPsAhX5H7cAHec1DxUQFjAMegQIBBAB&u	
		sg=AOvVaw2wKQuj2zCOK9jNoREpOoAl	
3	NCTM	https://www.nctm.org/Classroom-	M6
		Resources/Illuminations/Interactives/Isometric-Drawing-Tool/	



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. (S	SEM: I/II)		
Course Name: Chemistry								Course Code: BSC102		
	Conta	act Hours I	Per Week:	: 06				Credi	ts: 05	
Teachin	g Scheme	(Program S	Specific)		Exa	mina	tion So	cheme (Formative	e/ Summ	ative)
Modes of T	[eaching /	Learning /	Weightag	ge	Mo	des of	f Conti	nuous Assessmen	nt / Evalu	ation
	Hours P	er Week]	Theor	·y	Practical/Oral	Term	Total
						(100)	(25)	Work	
									(25)	
Theory	Tutorial	Practical	Contact	Credits	ISE	IE	ESE	PR	TW	
			Hours							
3	1	2	6	5	20	20	60	25	25	150
	ISF	: In-Semes	ster Exam	ination -	Paper	Dur	ation –	1 Hour		
			IE: Inno	vative Ex	amina	tion				
	ESE	: End Seme	ester Exar	nination ·	· Pape	r Du	ration	- 2 Hours		
The weightag	e of marks	s for contin	uous eval	uation of	Term	worl	⊾/ Repo	ort: Formative (40	9%), Time	ely
	completion of practical (40%) and Attendance/Learning Attitude (20%)									
Prerequisite: Inte	rmediate of	f Science le	vel knowl	edge of A	tomic	Struc	ture, ch	emical Bonding,		
Thermodynamics a	and Electro	chemistry								
RBT: Revised Blo	om's Taxo	nomy								

Course Objectives:

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



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Course Outcomes:

Sr.	Course Outcomes	RBT Levels
<u>No.</u> 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	Topics	Hrs.	RBT Levels
No.			
1.0	Water Treatment & Technology:		Remember
	Introduction – Hard water and Soft water. Hardness of water –		(R),
	types – expression of hardness (numerical problems).	9	Understand
	Estimation of hardness of water by complex metric method		(C), Apply (A)
	(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).		

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2.0	Instrumental Methods of Analysis	5	Remember	
	Introduction to Chromatography, Types of Chromatography		(R), Understand	
	(Adsorption and partition chromatography), Thin Layer		(U),	
	Chromatography (Theory, Principle, technique and applications),		Apply(A)	
	Gas Chromatography - (Introduction, theory, instrumentation.,			
	working) High Performance Liquid Chromatography, -			
	introduction, theory, instrumentation. Interpretation of			
	Gas/HPLC Chromatogram and TLC plate of various samples.			
3.0	A. Green Chemistry	7	Remember	
	Introduction to Green Chemistry, The 12 principles of Green		(R),	
	Chemistry, Prevention of waste, Atom Economy, Less		(II)	
	hazardous Chemical synthesis, Safer solvent and Auxiliary,		Apply(A)	
	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. Catalysis			
	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			

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4.0	Electrochemistry and its Application	10	Remember
	A. Electrochemistry		(R), Understand
	Introduction, Concept of electrode potential, Concept of		(U), Apply(A)
	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.		
	B. Corrosion:		
	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)		
5.0	Spectroscopic techniques and applications	7	
	Electromagnetic radiation, electromagnetic spectrum,		Remember
	Interaction of electromagnetic radiation with matter, Beer-		(R), Understand
	Lambert's law (mathematical expression and derivation,		(U)
	Numerical expected), UV Visible Spectrophotometer:		Apply(A)
	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.		

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6.0	Computational Chemistry	7	Remember
	Introduction to cheminformatics History and Evolution of		(K), Understand
	Cheminformatics, Molecular Modelling and Structure		(U),
	elucidation, Introduction to Mervin Sketch, chemaxon,		Apply(A)
	Chembank: 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:

