G H Raisoni Institute of Engineering and Technology

(An Autonomous Institute affiliated to RTM Nagpur University Nagpur)

Department of Civil Engineering

B. Tech. Civil Engineering with Multidisciplinary Minor

UG Scheme - 2023 (NEP-2020) B-Tech. Civil Engineering with Multidisciplinary Minor

Scheme Summary

Semester	Credits	Hours	Marks	No. of Theory Heads	No. of Practical Heads	Total Heads
I	21	28	525	6	6	12
II	19	26	625	7	5	12
III	20	24	575	6	3	9
IV	20	24	625	8	4	12
V	20	22	575	6	4	10
VI	20	23	500	6	3	9
VII	22	27	525	5	2	7
VIII	20	36	450	1	2	3
Total	**162**	**210**	**4400**	**45**	**29**	**74**

Course Category Credits Summary

Semester Basket		I	II	III	IV	V	VI	VII	VIII	Total Credits
Basic Science Course	BSC/ESC	5	9	--	--	--	--	--	--	14
Engineering Science Course		8	4	--	--	--	--	--	--	12
Programme Core Course (PCC)	Program Courses	--	2	8	8	10	8	10	--	46
Programme Elective Course (PEC)		--	--	--	--	4	8	4	4	20
Multidisciplinary Minor (MD M)	Multidisciplinary courses	--	--	2	2	4	2	4	--	14
Open Elective (OE) Other than a particular program		--	--	4	2	2	--	--	--	8

Vocational and Skill Enhancement Course (VSEC)	Skill Courses	2	2	--	2	--	2	--	--	8
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	2	--	--	2	--	--	--	--	4
Entrepreneurship/ Economics/ Management Courses		--	--	2	2	--	--	--	--	4
Indian Knowledge System (IKS)		2	--	--	--	--	--	--	--	2
Value Education Course (VEC)		--	--	2	2	--	--	--	--	4
Research Methodology	Experiential Learning Courses	--	--	--	--	--	--	--	4	4
Comm. Engg. Project (CEP)/Field Project (FP)		--	--	2	--	--	--	--	--	2
Project		--	--	--	--	--	--	4	--	4
Internship/ OJT		--	---	--	--	--	--	--	12	12
Co-curricular Courses (CC)	Liberal Learning Courses	2	2	--	--	--	--	--	--	4
Total Credits (Major)		**21**	**19**	**20**	**20**	**20**	**20**	**22**	**20**	**162**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-I													
23BTSHL102CE 23BTSHP102CE	Environmental Chemistry	BSC4	1	-	2	**3**	2	10	15	50	25	-	100
23BTSHL103CE	Matrices and Differential Calculus	BSC1	2	1	-	**3**	3	10	15	50	-	-	75
23BTSHL108CE 23BTSHP108CE	Communication Skills	AEC1	1	-	2	**3**	2	10	15	-	25	-	50
23BTSHL10XCE	Elective : Indian Knowledge System	IKS	2	-		**2**	2	10	15	50	-	-	75
23BTSHP112CE	Liberal Learning Courses-I	CC1	-	-	4	**4**	2	-	-	-	25	25	50
23BTCEL101 23BTCEP101	Engineering Mechanics	ESC2	3	-	2	5	4	10	15	50	25	-	100
23BTCEL10X 23BTCEP10X	Elective -I : Vocational and Skill Enhancement	VSEC 1	1	-	2	**3**	2	10	15	-	25	-	50
23BTMEL101CE 23BTMEP101CE	Engineering Graphics	ESC1	2	-	4	6	4	10	15	50	25	-	100
			12	**1**	**16**	**29**	**21**	**70**	**105**	**250**	**150**	**25**	**600**

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-II													
23BTSHL101CE 23BTSHP101CE	Engineering Physics	BSC2	1	1	2	**4**	3	10	15	50	25	-	100
23BTSHL107CE	Integral Calculus, Differential Equations and Numerical Methods	BSC3	2	1	-	**3**	3	10	15	50	-	-	75
23BTSHP113CE	Liberal Learning Course 2	CC2	-	-	4	**4**	2	-	-	-	25	25	50
23BTSHL116CE 23BTSHP116CE	Construction Material & WorkshopPractices	BSC5	2	-	2	**4**	3	10	15	50	25	-	100
23BTCEL105 23BTCEP105	Concrete Technology	ESC3	3	-	2	**5**	4	10	15	50	25	-	100
23BTCEL106	Water Resources Engineering	PCC1	2	-	-	**2**	2	10	15	50	-	-	75
23BTCEL10X 23BTCEP10X	Elective -II : Vocational and Skill Enhancement	VSEC2	1	-	2	**3**	2	10	15	-	25	-	50
			11	**2**	**12**	**25**	**19**	**60**	**90**	**250**	**125**	**25**	**550**

B. Tech. Civil Engineering with Multidisciplinary Minor

ELECTIVES

23BTSHL10XCE -Elective : Indian Knowledge System -

Course	Course Code (L)	Course Code(P)
Elective: IKS-1- Concepts and Applications inEngineering	23BTSHL109CE	Not Applicable
Elective: IKS-2- Social History of Medicine In Colonial India	23BTSHL110CE	Not Applicable
Elective: IKS-3- Modern Indian Architecture	23BTSHL111CE	Not Applicable

Civil Board

Course	Course Code (L)	Course Code(P)
Elective -I : Vocational and Skill Enhancement-Computer Aided Drawing	23BTCEL102	23BTCEP102
Elective -I : Vocational and Skill Enhancement-Design of Structure using Sketch Up	23BTCEL103	23BTCEP103
Elective -I : Vocational and Skill Enhancement	23BTCEL104	23BTCEP104
Elective -II : Vocational and Skill Enhancement-Architectural planning and Drawing	23BTCEL107	23BTCEP107
Elective -II : Vocational and Skill Enhancement- Modeling and Animation rendering REVIT Architecture	23BTCEL108	23BTCEP108
.Elective -II : Vocational and Skill Enhancement-	23BTCEL109	23BTCEP109

UG Scheme-2023 (NEP-2020)
B. Tech. Civil Engineering with Multidisciplinary Minor

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-III													
23BTCEL201 / 23BTCEP201	Mechanics of Materials	PCC2	2	1	2	5	4	10	15	50	25	25	125
23BTCEL202 / 23BTCEP202	Soil Mechanics	PCC3	3	-	2	5	4	10	15	50	25	-	100
23BT XXLXXX	Multidisciplinary Minor I	MDM1	2	-	0	2	2	10	15	50	-	-	75
23BTISL2XX	Open Elective -I	OE1	4	-		4	4	10	15	50	-	-	75
23BTHUL20X	Humanities Elective	VEC1	2	-	-	2	2	10	15	50	-	-	75
23BTHUL201	Engineering Economics and Industrial Management	EEMC1	2	-	-	2	2	10	15	50	-	-	75
23BTCEP203	Minor Project	CEP	-	-	4	4	2	-	-	-	50	-	50
			15	1	8	24	20	60	90	300	100	25	575

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-IV													
23BTCEL204/ 23BTCEP204	Surveying & Geomatics	PCC4	3	-	2	5	4	10	15	50	25	25	125
23BTCEL205/ 23BTCEP205	Structural Analysis	PCC5	3	-	2	5	4	10	15	50	25	-	100
23BTXXLXXX	Multidisciplinary Minor -II	MDM2	2		-	2	2	10	15	50	-	-	75
23BTISL2XX	Open Elective-II	OE2	2	-	-	2	2	10	15	50	-	-	75
23BTCEP2XX	Skill Enhancement Course-III	VSEC3	1	-	2	3	2	10	15	-	25	-	50
23BTHUL202 23BTHUP202	Aptitude & Employability Skills	AEC2	1	-	2	3	2	10	15	-	25	-	50
23BTCEL207	Project Planning & Construction Management	HSSM2	2	-	-	2	2	10	15	50	-	-	75
23BTHUL204	Universal Human Values 2: Understanding Harmony	VEC2	2	-	-	2	2	10	15	50	-	-	75
			16	0	8	24	20	80	120	300	100	25	625

UG Scheme-2023 (NEP-2020)
B. Tech. Civil Engineering with Multidisciplinary Minor

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-V													
23BTCEL301	Reinforced Concrete Design	PCC6	3	-	-	3	3	10	15	50	-	-	75
23BTCEL302/ 23BTCEP302	Transportation Engineering	PCC7	2	-	2	4	3	10	15	50	25	-	100
23BTCEL303/ 23BTCEP303	Fluid Mechanics	PCC8	3	-	2	5	4	10	15	50	25	25	125
23BTCEL3XX/ 23BTCEP3XX	Program Elective -I	PEC1	3	-	2	5	4	10	15	50	25	-	100
23BTXXLXXX	Multidisciplinary Minor -III	MDM-3	3	-	2	5	4	10	15	50	25	-	100
23BTISL3XX	Open Elective-III	OE3	2	-	-	-	2	10	15	50	-	-	75
			16	0	8	22	20	60	90	300	100	25	575

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-VI													
23BTCEL304	Design of Steel Structures	PCC9	4	-	-	4	4	10	15	50	-	-	75
23BTCEL305/ 23BTCEP305	Environmental Engineering	PCC10	3	-	2	5	4	10	15	50	25	25	125
23BTCEL3XX/ 23BTCEP3XX	Programme Elective –II	PEC2	3	-	2	5	4	10	15	50	25	-	100
23BTCEL3XX/ 23BTCEP3XX	Programme Elective –III	PEC3	4	-	-	4	4	10	15	50	-	-	75
23BTXXLXXX	Multidisciplinary Minor -IV	MDM4	2	-	-	2	2	10	15	50	-	-	75
23BTCEL3XX/ 23BTCEP3XX	Skill Enhancement Course IV	VSEC4	1	-	2	3	2	10	15	-	25	-	50
			17	0	6	23	20	60	90	250	75	25	500

UG Scheme-2023 (NEP-2020)
B. Tech. Civil Engineering with Multidisciplinary Minor

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-VII													
23BTCEL401	Irrigation & Drainage Engineering	PCC11	3	-	-	3	3	10	15	50	-	-	75
23BTCEL402/ 23BTCEP402	Estimating & Costing	PCC12	3	-	2	5	4	10	15	50	25	25	125
23BTCEL403	Advanced Structural Analysis	PCC13	3	-	-	3	3	10	15	50	-	-	75
23BTCELXXX	Programme Elective -IV	PEC4	4	-	-	4	4	10	15	50	-	-	75
23BTCELXXX	Multidisciplinary Minor -V	MDM5	4	-	-	4	4	10	15	50	-	-	75
23BTCEP405	Project	P	-	-	8	8	4	-	-	-	50	50	100
			17	0	10	27	22	50	75	250	75	75	525

Course Code	Name of Course	Course Category	Teaching Scheme				Credits	Evaluation Scheme					
								Theory			Practical		Total Marks
			L	T	P	Total Hours		TAE	CAE	ESE	INT	EXT	
SEMESTER-VIII													
23BTCEP406	Internship	I	-	-	24	24	12	-	-	-	200	100	300
23BTISP401	Research Methodology	RM	-	-	8	8	4	-	-	-	75	-	75
23BTISL4XX	Programme Elective-V (MOOCs Based)	PEC5	4	-	-	4	4	10	15	50	-	-	75
			4	0	32	36	20	10	15	50	275	100	450
						TOTAL	162	450	675	1950	1000	325	4400

UG Scheme-2023 (NEP-2020)
B. Tech. Civil Engineering with Multidisciplinary Minor
Tracks for Programme Elective Courses

Programme Elective -1 (Credits : 4) (Semester-V)		**Programme Elective -2 (Credits : 4) (Semester-VI)**		**Programme Elective - 3 (Credits : 4) (Semester-VI)**		**Programme Elective -4 (Credits : 4) (Semester-VII)**			
23BTCEL306/ 23BT CEP306	Advance Fluid Mechanics	23BTCEL309/ 23BTCEP309	Air Pollution & Solid Waste Management	23BTCEL312/ 23BTCEP312	Advanced Surveying	23BTCEL407	Waste Water Engineering	23BTCELXXX	Construction Technology and Management
23BTCEL307/ 23BTCEP307	Advanced Highway Material	23BTCEL310/ 23BTCEP310	Foundation Engineering	23BTCEL313/ 23BTCEP313	Green Building	23BTCEL408	Advanced Transportation Engineering	23BTCELXXX	Construction Equipment and Advanced Surveying Application
23BTCEL308/ 23BTCEP308	New Engineering Materials	23BTCEL311/ 23BTCEP311	Advance Concrete Design	23BTCEL314/ 23BTCEP314	Introduction to Structural Dynamics	23BTCEL409	Earthquake Resistance Structure	23BTCELXXX	Sustainability in Construction Projects

UG Scheme-2023 (NEP-2020)
B. Tech. Civil Engineering with Multidisciplinary Minor
Multidisciplinary Minor Electives

Multidisciplinary Minor Elective -1 (Credits : 2) (Semester-III)		**Multidisciplinary Minor Elective -2 (Credits : 2) (Semester-IV)**		**Multidisciplinary Minor Elective - 3 (Credits : 4) (Semester-V)**		**Multidisciplinary Minor Elective -4 (Credits : 2) (Semester-VI)**		**Multidisciplinary Minor Elective -5 (Credits : 4) (Semester-VII)**	
23BTCEL208	Disaster Management	23BTCEL209	Environmental Management	23BTCEL315 / 23BTCEP315	New Engineering Material	23BTCEL316	Repair & Rehabilitation of Structures	23BTCEL410/ 23BTCEP410	Green Building

UG Scheme-2023 (NEP-2020)
B. Tech. Civil Engineering with Multidisciplinary Minor
Skill Enhancement Courses

Skill Enhancement Course-1 (Credits : 2) (Semester-I)		Skill Enhancement Course-2 (Credits : 2) (Semester-II)		Skill Enhancement Course-3 (Credits : 2) (Semester-IV)		Skill Enhancement Course-4 (Credits : 2) (Semester-VI)	
23BTCEP104	Computer Aided Drawing	23BT CEP107	Architectural Planning & Drawing	23BT CEP210	Computational tool for Survey (Total Station)	23BT CEP317	Analysis & Structural Design using Software' SAP2000
23BT CEP105	Designing of Structure using Sketch Up	23BT CEP108	Modelling & Photorealistic Design of Structure Using - 3D Max	23BT CEP211	Planning & Scheduling Primavera	23BT CEP318	Analysis & Structural Design using Software' STAAD Pro
23BT CEP106	Graphical Analysis using Excel	23BT CEP109	Modelling & Animation Rendering using REVIT Architecture	23BT CEP212	Complete Processes of Construction Industry	23BT CEP319	Analysis & Structural Design using Software- ANSYS

CIVIL ENGINEERING DEPARTMENT
Track for B.Tech. Civil Engineering with Honor's

Sem	Structural Engineering	
	Name of Courses	Credit
III	23MTSTRL528 New Engineering Materials and Techniques	4
IV	23MTSTRL410 Theory of Plates and Shells	4
V	23MTSTRL525 Matrix Analysis of Structures	4
VI	23MTSTRL535 Advanced Design of Steel Structures	4
VII/VIII	23MTSTRL409 Structural Dynamics	4
	Credit	**20**

Dr. Mahesh V. Raut
BOS Chairman Civil

SYLLABUS FOR FIRST SEMESTER

Course Title: **Engineering Mechanics**										
Semester	I/II	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	Odd/Even	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	C	3 Hrs.	--	2 Hrs.	4	10	15	50	25	--
Course Code	23BTCEL101/23BTCEP101									
Teaching Mode	Offline	5 Hrs.			Total	75			25	
Duration of ESE	2.5 Hrs.					100				

Course Objectives	1. To describe and explain the conditions of rest or motion of the bodies under the action of force and also to be familiar with the concept of simple lifting machine
	2. To illustrate the basic concepts of forces moments, couples in two dimensional force system & spatial force system.
	3. To practice and analyze the simple determinate structures like beam & truss and to understand the properties of plane geometric area.
Course Outcomes	Upon successful completion of this course, student will be able to:
	CO 1: Apply the fundamentals of two dimensional force systems for replacement into equivalent force system
	CO 2: Demonstrate the basic concepts of free body diagrams for static equilibrium for two dimensional force systems
	CO 3: Implement the concepts of Simple Lifting Machine and friction and to analyze the internal forces in the members of truss.
	CO 4: Employ the concepts of forces, moments, and couples in spatial force system
	CO 5: Apply the basic concepts of Centroid, Moment of inertia of lamina & Virtual Work