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



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	To determine the turbidity of given		Understand (U)
8	unknown water sample.	2	Apply(A)
9	Synthesis of a Meta dinitrobenzene (drug	2	Understand (U)
	intermediate).		Apply(A) and
			Create(C)
10	To determine λ max and Molar extinction	2	Understand (U)
	coefficient of given solution of KMnO4		Apply(A)
	using Colorimeter.		
11	To determine λ max and Molar extinction	2	Understand (U)
	coefficient of given solution of CuSO4 -		Apply(A)
	NH ₃ complex using Colorimeter.		
12	Removal of Hardness of water by using	2	Understand (U)
	Ion Exchange Colum		Apply(A)
13	Inorganic Preparation: Preparation of	2	Understand (U)
	Tetraamine coppe (II) Sulphate		Apply(A)
14	Determination of Percentage of Iron in	2	Apply(A)
	Plain Carbon Steel.		
15	Demonstration of Column	2	Understand (U)
	Chromatography		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	Understand (U)	
	properties of water to be used for various	Apply (A)	
	industrial and domestic uses.		
PO-2	Measure molecular/system properties such	Understand (U)	
	as surface tension, viscosity, conductance of	Apply (A)	
	solutions, redox potentials, chloride content of		
	water, etc.		
PO-3	Synthesize a small drug molecule using	Understand (U)	
	principle of Green Chemistry	Apply (A) and Create(C)	
PO-4	Estimate the some important properties of	Understand (U)	
	lubricating oil to understand its suitability for	Apply (A)	
	industrial application		



PO-5	Use the Spectrophotometric/Colorimetric device	Understand (U)
	for measurement of concentration of unknown	Apply (A)
	solution	

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^{nd}
3	Physical Chemistry	Atkins	8 th
4	Principle of Instrumental Analysis	Skoog, Holler Gauch	7^{th}
5	Vogels Textbook of quantitative chemical Analysis	Vogel	8 th
6	Organic Chemistry	Morrison Boyd	7^{th}
7	QSAR and Molecular Modelling	S.P Gupta	-

Sr No	r No Website Name URI		Modules
51.140	website Name	UKL	Covered
1.	Free Open Source simulator	http://www.hplcsimulator.org/	M-2
	Project		
2.	Thin Layer Chromatography	https://elearning.cpp.edu/learning-objects/organic-	M-2
	Simulation	chemistry/tlc/?page=simulation.html	
3.	Gas Chromatography:	https://www.gc-sos.com/download	M-2
	Simulation & Optimization		
	software		
4.	IIT B Virtual Lab (Column	http://vlab.amrita.edu/?sub=2&brch=191∼=34	M-2
	Chromatography)	1&cnt=1	
5.	Simulation of UV-Visible	https://terpconnect.umd.edu/~toh/models/UVVis.h	M-5
	Photometer	tml	
6.	IIT B Virtual Lab (CFSE	http://vlab.amrita.edu/?sub=2&brch=193∼=61	M-1
	Calculation)	0&cnt=1	
7.	IIT B Virtual Lab	http://vlab.amrita.edu/?sub=2&brch=193∼=15	M-1
	(Hardness of Water)	48&cnt=1	
8.	IIT B Virtual Lab (UV-	http://vlab.amrita.edu/?sub=2&brch=190∼=33	M-5

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	Visible Spectroscopy)	8&cnt=1	
9.	IIT B Virtual Lab (EMF	http://vlab.amrita.edu/?sub=2&brch=190∼=36	M-4
	Measurement)		
10.	IIT B Virtual Lab (IR	http://ccnsb06-	M-5
	Spectroscopy)	iiith.vlabs.ac.in/Experiments.html?domain=%20C	
		hemical%20Sciences	
11	Mervin Sketch	https://chemaxon.com/products/marvin	M-6
12	Chembank	https://data.broadinstitute.org/chembank/assay/ind	M-6
		ex.html	



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					n Scheme (Formative/ Summative)					
Μ	odes of Teac	hing / Learniı	ng / Weighta	ige		Mo	des of C	ontinuous Assessn	nent / Evaluation	l
Hours Per Week				1	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	150
		ISE:	In-Semester	r Examinati	on - P	aper I	Duration	n – 1 Hour		
			Ι	E: Innovati	ve Exa	minat	ion			
		ESE:]	End Semeste	er Examinat	tion - l	Paper	Duratio	on – 2 Hours		
Th	The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely									
		completion	of practical	(40%) and	Attend	lance	/Learniı	ng Attitude (20%)	
Prerequis	ite: 10+2 leve	el knowledge o	of basic physi	ics and math	ematic	3				

<u>Course Objective</u>: 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.

<u>Course Outcomes:</u> 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



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

Madula			Cognitive levels of
No.	Topics	Hrs	attainment as per
		0.0	Bloom's Taxonomy
1	D.C. CIRCUITS: Electrical circuit elements (P , L , and C), voltage and	09	L1, L2, L3
	eurrent sources. Kirchoff current and voltage laws. Mash		
	and Nodal analysis Super Mesh and Super Node		
	Supermosition Theorem's and Norten's Theorems		
	Introduction to Multicim software for DC circuit		
	Introduction to Multisini software for DC circuit		
2	A.C. CIRCUITS:	09	L1, L2, L3
	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		
3	POWER GENERATION:	04	L1, L2
	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.		
4	TRANSFORMERS:	07	L1, L2, L3
	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.		

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5	 ELECTRICAL MACHINES: 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
6	POWER CONVERTERS: 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.	Basic	Basic safety precautions.	2	L1, L2, L3
	Experiments	Introduction and use of measuring		
		instruments – voltmeter, ammeter,		
		multi-meter, oscilloscope, resistors,		
		capacitors and inductors		
2.		Verification of the concept of Mesh		
		& Nodal Analysis.		
3.		Study of resonance in series R-L-C	2	L1, L2, L3
		circuits.		
4.		Three-phase transformers: Voltage	2	L1, L2, L3
		relationships in star and delta		
		connections. Cumulative three-phase		
		power in balanced three-phase		
		circuits.		
5.	Design based	Verification of Thevenin's theorem	2	L1, L2, L3
	Experiments	& Maximum Power Transfer		
		Theorem.		
6.		Verification of Superposition		
		theorem		



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

Suggested Text/Reference Books:

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



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



DEPARTMENT OF ENGINEERING SCIENCES AND HUMANITIES (ES&H) Choice Based Credit Grading System (CBCGS) Under TCET Autonomy

F.E./F.T. Semester –I/II

TCET



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 **Examination Scheme (Formative/ Summative) Teaching Scheme (Program Specific)** Modes of Teaching / Learning / Weightage Modes of Continuous Assessment / Evaluation **Hours Per Week** Practical/Oral **Term Work** Total Theory (100)(25)(25)Contact Theory Tutorial Practical Credits ISE IE ESE PR TW Hours 4 20 20 60 25 3 2 25 --5 150 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:
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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	Topics	Hrs	Cognitive levels of		
No.			attainment as per		
1		0.4	Bloom's Taxonomy		
1	Introduction to Programming, Algorithm	04	L1, L2		
	and Flowchart				
	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	0.6			
2	Fundamentals of C-Programming	06	L1, L2, L3		
	Structure of C program				
	Character Set, Identifiers and keywords, Data				
	types, Constants, Variables.				
	Operators -Arithmetic, Relational, Logical,				
	Assignment, Compound assignment,				
	Bitwise, Unary and Conditional. Operator				
	precedence				
	Data Input and Output –printi(), scani(),				
2	Conditional Branching & Loops	10			
3	Pronching/Selection if statement if also	10	L1, L2, L3		
	Statement Multiway decision Switch				
	statement (Menu Driven Programs)				
	Iterative/Looping – while do-while for				
	Jump Statements-				
	Continue statement, Break statement, goto				
	statement, return statement				
	Calculation of time complexity of the				
4	Functions and Parameters	07			
+	Function -Introduction to Function Definition	07	L1, L2, L3, L4		
	& Declaration of Function accessing a				
	Function, call by value, Recursion Vs.				
	Iteration				
	Library functions: math.h, ctype.h,time.h				
	Storage Classes – Auto, Extern, Static,				
	Register	0.0			
5	Arrays and Strings	09	L1, L2, L3		
	Array-Concepts, Declaration, Definition,				
	Accessing array element, One-dimensional and				
	String Basics of String Library Functions				
	Operations on String without using Library				
	functions from string h				

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

List of Practical/ Experiments:

Practical No.	Type of Experiment	Practical/Experiment Topic	Hrs	Cognitive levels of attainment as pr Bloom's Taxonomy
		A) Design an algorithm and Draw a Flowchart to perform arithmetic operations.	04	L1, L2, L3
1		 B) Design an algorithm and Draw a Flowchart to calculate gross salary of an employee [using formula: gross_sal = basic_sal+hra+da]. 		
		A) Design an algorithm, Draw a Flowchart and implement a C program to find maximum value using conditional operator	02	L1, L2, L3
2	Basic Experiments	 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. 		
3		 A) Write a Program to generate the result (display grade) if subject marks are given by user. 	02	L1, L2, L3
		b) while 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.		
	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