Mapping of Course Outcomes with Program Outcomes:

Course Outcomes	Program Outcomes											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	1	--	--	--	--	--	--	--	--	--	1
CO2	3	1	--	--	--	--	--	--	--	--	--	1

CO3	3	1	--	--	--	--	--	--	--	--	--	1
CO4	3	1	--	--	--	--	--	--	--	--	--	1
CO5	3	1	--	--	--	--	--	--	--	--	--	1

Course Contents:

Unit	Contents	Hours
I	**Fundamentals of Statics :** Definition of mechanics, Body, Rigid Body, Scalar quantities, Vector quantities, Representation of vector, Fundamental Units, Derived Units, Particle, Mass, Weight, Fundamental principles of mechanics, Newton's law of universal gravitation. **Equivalent Force System (2-D):** Concept of Force, Unit Newton force, System of force, Principle of transmissibility of force, Resolution and composition of coplanar force system, Resultant, Equilibrant, Law of parallelogram of force, Triangle law, Polygon law, Moment of force, Varignon's theorem, Couple and it's properties, Reduction of system of forces into a force couple system. Numericals on equivalent force involving co-planer force systems acting on body, Numericals on reduction of system of forces into a force couple system.	7
II	**Equilibrium of Two Dimensional Force System :** **Force System :** Concept of equilibrium, Principles of equilibrium, Equations of Equilibrium, Lami's theorem, Numericals on equilibrium involving co-planer force systems acting on body. **Beam:** Beam, Simply Supported Beam, Overhanging Beam, Beam reaction, Types of load acting over beam i.e. Concentrated load, Uniformly distribute load (UDL), Uniformly varying load (UVL), Types of support i.e. Simple support, Hinge support, Roller Support, Numericals on reaction of beam subjected to combination of loads	8
III	**Analysis of Truss *:*** Perfect Frame, Imperfect frame, Deficient frame, Redundent frame, Assumptions made in analysis of truss, Method of joints, Method of sections, Numericals on forces in the members of a truss. **Friction:** Definition of friction, Types of friction, Angle of repose, Coulombs laws of dry friction, Analysis of rigid bodies on rough inclined surfaces.	8
IV	**Spatial Force System (Three Dimensional Force System):** Component of force in a space, Resultant spatial force system, Force multiplier, Cartesian form of representation of vector, Unit vector, Position vector, Displacement Vector, Scalar product or Dot product, Vector product or Cross product, Length of common perpendicular between two non-intersecting vectors, Shortest distance, Moment of force about point, Moment of force about axis, Moment arm of force about point, Moment arm of force about axis, Resultant moment, Couple.	8

V	**Properties of Areas:** Centroid of plane areas, Moment of Inertia of composite lamina, Radius of gyration, Second moment of area, Product of inertia, Parallel axis theorem, Perpendicular axis theorem, Polar moment of inertia, Moment of inertia & product of inertia about new axes, Principal moment of inertia and principal axis direction by analytical method only. **Virtual Work :** Virtual Displacement, Definition of virtual work, Principles of virtual work, Virtual work method applied to beams, frames & mechanisms.	9

Text Books	1	Engineering Mechanics - Statics & Dynamics by Author : K. Vijaya Reddy & J Suresh Kumar, B S Publication, 2010, Third Edition
	2	Engineering Mechanics Statics and Dynamics, Rajasekaran S and Sankarasubramanian G, Vikas Publishing House Pvt. Ltd., 2005.
	3	Engineering Mechanics, Bhavikatti, S.S, and Rajashekarappa, K.G., New Age International (P) Limited Publishers, 1998.
E-Books	1	Textbook of Engineering Mechanics by R.K. BansalLaxmi Publications, 2005
	2	Engineering Mechanics A Textbook Of Applied Mechanics by S. Ramamrutham, DhanpatRai Publishing Company (P) Limited, 2008
Reference Books	1	F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers, Vol I – Statics, Vol II – Dynamics, Tata McGraw Hill, 2011, Ninth Edition
	2	I. H. Shames, Engineering Mechanics: Statics and dynamics, PHI, 2002, Fourth Edition
	3	R. C. Hibbler, Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press, 2006

List of Experiments-

Sr. No.	Name of Experiments (Any Seven)
1	Familiarity (study) of simple lifting machines
2	Determination of velocity ratio, law of machine for “Single Purchase Crab Winch
3	Determination of velocity ratio, law of machine for “Double Purchase Crab Winch”.
4	Determination of velocity ratio, law of machine for “Differential Axle and Wheel”.
5	Determination of velocity ratio, law of machine for “Simple Screw Jack”.
6	Determination of reactions at the supports of simply supported beam
7	Determination of forces in the members of jib crane.
8	Determination of forces in the members of a shear leg apparatus
9	Determination of coefficient of friction of inclined planes

10	Determination of coefficient of coil friction.
11	Determination of mass moment of inertia of fly wheel
Open Ended Experiments	
1	To investigate effect on reaction forces produced at simply supported beam due to variation of position of single load.
2	To investigate effect on reaction forces produced at simply supported beam due to variation of position of multiple loads

Course Title: **Skill Enhancement Course -I (Computer Aided Drawing)**										
Semester	I	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	VSEC	1 Hr.	-	2 Hrs.	2	10	15	-	25	-
Course Code	23BTCEP102									
Teaching Mode	Offline	3 Hrs.			Total	25			25	
Duration of ESE	-					50				

Course Objectives	To understand importance of Building drawing as an engineer's language
	To plan building as per owner's requirements and Building byelaws
	To develop drawings to scale with location site and block plan with AutoCAD software
Course Outcomes	**CO1**: Understand the various computer aided Drawing tools.
	CO2: Interpret the functions of building components and draw them free hand.
	CO3: Develop Single Line building drawing as per functional requirements.
	CO4: Evaluate the planning & drawing with appropriate scales using AutoCAD Software.
	CO5: Develop the Provisional drawing of a building as per bye-laws.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO2	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO3	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO4	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-

CO5	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-

Course Contents:

Unit	Contents	Hours
1	**Introduction of Drawing tools –** Introduction to various methods of Drawing, Its's significance, various drawing tools & software's. Introduction to 2D & 3D Drawings, Various software commands & their applications.	**5**
II	Design single line plan on Graph paper (line plans) based on various requirements for residential, public, education and industrial buildings.	**8**
III	**Auto CAD (Computer Aided Drafting)** a) Specifying Distance and coordinates. Polar coordinates, relative Cartesian coordinates. Interpreting curser modes and understanding prompt, choosing commands options, selecting objects, editing and grips. Setting up work area, measurement systems, scales factor mode as drafting tools. Symbols, blocks layers. Templates copying object, editing lines, changing length of object. Geometric construction of line and point parallel line, perpendicular lines, breaking lines, dividing lines, fillets, chambers, circles, tangent, arcs, curves through points, breaking polygons, solid shape ellipse.	**8**
IV	**Signs & Symbol :-** Hatch patterns boundary, adding text, Text formatting styles, size of text and scale of drawing, dimensions style, unit heights, locations, arrow style	**5**
V	**Method of Drawing:** Importance of Building drawing as Engineers language in construction & costing, Selection of scales for various drawings. Thickness of line Dimensioning, first angle and third angle method of projection, Abbreviations and conventional representations as per NBC, Free hand dimensioned sketches, stones of various building elements.	**6**

Text Books	1.	Shah and Kale, Building Drawing and Design, 2nd Edition, Tata McGraw, 2002
EBooks	1.	Advances in Landscape Architecture, Murat Ozyavuz (ed.) - InTech , 2013
	2.	Green Architecture: Advanced Technologies and Materials, Osman Attmann
Reference Books	1.	V. B. Sikka, Civil Engineering Drawing, 3rd Edition, S. K. Kataria & sons, 2003
	2.	George Omura, Mastering Autocad 1, 1st Edition, BPB Publications, New Delhi, 2004
on line NPTL Material	1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar08
	2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar09

List of Experiments-

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	One compulsory field visit and exercise given by teacher, free hand sketching of components and building plans and report submission.