TCET DEPARTMENT OF ENGINEERING SCIENCES AND HUMANITIES (ES&H) Choice Based Credit Grading System (CBCGS) Under TCET Autonomy	tcet
	Estd. In 2001

4		following		
		Series.		
		1!+1/2!+1/3!+1/4!. 1/n!		
		c) Write a Program to print the following pattern:		
		A		
		A B		
		A B C		
		A B C D A) Write a Program to find the maximum and	04	
		minimum of given three numbers using	01	L1, L2, L3
5		functions		, ,
5		B) Write a recursive function to find the Nth		
		term in the Fibonacci series		
		C) Write a program to test math.h, ctype.h		
		and time.h library functions		
		A) Write a program to sort the given	04	
		element of anarray in		L1, L2, L3
6		ascending/descending order.		
0		B) Write a program to Perform Binary		
		A) Write a program to find the transpose	04	
		of a Square Matrix without using	01	L1, L2, L3
		another matrix		
7		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	00	
		A) Write a Program that Implements string handling functions with and without using	02	111213
	Design	string library function.		1, 12, 15
8	Experiments	B) Write a Program to check whether the		
	-	given string is palindrome or not.		
		A) Implement a C Program to accept two	04	111212
		numbersfrom the user and swap them. Pass the values to be swapped to the		L1, L2, L3
		function using call by reference method.		
		B) A sport club of cricket needs to maintain		
		data about players. Description of it is		
9		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 aboveproblem.		



10	Mini project	A) Design a puzzle gameB) Draw the basic shapes using graphics.h library function	02	L1, L2, L3
		Total	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 nd Edition	2006
2	Programming inANSI C	E Balaguruswamy	McGrawHill	8 th Edition	2018
3	Programming in C	Pradeep Dey and Manas Gosh	Oxford UniversityPress	2 nd Edition	2011
4	Let Us C	Yashwant Kanetkar	BPB	16 th Edition	2018
5	Data Structuresusing C	Aaron M. Tenenbaum	Pearson	7th Edition	2009

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

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F.E./F.T. Semester -I

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

			0							/
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					ion Scheme (Forma	ative/ Summative	e)			
Mod	es of Teach	ing / Learn	ing / Weigl	htage		Mo	des 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
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%)										
Prerequi	site: Basic	knowledge o	f Manufact	uring Tech	niques					

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

<u>Course Outcomes:</u> Upon completion of the course students will be able to:



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	



DEPARTMENT OF ENGINEERING SCIENCES AND HUMANITIES (ES&H) Choice Based Credit Grading System (CBC Under TCET Autonomy

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	Estd. In 2001

6	Preparation of Domestic Pipe Line	2	
Total		30	

Books and References:

Sr.	Title	Authors	Publisher	Edition	Year
No.					
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	Kalpakjian 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

Sr No	o. Website Name URL		Module
51. NO.	website maine	UKL	covered
1	Plastic process	https://www.pds.gov.in/downloads/PLASTIC_PROCESSING_T	M-3
		ECHNIQUE.pdf	
2	Additive	https://additivemanufacturing.com/basics/	M-4
	Manufacturing		
3	Welding &	https://www.lucasmilhaupt.com/EN/Brazing-Academy/Brazing-	M-5
	Brazing	vs-Welding.htm	



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)		
Cou	Course Name: Presentation Skills-I (Presentation or Life Skills)						Course Code: HME- PS101			
	Contact Hours Per Week: 02						С	redits: 01		
Т	eaching S	cheme (Progra	m Specifi	c)	F	lxam	inatior	n Scheme (Form	ative/ Sum	mative)
Moo	des of Teac	hing / Learnir	ng / Weigh	itage	Ν	/lode	s of Co	ontinuous Assess	sment / Eva	luation
	H	Iours Per Wee	k		Th	eory	(00)			Total
Theory	Tutorial	Integrated Theory and Practice (ITP)	Contact Hours	Credits	ISE	IE	ESE	Presentation (50)	Report (25)	75
-	-	2	2	1	-	-	-	50	25	
ISE: In-Semester Examination - NA IE: Innovative Examination - NA ESE: End Semester Examination - NA										
Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
Pre-requ RBT: Re	isite- Basic vised Bloo	knowledge of m's Taxonomy	English la	nguage, G	ramm	ar, V	ocabula	ary and Compute	r Skills	

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:

Sr. No.	Course Outcomes	Cognitive Levels of Attainment as per Bloom's Taxonomy
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	Key Competencies	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: 		
	emphasis, pacing, pauses, etc.		
2.0	Essential of Presentation Skills	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	Introduction to MS Power Point Presentation	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 	0.5	
4.0	Introduction to MS Excel	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, 		





DEPARTMENT OF ENGINEERING SCIENCES AND HUMANITIES (ES&H)

Choice Based Credit Grading System (CBCGS) Under TCET Autonomy



	OR; Searching; match, search		
	4.5 Case Study: Managing personal finance		
5.0	using Microsoft Excel	07	
5.0	Adding Graphical Elements to Presentation	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	Delivering Presentation	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	Type of	Practical/ Experiment Topic	Hrs.	RBT
Number	Experiment			Levels
1	Basic	Group Activities to build confidence	2	L1, L2, L3
2	Experiments	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.	Name of the Book	Name of the	Publisher	Edition	Year of
No		Author			Publication
1	Exploring	Mary Anne Poatsy,	Paperback	1 st Edition	2016
	Microsoft	Rebecca Lawson,		Kindle	
	PowerPoint	Cynthia Krebs,			
		Robert T. Grauer			
2	Building Financial	K. Scott Proctor	John Willey	2004	2004
	Models with		& Sons	Edition	
	Microsoft Excel				



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

Sr No	Website Nome	LIBI	Modules
51. 110.	website Maine	UKL	Covered
1	Coursera	https://www.coursera.org/learn/slides	M 1-M 6
2	NPTEL	https://nptel.ac.in/courses/109/106/109106067/	M 1-M 6
3	Dale Carnegie	https://www.dalecarnegie.com/en/courses-v2/191?	M 1-M 6

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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					
Те	eaching Sc	heme (Progr	am Specif	fic)	Ex	aminati	on Scheme (Forn	native/ Summa	tive)
Modes of Teaching / Learning / Weightage				M	Modes of Continuous Assessment / Evaluation				
Hours Per Week			Th (1	eory 00)			Total		
Theory	Tutorial	Integrated Theory and Practice (ITP)	Contact Hours	Credits	IA	ESE	Presentation (50)	Report (25)	75
		02	02	01			50	25	15
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									
	1	rerequisite.	computer	Dasies, Iu	nuame	mai Kii0	whenge of Mathem	latics	

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

<u>Course Outcomes:</u> 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

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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	Introduction to Computers	0.7	L1
	Computer Systems, Computer Languages, Software Development, Operating System, Number Systems and their conversion, Introduction to Scratch	05	
2	Logic Building Techniques	0.4	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	04	
3	Critical thinking and logical reasoning		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	06	
4	Greedy and Dynamic Techniques	05	L1, L2, L3
	Problem definition, Problem decomposition, Abstraction, Greedy Method, Divide and Conquer. Difference between Greedy and Divide and Conquer with various examples.	05	
5	Problem Solving Techniques		L1, L2, L3, L4,
	Searching Techniques: Linear and Binary search Sorting Techniques: Bubble, Selection, Insertion, Merge, and Quick Sort Hashing Techniques techniques and their applications	06	L5
6	Latest tools and Emerging Techniques	0.4	$L1, L\overline{2, L3}$
	User Interface Designing, Machine Learning, Artificial Intelligence, Ubiquitous Computing, IOT	04	



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

Sr. No.	Website Name		Modules
		URL	Covered
1	www.tutorialspoints.com	http://www.tutorialspoint.com/basics_of_computers/b	M1
		asics_of_computers_introduction.htm	
2	www.indeed.com	www.indeed.com/career-advice/career-	M2
		developement/strengthen -logical-thinking-skills	
3	www.plato.standford.edu	www.plato.standford.edu/entries/critical-thinking/	M3
4	www.geeksforgeeks.org	www.geeksforgeeks.org/greedy-approach-vs-	M4
		dynamic programming/	
5	https://www.thevectorimpact.	https://www.thevectorimpact.com/problem-solving-	M5
	com	techniques/	
6	http://pfister.ee.duke.edu	http://pfister.ee.duke.edu/courses/ece586/notes_ch1	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 Co	ode: HME- AB	L101		
Т	eaching Sc	heme (Progra	am Specifi	c)]	Exan	ninatio	n Scheme (Form	ative/ Summat	tive)
Mod	Modes of Teaching / Learning / Weightage Modes of Continuous Assessment / Evaluation									
	Hours Per Week Theory (00)			Presentation	Donort	Total				
Theory	Tutorial	Integrated Theory and Practice	Contact Hours	Credits	ISE	IE	ESE	(50)	(25)	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.