2	Minimum 15 free hand self-explanatory dimensioned sketches of various building elements in sketchbook
3	Minimum 15 self-explanatory dimensioned sketches of various building elements on Auto-CAD
4	Drawing of single line plan of residential single storied building in sketchbook & on Auto-CAD
5	Drawing of single line plan of various types of Public building single storied building in sketchbook & on Auto-CAD
6	Single Line plans of multi-storied (2-storied) residential buildings in sketchbook
7	Single Line plans of multi-storied (2-storied) various types of buildings e.g. public / educational / industrial / hospital / community on graph papers (Four assignments) in sketchbook.
Details of on line Laboratory Resource Material Instruction / Operating Manuals	
1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar16
2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar14

Course Title: **Skill Enhancement Course -I (Sketch Up)**										
Semester	I	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	VSEC	1 Hr.	-	2 Hrs.	2	10	15	-	25	-
Course Code	23BTCEL103									
Teaching Mode	Offline	3 Hrs.			Total	25			25	
Duration of ESE	-					50				

Course Objectives	To understand importance of Building drawing as an engineer's language
	To plan building as per owner's requirements and Building byelaws
	To develop drawings to scale with location site and block plan with AutoCAD software
Course Outcomes	**CO1**: Understand the various computer aided Drawing tools.
	CO2: Interpret the functions of building components and draw them free hand.
	CO3: Develop Single Line building drawing as per functional requirements.
	CO4: Evaluate the planning & drawing with appropriate scales using AutoCAD Software.
	CO5: Develop the Provisional drawing of a building as per bye-laws.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO2	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO3	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO4	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO5	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-

List of Experiments-

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	**INTRODUCTION-** Introduction of GOOGLE SKETCHUP ,Unit setup, Shortcut key, Default tray , Mouse Control
2	**TOOLS-BARS-**Camera Tool ,Construction Tool, Edit ,Getting Started ,Large Tool Set ,Layers ,Standard , Principal
3	**DRAWING TOOLS –** Shadows, Styles, Views, Sandbox
4	**3D PLAN DRAW-** Level setting and editing of door, window, and wall
5	**INTERIAL DRAWING -**Kitchen Draw ,Room designing
6	**FURNITURES -** Bed , Table , Chair
7	**3D WAREHOUSE-**Download Components – Importing, editing, placing.
8	**RENDERING -**Apply material, Rendering setup
Details of on line Laboratory Resource Material Instruction / Operating Manuals	
1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar16
2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar14

SYLLABUS FOR SECOND SEMESTER

Course Title: **Construction Material & Workshop Practices**										
Semester	I	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	BSC	2 Hrs.	-	2Hrs.	03	10	15	50	25	-
Course Code	23BTSHL116CE/ 23BTSHP116CE									
Teaching Mode	Offline	4 Hrs.			Total	75			25	
Duration of ESE	2.5 Hrs.					100				

Course Objectives	To identify the various elements of building and material.
	To describe methods and techniques used for various types of construction work.
	To define terminologies associated with Building & its Functional Facilities.
Course Outcomes	**CO1**: Define types of Foundation and basic requirements for building.
	CO2: Identify various components of construction of Building.
	CO3: Select appropriate material for building construction.
	CO4: Examine requirements in various construction related activities and their quality control.
	CO5: Select appropriate conventional as well as sustainable materials for Construction Work of building.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	--	--	3	3	--	3	--	--	--	--	2	3	--	1
CO2	3	--	--	3	3	--	3	--	--	--	--	2	3	--	1
CO3	3	--	--	3	3	--	3	--	--	--	--	2	3	--	1
CO4	3	--	--	3	3	--	3	--	--	--	--	2	3	--	1
CO5	3	--	--	3	3	--	3	--	--	--	--	2	3	--	1

Course Contents:

Unit	Contents	Hours
I	**Foundations:** Necessity and types of R.C.C. foundations, Detail of Deep foundation and precast foundation in general, Details shallow foundations. Bearing capacity of soils and its assessment.	**8**
II	**Brickwork:** Qualities of good bricks, classification of bricks tests on bricks as per as codes. Terms used in brickwork, commonly used types of bonds in brickwork such as header, stretcher, English and Flemish bonds, principles of construction. Reinforced brickwork, brick knogging. Parapets, copings, sills and corbels, brief introduction to cavity walls, load bearing and partition walls. Masonry construction using cement concrete blocks and clay walls, load bearing and partition walls. Masonry construction using cement concrete blocks and clay blocks. Precast construction: Introduction to method and materials. Precast elements like poles, cover, jallies, steps corbets, truss element etc.	**8**
III	**Stone Work:** Stones, cutting and dressing, selection of stones types of stone masonry, principles of construction joints in masonary. Lifting heavy stones, **Arches and Lintels:** Terminology in contraction, type's chajjas and canopies, precast Lintels & Arches. **Damp Proofing:** Causes and effect of dampness. Various methods of damp proofing Damp proofing in plinth protection, New Techniques of Damp proofing. Epoxy etc.	**8**
IV	**Floors and Roofs:** Floors: General Principals, types and method of construction, floors finished quality, testing floor tiles, synthetic & Ceramic Tiles. Roofs: Flat and pitches roofs, roof coverings, types AND their constructional features. Thermal Insulation **Stairs:** Types of stairs, functional design of stairs. **Doors and Windows:** Purpose materials of construction and types.	**8**
V	**Plastering and Pointing:** Necessity, types and methods **Temporary Timbering:** Centering and formwork shoring, underpinning and scaffolding. **Painting:** White washing, colour washing and distempering new materials & Techniques.	**8**

Text Books	1.	Dr. B. C. Punmia, Ashok Kr. Jain, Arun Kr. Jain, Building Construction, 11th Edition, Laxmi Publications (p) LTD, New Delhi, 2015
	2.	Chudley, R. Greeno (2006), Building Construction Handbook' (6th), R. Butterworth-Heinemann
	3.	Building Construction by Rangwala Charotar Pub. House
EBooks	1.	http://gtuinfo.com/Subject/2110004/ECE/Elements_of_Civil_Engineering/Books
	2.	Concrete: Microstructure, Properties, and Materials, Fourth Edition
Referenc e Books	1.	S.C.Rangwala, Building Construction, 30th Edition, Charotar Publishing House, 2011
	2.	Gurcharan Singh, Building Construction & Material, 14 th Edition, Standard Book House, Rajsons Publication Pvt. LTD, 2011

	3.	Building Materials, P.C. Varghese, Prentice-Hall India, 2005
	4.	Various related updated & recent standards of BIS, IRC, ASTM, RILEM, AASHTO, etc. corresponding to materials used for Civil Engineering applications
	1.	www.nptel.iitm.ac.in/iitDelhi (https://nptel.ac.in/courses/105/102/105102088/)

Sr. No.	Name of Experiments / Case Studies
1	To study the various construction Material
2	To Draw the Sign & Symbols of the various construction Material & Building Component
3	To Draw the Sketches of different types of Foundations
4	To Draw the Sketches of different types of bonds in Brickwork
5	To Draw the Sketches of different types of bonds in Stonework
6	To Draw the Sketches of different types of Lintels & Arches
7	To Draw the Sketches of different types of Doors & Windows
8	To Draw the Sketches of different types of Staircases
9	To Draw the Sketches of different types Roofs
10	To Draw the Sketches of different types Scaffolding.