<u>Course Outcomes:</u> 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
	Orientation:	06	L1, L2, L3
	• Discussions on Healthy Diet plan		
	• Impact of Daily routine on Health		
1	Introduction about physical fitness:		
	• Introduction to Yoga, Benefits of yoga, Jogging and running,		
	Introduction to different Suksham asana, cyclic asanas and		
	different mudras		
	Basic asanas: Sitting postures, Padmaasan, Bhadrasan,	05	L1, L2, L3
2	Paschimottanasan, Vakrasan, Vajrasan, Kurmasan etc.		
	Demonstration and Practice session		
	Introduction to basic asanas (Standing, Reclining and	05	L1, L2, L3
3	Sleeping postures): Taadasan, Trikonasana, Vraishasan		
	Shalabhasan, Bhujangasan, Dhanurasan Shavaasaan, Supta		
	Vajrasana etc. Surya Namaskar and its benefits.		
	Demonstration and Practice session		
	Introduction of society outreach, Orientation related to	04	L1
4	HEALTH domain, Group discussion on Health Domain,		
	Discussion on activities, Group formation (6 Groups consisting of		
	5 students each).		
	Poster/Slogan: Selection of topic, Placards, Poster (A3 size),		
	Poster/Placards Presentation/Street play on awareness about		
	Health domain.		
	Survey: Questionnaire preparation, Community interaction,	06	L1, L2, L3
5	awareness about Health domain, Data collection.		
	Impact: Use of technology in Compilation of collected data,		
	Analysis of data, Solution of their identified health related		
	problems, Predicted Outcomes.		
6	Presentation: Presentation based on activities performed under	04	L1, L2, L3
o	ABL -I		
	Demonstration		



Books and References:

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

Sr. No.	Website Name	URL	
			covered
1	Coursera	https://www.coursera.org/lecture/engineering-health-yoga-	M1-M3
		physiology/welcome-and-introductions-b4dTw	
2	Coursera	https://www.coursera.org/lecture/engineering-health-yoga-	M1-M3
		physiology/yoga-and-nervous-system-health-aFD8h	
3	Pinterest	https://www.pinterest.ca/doyogawithme/	M1-M3
4	NCBI	.https://www.ncbi.nlm.nih.gov/books/NBK222137/	M4-M6
5	Study.Com	https://study.com/academy/lesson/health-services-definition-	M4-M6
		types-providers.html	



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



F.E./F.T. Semester – II

Choice Based Credit Grading Scheme with Holistic and Multidisci	plinary Education (CBCGS-HME 2020)

B.E./B.Tech. (All Branches)							F.E./F.T. (SEM: I/II)			
Course Name: Mathematics-II						Course (Code: BSC104			
Те	aching Sch	ieme (Prog	ram Specif	fic)		Exan	ninatio	n Scheme (Forma	tive/ Summati	ve)
Mode	es of Teach	ing / Learn	ing / Weig	ghtage		Mod	es of C	ontinuous Assessn	nent / Evaluat	ion
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	125
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%)										
Prerequ	isite: 10+2	level Math	ematics					<u> </u>	,	

<u>Course Objective</u>: 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	Topics	Hrs.	Cognitive Levels of
No.			Attainment as per
			Bloom's
			Taxonomy
1	Mathematical Modelling & First order	7	L1, L2, L3
	ordinary differential equations		
	Exact and reducible to exact differential equation,		
	Linear differential equation, Bernoulli's differential		
	(Newton's law of cooling) RC & RL circuit model		
	(Self-Study: Mixing problem)		
2	Higher order linear differential equations	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	Matrices II	6	L1, L2, L3
	Eigenvalues eigenvectors Caley Hamilton		
	theorem. Diagonalization of matrix. Gram-		
	Schmidt orthogonalization		
	(Self-Study: Orthogonal transformation)		
4	Multivariable Coloulus I (Double Integration)	0	I 1
4	Multivariable Calculus I (Double Integration)	0	LI
	Multiple Integration: Double integrals (Cartesian &		
	Polar), Change of order of integration (Fubinis 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	Multivariable Calculus II (Triple Integration)	9	L1, L2, L3
	Triple integrals (Cartesian & Polar), Orthogonal		
	curvilinear coordinates,		
	Application: Volume on cartesian, spherical and		
	cylindrical polar coordinates, Vector line integrals,		
	Vector surface integrals		
	(Self-Study: Scalar line integrals, Scalar surface		
	integrals)		
6	Complex Variable – Integration	8	L1, L2, L3