Course Title: **Concrete Technology**										
Semester	II	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	ESC	3 Hrs.	-	2 Hrs.	4	10	15	50	25	-
Course Code	23BTCEL105/ 23BTCEP105									
Teaching Mode	offline	5 Hrs.			Total	75			25	
Duration of ESE	2 Hrs.					100				

Course Objectives	To understand the properties of concrete ingredients.
	To study the compressive, flexural, split strengths etc and other non-destructive tests.
	To learn mix design of concrete and its application in construction work.
Course Outcomes	**CO1:** Understand Properties of cement , aggregates and water use in concrete
	CO2: Evaluate the Mechanical properties of hardened concrete with destructive and non-destructive testing instrument.
	CO3: Analyze various additives & admixtures of concrete to get acquainted to concrete handling equipment and different Special concrete types

	CO4: Judge the durability requirements of concrete.
	CO5: Design concrete mixes as per IS codes

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO2	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO3	2	3	-	-	-	-	2	-	-	-	-	-	2	3	2
CO4	2	3	-	-	-	-	2	3	-	-	-	-	2	3	2
CO5	2	-	-	-	-	-	2	-	-	-	-	3	2	3	2

Course Contents:

Unit	Contents	Hours
I	**Cement**: Main constituents of cements, hydration of cement, water requirement. Physical properties. Types & test on Cement, field & laboratory tests. **Aggregates**: Classification and nomenclature, coarse and fine aggregate, normal weight (light and heavy weight aggregates). Aggregate characteristics and their significance in strength, workability, placement and compaction of concrete. Sampling, Particle shape and texture, Bond of aggregate, size & grading of aggregate strength of aggregate. Mechanical properties and laboratory tests– Specific gravity, bulk density, porosity, absorption of aggregate, moisture content of aggregate, bulking of sand abrasion test, impact value.	7
II	**Water**:-Water quality for mixing and curing, acceptable water, pH value, seawater chlorides content. Provisions in IS: 456-2000 **Fresh Concrete**: Batching, mechanical mixers, automatic batching and mixing plants. Efficiency of mixing, workability measurement- slump cone test, compacting factor test, flow table, Vee-Bee consisto meter, factor affecting workability, setting time, significance of W/C ratio, segregation, bleeding, voids and permeability. Placing of concrete, compaction, vibrators, methods of curing and temperature effects on curing.	10
III	**Strength of concrete**- Factors affecting compressive, tensile and flexural strengths, relation between compressive, flexural and tensile strength. **Destructive Testing of hardened concrete**: Compression strength test on cubes/ cylinder and their relation. Flexural strength of concrete, determination of tensile strength, indirect tension test. **Non Destructive Test (NDT)** – it's Significance, rebound hammer test, ultra sonic pulse velocity test, pullout test as per IS code provision.	8
IV	**Additives and admixtures**- Types of admixtures, byproducts – pozzolana, fly ash, silica fume, rice husk ash, metakaoline, G.G. blast furnace slag. Air entraining,	8

	water reducing, accelerators, retarders, plasticizers and super plasticizers. Fibers & it's types **Special concretes** – Lightweight concrete, fiber reinforced concrete, high density concrete, self-compacting concrete and applications.	
V	**Mix Design**- Standard deviation, factors affecting mix properties, degree of quality control, design of mix by IS code method. **Durability of concrete**- Significance, water as an agent of deterioration, permeability of concrete, air sulphate attack and control, sea water attack, acid attack, efflorescence, resistance of corrosion, abrasion and cavitation's, process of rusting of steel. Study of different types supplementious material	7

Text Books	1.	M L Gambhir, Concrete Technology, 5th Edition, The McGraw-Hill Companies, 2013
	2.	Krishnaswamy, K.T., Kamasundara Rao, A, and Khandekar A.A., Concrete Technology",
	3.	A M Neville, Properties of concrete, 4th Edition, ELBS, London, 2012
E--Books	1.	IS 456-2000, IS 383-1970, IS 516-1959, IS 9103-1999, IS 10262-2009
	2.	M S Shetty, Concrete Technology, 5th Edition, S Chand & Co. Ltd., 2005
Reference Books	1.	M S Shetty, Concrete Technology, 5th Edition, S Chand & Co. Ltd., 2005
	2.	Shanthakumar A. R., "Concrete Technology", Oxford University Press, 2007
	3	Concrete Technology by R.S. Varshney, Oxford and IBH.
on-line NPTL Material	1.	Concrete Technology, Prof. Bhattacharjee B, Indian Institute of Technology - Delhi
	2.	Prof. Bhattacharjee B, Indian Institute of Technology - Delhi
	3.	Manu Santhanam, IIT Madras

List of Experiments-

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	To determine Fineness of cement and Standard Consistency of Cement by Vicat's Apparatus
2	To determine initial and Final Setting time of given cement by Vicat's Apparatus and Soundness cement
3	To determine compressive strength of cement mortar cube.
4	To determine Moisture content, silt content, density and Specific gravity of fine aggregate by pycnometer method
5	To determine Fineness Modulus (FM) by sieve analysis of Fine Aggregate
6	To determine Moisture content, water absorption, density and Specific gravity of coarse aggregate coarse aggregate.
7	To determine Fineness Modulus (FM) by sieve analysis of coarse Aggregate
8	To determine the Workability of Concrete by Slump Test, Compaction Factor and Vee Bee test. Effect of admixture and retarders on setting time of concrete.
9	To determine the Workability of Flowable Concrete & Effect of admixture and retarders on setting time concrete.
10	To determine compressive strength by rebound hammer test and ultrasonic pulse velocity test.

11	To determine the Flexural Strength of Concrete
12	Concrete mix design by IS code method
Open Ended Experiments / New Experiments	
1	Mix Design of rapid hardening cement concrete and low heat cement concrete
2	Mix design of concrete for offshore structures
3	NDT evaluation of rigid pavement by core cutter method

Course Title: **Water Resources Engineering**										
Semester	II	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	ODD	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PCC1	2 Hrs.	-	-	2	10	15	50	-	-
Course Code	23BTCEL106									
Teaching Mode	Offline	2 Hrs.			Total	75			-	
Duration of ESE	2.5 Hrs.					75				

Course Objectives	To understand the hydrological cycle and its processes.
	To understand the infiltration characteristics of runoff.
	To characterize developing hydrograph.
Course Outcomes	**CO1**: Classify hydro-meteorological parameters & estimate abstractions from precipitation.
	CO2: Apply the mechanism of Evaporation, Transpiration and Evapotranspiration in real life situation
	CO3: Analyze rainfall-runoff models and development of hydrographs
	CO4: Examine statistical model and solve hydrologic flood routing models
	CO5: Investigate ground water hydrology and design of rainwater harvesting system.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

B. Tech. Civil Engineering with Multidisciplinary Minor

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2	PSO 3
CO1	1	2	2	-	-	-	-	-	-	-	-	1	3	2	1
CO2	1	2	2	-	-	-	-	-	-	-	-	1	3	2	1
CO3	1	3	2	3	2	-	-	-	-	-	-	2	3	2	1
CO4	1	3	2	1	2	-	-	-	-	-	-	2	3	2	1
CO5	1	3	2	-	2	-	-	-	-	-	-	2	3	2	1

Course Contents:

Unit	Contents	Hours
I	**Introduction**: Hydrological Equations and brief description of its components. Importance of temperature, wind and humidity in hydrology. Earth and its atmosphere and importance. Definition, classifications, selection of site, density and adequacy of rain-gauge station.	6
II	**Infiltration:** Definition, mechanism, factors affecting. **Evaporation:** Definition, mechanism, factors affecting. **Transpiration:** Definition, mechanism, factors affecting.	10
III	**Run off:** Source components of run off, classification of streams, factors affecting. Estimation of discharge and Measurement methods. **Hydrographs:** Introduction: unit hydrographs. Base flow and base flow separation, S-Curve theories. Numerical on Infiltration, Evaporation, Transpiration, Runoff, Hydrographs.	8
IV	**Statistical methods:** Statistics in hydrological analysis. Probability and probability distribution. Analysis of time series, frequency analysis. Statistical analysis of the precipitation. **Floods:** Causes and effects, factors affecting, flood routing and flood forecasting & numerical.	8
V	**Geohydrology:** Introduction, occurrence and distribution, ground water exploration techniques, introduction to hydraulics of well, Numerical. Ground water quality, geomorphic and geologic control, Ground water province of India. **Ground water recharge:** Introduction, recharging methods, spreading methods. Recharge through rain water harvesting. Interlinking of rivers and catchment.	8

Text Books	1.	Subrahmanya, K., 2008, Engineering Hydrology, Tata McGraw Hill Pub. Co., New Delhi.
EBooks	1.	Handbook of Applied Hydrology, Second Edition, By Vijay P. Singh, Ph.D., D.Sc., D. Eng. (Hon.), Ph.D. (Hon.), D. Sc. (Hon.), P.E., P.H., Hon. D. WRE, Academician (GFA)
Reference Books	1.	Dr. P. Jaya and Rami Reddy, Text book of hydrology, 3rd Edition, Laxmi Publication, 2007

	2.	R. K. Sharma and T. K. Sharma, Text book of hydrology and water resource engineering, 5th Edition, Dhanpat Rai Publications, 2007
on line NPTL Material	1.	https://nptel.ac.in/courses/105/101/105101002/
	2.	https://nptel.ac.in/courses/105/103/105103026/

Course Title: **Skill Enhancement Course -II Architectural Planning & Drawing**										
Semester	II	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	VSEC	1 Hr.	-	2 Hrs.	2	10	15	-	25	-
Course Code	23BTCEL107/ 23BTCEP107									
Teaching Mode	Offline	3 Hrs.			Total	25			25	
Duration of ESE	-					50				

Course Objectives	To understand importance of Building drawing as an engineer's language
	To plan building as per owner's requirements and Building byelaws
	To develop drawings to scale with location site and block plan with AutoCAD software
Course Outcomes	**CO1**: Understand the principle of planning and provisions in Bylaws
	CO2: Interpret the functions of building components and draw them free hand
	CO3: Relate building drawing as per functional requirements
	CO4: Evaluate the planning & drawing with appropriate scales using AutoCAD software.
	CO5: Develop the submission drawing of a building as per bye-laws

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO2	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO3	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO4	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO5	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-

Course Contents:

Unit	Contents	Hours

1	**Designing of Building-** Importance of drawing in Civil Engineering, Site requirements, zoning concept, Detailed Project Report and Building byelaws necessary documents. Climate and design consideration, orientation, recommendations of CBRI, General principles of planning with emphasis on functional planning. Graph paper design (line plans) based on various requirements for residential, public, education and industrial buildings.	**8**
II	**Auto CAD (Computer Aided Drafting)** a) Specifying Distance and coordinates. Polar coordinates, relative Cartesian coordinates. Interpreting curser modes and understanding prompt, choosing commands options, selecting objects, editing and grips. Setting up work area, measurement systems, scales factor mode as drafting tools. Symbols, blocks layers. Templates copying object, editing lines, changing length of object. Geometric construction of line and point parallel line, perpendicular lines, breaking lines, dividing lines, fillets, chambers, circles, tangent, arcs, curves through points, breaking polygons, solid shape ellipse.	**5**
III	Hatch patterns boundary, adding text, Text formatting styles, size of text and scale of drawing, dimensions style, unit heights, locations, arrow style Polyline, editing, creating splice curve, dividing in segments, filling in solid area, Printing and plotting drawing, output device paper size, orientation, control on scale and location.	**5**
IV	**Method of Drawing:** Importance of Building drawing as Engineers language in construction & costing, Selection of scales for various drawings. Thickness of line Dimensioning, first angle and third angle method of projection, Abbreviations and conventional representations as per NBC, Free hand dimensioned sketches, stones of various building elements. Developing working drawings to scale as per NBC from the givens sketch design and general specifications for terraced and pitched roofs in Auto-CAD, Developing submission drawings to scale with location site and block plan complete in Auto-CAD.	**8**
V	**Perspective Drawing:** Two point and Three Point perspective of Residential building including small elements of building such as plinth offset, chajjah projections etc.	**6**

Text Books	1.	Shah and Kale, Building Drawing and Design, 2nd Edition, Tata McGraw, 2002
EBooks	1.	Advances in Landscape Architecture, Murat Ozyavuz (ed.) - InTech , 2013
	2.	Green Architecture: Advanced Technologies and Materials, Osman Attmann
Reference Books	1.	V. B. Sikka, Civil Engineering Drawing, 3rd Edition, S. K. Kataria & sons, 2003
	2.	George Omura, Mastering Autocad 1, 1st Edition, BPB Publications, New Delhi, 2004
on line NPTL Material	1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar08
	2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar09

List of Experiments-

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	Drawing of Double line plan of residential single storied building on Auto-CAD
2	Working drawing of residential single storied building of terrace and pitched roofs with foundation plan of load bearing structure. (Two assignment)
3	Submission drawing of single storied residential building (framed structure) with access to terrace including with foundation plan, all details and statements as per the local bye-laws. (One assignment) on Auto-CAD
4	Submission drawing of 02 (G+1) storied residential building framed structure including with foundation plan, all details and statements as per the local bye laws. (One assignment) on Auto-CAD
5	Double Line plans of various types of buildings e.g. public / educational / industrial / hospital / community on Auto-CAD (Two assignments).
6	Two point perspective of the single Residential building neglecting small building elements. (Two assignment – pitched & terraced roof)
7	Three Point perspectives of the single Residential building neglecting small building elements. (Two assignment – pitched & terraced roof)
8	Working drawing of multistoried Public / Educational / Health / Community / Industrial building including structural details and layout of services. (Two assignment) on Auto-CAD/ Sketch-up / 3-D Max / BIM
Details of on line Laboratory Resource Material Instruction / Operating Manuals	
1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar16
2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar14

Course Title: **Skill Enhancement Course -II (REVIT ARCHITECTURE)**										
Semester	**II**	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	VSEC	1 Hr.	-	2 Hrs.	2	10	15	-	25	-
Course Code	23BTCEL108									
Teaching Mode	Offline	3 Hrs.			Total	25			25	
Duration of ESE	-					50				

Course Objectives	To understand importance of Building drawing as an engineer's language
	To plan building as per owner's requirements and Building byelaws

	To develop drawings to scale with location site and block plan with AutoCAD software
Course Outcomes	**CO1**: Understand the principle of planning and provisions in Bylaws
	CO2: Interpret the functions of building components and draw them free hand
	CO3: Relate building drawing as per functional requirements
	CO4: Evaluate the planning & drawing with appropriate scales using AutoCAD software.
	CO5: Develop the submission drawing of a building as per bye-laws

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO2	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO3	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO4	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-
CO5	3	-	3	-	3	-	-	3	-	-	-	3	2	3	-

Course Contents:

Unit	Contents	Hours
1	**Introduction**:- To Revit Architecture- Exploring Gui & Workspace, Display Control (Zoom, Pan, Views, Undo, Redo),File Management (New Open, Save, Save As)	**5**
II	**Units Setting-** Project Browser–Plan Views, Top Views, 3D View, Level Setting, Build Tools – Wall Architecture(Wa), Trim, Modify Tool Trim/ Extend To Corner, Extend Single Element, Trim / Extend Multiple Elements, Annotate Tool – Aligned Dimension, Build Tools – Door (Dr) & Windows (Wn) Load, Family, Door Editing, Window Editing, Build Tools – Floor Architecture & Editing, Roof By Footprint & Editing, Column Architecture & Editing, Build Tools–Ceiling & Editing	**5**
III	**Modify Tools: -** Move, Copy, Offset, Align, Mirror Pick Axis, Mirror Draw Axis, Rotate, Split Element, Split With Gap, Pin, Unpin, Delete, Wall Join.	**5**
IV	**Circulation Tools:-** Railing & Editing, Ramp & Editing, Stairs & Types & Editing, Stair By Sketch	**5**
V	**Opening Tools**:- Edit Profile (Wall), Wall Opening, Attach & Detach Wall. Opening By Face, Vertical, Opening, Shaft Opening, Dormer, Join / Unjoin Roof.	**5**
VI	**Model Site:-** Topo surface, Sub region, Split, Surface, Merge Surfaces, and Site Component.	**5**

Text Books	1.	Shah and Kale, Building Drawing and Design, 2nd Edition, Tata McGraw, 2002
EBooks	1.	Advances in Landscape Architecture, Murat Ozyavuz (ed.) - InTech , 2013
	2.	Green Architecture: Advanced Technologies and Materials, Osman Attmann