DEPARTMENT OF ENGINEERING SCIENCES AND HUMANITIES (ES&H) Choice Based Credit Grading System (CBCGS)

Under TCET Autonomy



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)

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

Sr No	Wabsita Nama	TIDI	Module
SI. NO	website maine	UKL	Covered
1.	Openstax	https://openstax.org/	M1-M6
2	Lumanlearning .com	https://courses.lumanlearning.com	M1-M6
3	Engineering Mathematics Tutorial - GeeksforGeeks	https://www.geeksforgeeks.org/	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 C	Code: ESC104			
T	eaching So	cheme (Pro	gram Specifi	ic)		Exan	ninatio	n Scheme (Forma	tive/Summativ	ve)
Мо	des of Tea	ching/Lear	ning/Weight	age		Modes of Continuous Assessment/Evaluation				n
Hours Per Week				Theory (100)			Practical/Oral (00)	Term Work (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	
3		2	5	4	20	20	60	25	25	150
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:										
F	Formative (40%), Time	ely completio	n of practi	ical (4	0%) a	nd Atte	endance/ Learning	Attitude (20%)	
Prerequ	iisite: Basi	cs of Force	, displacemen	t, Velocit	y, acce	lerati	on & re	elated concept from	Physics. Also	

required basics of mathematics like integration & differentiation

<u>Course Objective</u>: 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 com	pletion of	the course	students v	vill be able to:
		1	1			

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):

			Cognitive Levels
Sr			of Attainment as
No	Topics	Lectures	per Bloom's
110.			Taxonomy
01	System of Coplanar Forces:	08	L1, L2
	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.		
	Centroid of composite plane lamina.		
02	Equilibrium of System of Coplanar Forces:	08	L1, L2, L3
	Free Body Diagram, Condition of Equilibrium. Equilibrium		
	of system consisting of several forces.		
	Types of support:		
	Types of loads, Types of Beams, Determination of reactions		
	at supports for various types of loads on beams. (Excluding		
	problems on internal hinges)		
	Stresses & Strains:		
	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.		
03	Friction:	05	L1, L2, L3
	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.		
04	Forces in space:	06	L1, L2, L3
	Resultant & Equilibrium of concurrent force system, parallel		
	force system and non-concurrent non-parallel force system in		
	3D space		

	DEPARTMENT OF ENGINEERING SCIENCES AN Choice Based Credit Grading System (CB Under TCET Autonomy	<mark>ND HUMAN</mark> BCGS)	ITIES (ES&H)	8
05	Kinematics of a Particle:	09	L1, L2, L3	
	Introduction to different types of motion, Projectile motion.			
	Introduction to general plane motion, Instantaneous			
	center of rotation for the mechanisms up to three links only.			
06	Kinetics of a Particle:	09	L1, L2, L3	
	Force and Acceleration:			
	Newton's second law of motion, D'Alembert's Principle,			
	Equations of dynamic equilibrium for rectilinear and			
	curvilinear motion,			
	Work and Energy:			
	Principle of work and energy, Law of conservation of			
	energy.			
	Impulse and Momentum: Principle of linear impulse			
	and momentum and its application, principle of conservation			

Suggested List of Practical/ Experiments:

of momentum

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	Basic Experiments	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	Design	Design of Flywheel	3	L1, L2, L3



	plane area		
Group	Mini Project	3	L1, L2, L3
Activities			
	Total	30	
	Group Activities	glane area Group Mini Project Activities Total	plane areaGroup ActivitiesMini Project3Total30

Books and References:

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

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



F.E. Semester –II

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

								1		
		B.E./B.Tec	ch. (All Bra	nches)					F.E./F.T. (SEM:	I/II)
	Course I	Name: Engli	sh for Profe	essional Co	mmunicat	tion		Course Code: HSMC 101		
Tea	ching Schem	ie (Program	Specific)		Examina	tion Sche	me (Form	ative/ Summati	ive)	
Modes	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
ISA: In-Semester Examination- Paper Duration – 1 Hours 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%)										
Prerequisit	t e- Basic kn	owledge of	English la	anguage, (Grammar	and Voc	abulary			

<u>**Course Objective:**</u> 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