Reference Books	1.	V. B. Sikka, Civil Engineering Drawing, 3rd Edition, S. K. Kataria & sons, 2003
	2.	George Omura, Mastering Autocad 1, 1st Edition, BPB Publications, New Delhi, 2004
on line TL Material	1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar08
	2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar09

SYLLABUS FOR THIRD SEMESTER

Course Title: **Mechanics of Materials**										
Semester	III	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	ESC	3 Hrs.	1	2 Hrs.	4	10	15	50	25	-
Course Code	23BTCEL201/ 23BTCEP201									
Teaching Mode	offline	5 Hrs.			Total	75			25	
Duration of ESE	2 Hrs.					100				

Course Objectives	To study the various mechanical properties of materials
	To provide systematic methods for solving engineering problems in solid mechanics
	To use the fundamental concepts of stress, strain and elastic behavior of materials
Course Outcomes	**CO1:** Understand the behavior of materials under different stress and strain condition
	CO2: Develop the shear force and bending moment diagrams .
	CO3: Formulate the bending, torsional and shear stress equation and develop bending and shear stress distribution
	CO4: Evaluate the slope and deflection of beams subjected to loads .
	CO5: Determine the principal stresses and principal planes

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

	Program Outcomes and Program Specific Outcomes

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO2	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO3	2	3	-	-	-	-	2	-	-	-	-	-	2	3	2
CO4	2	3	-	-	-	-	2	3	-	-	-	-	2	3	2
CO5	2	-	-	-	-	-	2	-	-	-	-	3	2	3	2

Course Contents:

Unit	Contents	Hours
I	**Mechanical Properties and Uniaxial Problems**: Concept of stress and strain, Stress strain behavior of ductile and brittle material in uniaxial state of stress. Elastic constants, Relation between elastic constants. Uniaxial loading and deformation of simple cases of statically indeterminate problems under axial loading.	6
II	**Shear Force & Bending Moment Diagrams**: Determination of shear forces and Bending moment at a section, SF and BM diagram in beams, Differential relation between shear force and bending moment, Relation between load and shear force.	5
III	**Shear & Bending Stresses in Beam**: Bending stresses in simple beam, Assumptions and derivation of simple bending, Homogeneous and composite beams. Shear stresses in simple beams, shear stress distribution, Shear Stress in composite beams. **Torsion of Shafts**: Torsion of circular sections, Assumptions and derivation of relations between torsional moment, Shear stresses and angle of twist. Torsional stress in solid and Circular sections.	9
IV	**Slope & Deflection of determinate beams**: Differential equation relating deflection and moment shear and load, Deflection of simple beams by integration.	5
V	**State of Stress In Two Dimensions:** State of stress in two dimensions, Differential equation of equilibrium, Transformation of stresses , Principal stresses, Maximum shear stresses, Mohr's circle, Combined bending and torsion, Combined effect of Torsion and Shear.	6

Text Books	1.	James Gare, Mechanics of Material, 8th Edition, Cengage Learning, 2012.
	2	Gere and Timoshenko, "Mechanics of Materials", CBS publishers.
	3	B. C. Punmia, Mechanics of Material, 15th Edition, Laxmi Publications, 2005.
	4	Beer and Johnston, "Mechanics of Material", Tata Mc Graw Hill publication.

List of Practicals:

Sr. No.	Name of Experiments (Any Ten Experiment)
1	Study of Universal Testing Machine (U.T.M)
2	To determine the Tensile Strength of Steel specimen.
3	To perform shear test on different metals.
4	To perform Hardness test on various metals. (Brinell's hardness test & Rockwell hardness test)
5	To perform standard Torsion test on metals.
6	To perform the bending test on wooden beam and find its Flexural Rigidity.
7	To determine the compressive strength of wet and dry bricks
8	To determine the compressive strength of wooden block (Parallel & Perpendicular to the grains)
9	To determine the transverse strength of flooring tiles
10	To determine Impact strength of different metals by Izod Impact Test
11	To determine Impact strength of different metals by Charpy Impact Test

<table>
<tr><td colspan="11">Course Title: Soil Mechanics</td></tr>
<tr><td rowspan="2">Semester</td><td rowspan="2">III</td><td colspan="4" rowspan="2">Teaching Scheme</td><td colspan="5">Evaluation Scheme</td></tr>
<tr><td colspan="3">Theory</td><td colspan="2">Practical</td></tr>
<tr><td>Term</td><td>EVEN</td><td>Th</td><td>Tu</td><td>Pr</td><td>Credits</td><td>TAE</td><td>CAE</td><td>ESE</td><td>INT</td><td>EXT</td></tr>
<tr><td>Course Category</td><td rowspan="2">ESC</td><td rowspan="2">3 Hrs.</td><td rowspan="2">1</td><td rowspan="2">2 Hrs.</td><td rowspan="2">4</td><td rowspan="2">10</td><td rowspan="2">15</td><td rowspan="2">50</td><td rowspan="2">25</td><td rowspan="2">-</td></tr>
<tr><td>Course Code</td><td>23BTCEL202/ 23BTCEP202</td></tr>
<tr><td>Teaching Mode</td><td>offline</td><td colspan="3" rowspan="2">5 Hrs.</td><td rowspan="2">Total</td><td colspan="3">75</td><td colspan="2">25</td></tr>
<tr><td>Duration of ESE</td><td>2 Hrs.</td><td colspan="5">100</td></tr>
</table>

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:
B. Tech. Civil Engineering with Multidisciplinary Minor

Course Objectives	To design and plan the residential buildings as per local bye-laws and produce different types of drawings for the same
Course Outcomes	**CO1:** Characterize and classify different types of soils
	CO2: Identify the methods for determination of soil properties and different types of classification Systems .
	CO3: Implement the concepts of flow of water through soil
	CO4: Apply the concept of compaction and consolidation on field .

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO2	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO3	2	3	-	-	-	-	2	-	-	-	-	-	2	3	2
CO4	2	3	-	-	-	-	2	3	-	-	-	-	2	3	2
CO5	2	-	-	-	-	-	2	-	-	-	-	3	2	3	2

Course Contents:

1	**Introduction & Physical properties of soil**: Introduction to Soil and Soil Mechanics, Civil Engineering problems related to soils, Complexity of soil nature, Soil formation and soil types, Soil- a three phase system, Solids-water-air relationships, water content, void ratio, porosity, degree of saturation, unit weight, specific gravity, their interrelationships and Laboratory determination	10
2	**Index properties of soil & Classification of soils**: Grain size distribution by sieve analysis, Consistency of clays and determination, Atterberg's limits and indexes as per IS-code, Necessity of classification, criteria for classification, classification based on grain size and plasticity, Indian standard classification system	10
3	**Permeability & Seepage analysis**: Darcy's law, methods of determination of coefficient of permeability of soils – constant head and falling head permeability tests, factors affecting permeability, approximate coefficient of permeability of common soils, field permeability tests, Seepage pressure, upward flow, quick condition, two-dimensional Laplace equation, Flow net and its properties Effective Stress Principle, Introduction to Liquefaction potential of soil	10

4	**Soil compaction:** Necessity of compaction in field, Standard Proctor test, Modified Proctor test, compaction curve, OMC and Maximum dry density, Compaction curve for sand, factors affecting 28 compaction, structure and engineering behavior of compacted soil, Zero air void line, Compaction in field, suitability of various compaction equipment **Consolidation:** The consolidation process, spring analogy, consolidation of laterally confined soil, Terzaghi's theory of one-dimensional consolidation (no derivation), solution of the consolidation equation, determination of coefficient of consolidation, square root time fitting method, logarithm of time fitting method, coefficient of compression, coefficient of volume change, consolidation settlement, consolidation of undisturbed specimen, determination.	12

Text Books	1.	Shah and Kale, Building Drawing and Design, 2nd Edition, Tata McGraw, 2002
	2	Singh, Alam, Soil Mechanics in Theory & Practice, Asia Publishing House, 12th Edition 2011
	3	Holtz, R.D. and Kovacs, W. D., An Introduction to Geotechnical Engineering, 2nd Edition, Prentice Hall, 1981
	4	Couduto, D.P., Geotechnical Engineering – Principles and Practices, 2nd Edition, Prentice Hall of India, 12th Edition, 2002
	5	Arora, K. R., Soil Mechanics & Foundation Engineering, Standard Publishers, 5th Edition

List of Practical

1.	Moisture content and Specific gravity of soil.
2.	Grain size Analysis – (Sieve Analysis).
3.	Consistency limit, plastic limit and liquid limit of soil.
4.	Hydrometer Analysis.
5.	Constant Head Permeability test of or Falling Head Permeability test.
6.	Consistency limit of soil (shrinkage limit).
7.	Field Density by sand replacement method.
8.	Field Density by core cutter method.
9.	Unconfined compression test.
10.	Direct shear Test.
11.	Triaxial shear test (Demonstration).
12.	Proctor compaction Test and Proctor needle test.