ſ	6	To improve speaking ability in English both in terms of fluency	L1, L2, L3
		and comprehensibility	

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

Module No.	Topics	Hrs.	Cognitive Levels of Attainment as per Bloom's Taxonomy
1	 Communication Foundation 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 	05	L1, L2, L3
2	 Word Formation 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 	05	L1, L2, L3
3	 Basic Language Skills 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 	08	L1, L2

TCET DEPARTMENT OF ENGINEERING SCIENCES AND HUMANITIES (ES&H)

Choice Based Credit Grading System (CBCGS) Under TCET Autonomy



Suggested List of Practical/ Experiments:

Ice

ENGINEERS

Practical	Type of	Practical/ Experiment Topic	Hrs.	RBT
Number	Experiment			Levels
1	Basic	Introduction	2	L1, L2, L3
	Experiments			
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

	TCET DEPARTMENT OF ENGINEERING SCIENCES AND HUMA Choice Based Credit Grading System (CBCGS) Under TCET Autonomy	NITIES (ES	SEH)	640
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 Heasly	Cambridge University Press	2nd Edition	2006



6	Exercises in	CIEFL	University	1997 Edition	1997
	Spoken English		Press		
	Parts. I-III				

Sr. No.	Website Name	URL	Modules Covered
1	Coursera	https://www.coursera.org/learn/speak-english-professionally	M 1-M 6
2	NPTEL	https://nptel.ac.in/courses/109/106/109106129/	M 1-M 6
3	NPTEL	https://nptel.ac.in/courses/109/106/109106094/	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 / Evaluatio				aluation					
Hours Per Week			The (eory)0)	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									

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

<u>Course Outcomes:</u> Upon completion of the course students will be able to:

SN	Course Outcomes	Cognitive Levels of
bitt		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	Topics	Hrs.	Cognitive Levels of	
110.			Attainment as per Bloom's Taxonomy	
	Yoga in Modern Times: Relevance of Yoga in	06	L1, L2	
1	Today's World, Stress management, type of Stress,			
1	Dimensions of Health: Physical, Mental, Social and			
	Spiritual			
	Breathing Awareness & Yogic Breathing:	05	L1, L2, L3	
2	Pranayam and its types and Benefits of Pranayama: Kapal bharti Apulom Vilom Brahmri Uijavi			
2	Bhastrika etc.,			
	Techniques and Importance of Dhyana, suitable place			
	for Dhyana, Meditation and its types, Benefits of			
	Meditation			
	Introduction to different asanas:	05	L1, L2, L3	
	Ardhachakrasan, Padahatasan, Parvottasan, Savasana,			
3	Pavanamuktasana Setubandhasan Swastikasan			
	Cycling, Twisting, etc. Clapping Therapy			
	Orientation on Domain (Environment), Discussion	04	LI	
4	Cleanness drive, tree plantation activity. Group			
	formation (6 Groups consisting of 5 students each)			
	formation (o croups consisting of a students cach).			
	Poster / Slogan/ Street play			
	Selection of topic related to Environment, Placards,			
	Poster (A3 size), Poster / Placards / Slogan			
	Presentation,/Street play demonstration.			
	Survey	06	L1, L2, L3	
5	Questionnaire preparation, Identification of area, visit			
5	to specified area, Data collection			
	Impact			
	Compilation of collected data, Analysis of data,			
	Predicted Outcomes.			
	Project	04	L1, L2, L3	
	Project based on environmental activities			
6	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

Sr.	Wahaita Nama	LIDI			
No.	website maine	UKL			
1	Coursera	https://www.coursera.org/lecture/engineering-health-yoga-	M1-M3		
		physiology/welcome-and-introductions-b4dTw			
2	Coursera	https://www.coursera.org/lecture/engineering-health-yoga-	M1-M3		
		physiology/yoga-and-nervous-system-health-aFD8h			
3	Pinterest	https://www.pinterest.ca/doyogawithme/	M1-M3		
4	Youtube	https://youtu.be/lbyHCkNEOKo	M1-M3		
5	You tube	https://youtu.be/v7AYKMP6rOE	M1-M3		
6	You tube	https://youtu.be/gEk6JLJNg0U	M4-M6		
7	Wikipedia	https://en.m.wikipedia.org/wiki/Environmental_protection	M4-M6		
9	DCCAE	https://www.dccae.gov.ie/en-ie/environment/topics/environmental-	M4-M6		
		protection-and-awareness/Pages/default.aspx			