Course Title: **Disaster Management (Multidisciplinary Minor-1)**										
Semester	III	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	ESC	2 Hrs.	-	2 Hrs.	2	10	15	50	25	-
Course Code	23BTCEL208									
Teaching Mode	offline	4 Hrs.			Total	75			25	
Duration of ESE	2 Hrs.					100				

Course Objectives	To understand various types of disaster situation and basic concept of disaster management
	To understand the various processes of risk management
	To apply basic concepts and scientific strategies to Control Disaster hazards and preparedness
Course Outcomes	Upon successful completion of this course, student will be able to:
	CO1: Understand Types, Trends, Causes, Consequences and Control of Disasters.
	CO2: Interpret the usefulness of integrating management principles in disaster Mitigation work.
	CO3: Apply the concept of Disaster Management
	CO4: Evaluate the different approaches needed to manage pre-during and post- disaster periods.
	CO5: Develop modern tools to solve the issues related to Disaster in line with Sustainable technology.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO2	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO3	2	3	-	-	-	-	2	-	-	-	-	-	2	3	2
CO4	2	3	-	-	-	-	2	3	-	-	-	-	2	3	2
CO5	2	-	-	-	-	-	2	-	-	-	-	3	2	3	2

Course Contents:

Unit	Contents	Hours
I	**UNIT I: Introduction on Disaster** Different Types of Disaster: Natural Disaster: such as Flood, Cyclone, Earthquakes, Landslides etc. Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures (Building and Bridge), War & Terrorism etc. Causes, effects and practical examples for all disasters.	9
II	**UNIT II: Risk and Vulnerability Analysis** Risk: Its concept and analysis, Risk Reduction, Vulnerability: Its concept and analysis, Strategic Development for Vulnerability Reduction, Risk Management in disaster zone	9
III	**UNIT III: Disaster Preparedness** Disaster Preparedness: Concept and Nature, Disaster Preparedness Plan, Prediction, Early Warnings and Safety Measures of Disaster, Role of Information, Role of Government, International and NGO Bodies, Role of IT in Disaster Preparedness, Role of Engineers on Disaster Management.	9
IV	**UNIT IV: Disaster Response** Disaster Response: Introduction, Disaster Response Plan, Communication, Participation, and Activation of Emergency Preparedness Plan Search, Rescue, Rescue Equipment, Rescue Methods Evacuation and Logistic Management Role of Government, International and NGO Bodies Psychological Response and Management (Trauma, Stress, Rumor and Panic), Relief and Recovery, Medical Health Response to Different Disasters	**9**
V	**UNIT V: Rehabilitation, Reconstruction and Recovery** Reconstruction and Rehabilitation as a Means of Development, Damage Assessment, Disaster Resistant House Construction Sanitation and Hygiene, Education and Awareness, Dealing with Victims' Psychology, Long-term Counter Disaster Planning, Role of Educational Institute.	9

Text Books	1	Singhal, J.P. Disaster Management, Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423.
	2	Bhattacharya, T. Disaster Science and Management, McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361.
	3	Gupta, A. K. and Sreeja, S. N. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011.

	4	Kapur, A. Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.
Reference Books	1.	Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
	2.	Government of India, National Disaster Management Policy,2009, 2019.

Course Title: **Basics of Civil Engineering (Open Elective-1)**										
Semester	III	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	ESC	2 Hrs.	-	2 Hrs.	4	10	15	50	25	-
Course Code										
Teaching Mode	offline	4 Hrs.			Total	75			25	
Duration of ESE	2 Hrs.					100				

Course Objectives	To design and plan the residential buildings as per local bye-laws and produce different types ofdrawings for the same
Course Outcomes	Upon successful completion of this course, student will be able to:
	CO1: Characterize and classify different types of soils
	CO2: Identify the methods for determination of soil properties and different types of classificationSystems
	CO3: Implement the concepts of flow of water through soil
	CO4: Apply the concept of compaction and consolidation on field .

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO2	2	-	-	-	-	-	2	-	-	-	-	-	2	3	2
CO3	2	3	-	-	-	-	2	-	-	-	-	-	2	3	2
CO4	2	3	-	-	-	-	2	3	-	-	-	-	2	3	2
CO5	2	-	-	-	-	-	2	-	-	-	-	3	2	3	2

Course Contents:

Unit	Contents	Hours
I	**UNIT I: Introduction to Civil Engineering** Introduction and scope of Civil Engineering. Role of Engineers in the infrastructure development. General concepts related to building.Selection of site, basic functions of buildings, types of buildings – Residential, Public, Commercial, and Industrial. Principles of planning, orientation of buildings, introduction to bye-laws regarding building line, Height of building, open space requirement, F.S.I., Carpet area, built up area, setbacks, ventilation. Components of Buildings Introduction to Types of loads on buildings. Substructure – Types of soils; rocks and foundation strata, concept of bearing capacity, Types of foundation and their suitability. Superstructure – Types of construction: Load Bearing, Framed, and Composite. Building Materials Introduction to basic construction materials; cement, bricks, stone, aggregates, reinforcing steel, structural glazing, structural steel; Concrete types: PCC, RCC, Prestressed, Precast and Ready Mix Concrete. Use of various eco- friendly materials in construction. Introduction to advance construction equipment's and techniques	8
II	**UNIT II: Surveying:** Various types of maps and their uses; Introduction to digital mapping; Principles of survey. Introduction to various survey instruments such as EDM, Lasers, Total Station, and digital planimeter. Modern survey methods. Introduction to GIS, GPS and their applications. Transportation Engineering Role of transportation in national development; various modes of Transportation. Classification of Highways: Expressways, NH, SH, MDR, ODR, VR; Types of Pavements, Traffic Signs, signals, Parking system, and Causes of Accidents	7
III	**UNIT III: Environment and Natural Resource Management Water supply** Sources, drinking water requirements, impurities in water and their effects; Purification of water, modern purification processes; Standards of purified water. Waste Management: Collection and Disposal methods of Liquid, solid and gaseous wastes. Water Resources Engineering Introduction to Hydraulic structures of storage; water conveyance systems; Watershed management: Definition, Necessity and methods; Roof top rain water harvesting andGround water recharge: relevance and methods.	7
IV	**UNIT IV: Instrumentation in Civil Engineering Structures**: Various instruments used in construction, water resources, Environmental Engineering, Foundation Engineering, Thermocouples, condition monitoring equipment's, Half Cell Potentiometers, Strain Gauges. Management of Utilities using telemetry & SCADA System. Sustainable Development: Role of Engineers in Sustainable Development. Concept of greenbuildings and LEED Certification	6

Text Books	1	Bhavikatti, S. S. Elements of Civil Engineering, New Age International, 2019
	2	Punmia, B. C, Jain Ashok K,and Jain Arun K..Basic Civil Engineering, Laxmi Publication, 2003.

	3	Shetty, M.S. Concrete Technology, S. Chand, 2014
	4	Kanetkar and Kulkarni, Surveying and Levelling, Pune Vidyarthi Graha Prakashan, 2006
	5	Birdie G. S., and Birdie, J. S., Water Supply and Sanitary Engineering, Dhanpatrai Publication, 2018
	6	Kumar Sushil, Building Construction, Standard Publications, 2020
	7	Khanna & Justo, Transportation Engineering, Nem Chand and Brothers, 2001
	8	Shah and Kale, Building Drawing Design, Tata McGraw Hill Education, 2001

SEMESTER –IV

Course Title: **Surveying & Geomatics**										
Semester	IV	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PCC4	3 Hrs.	-	2 Hrs.	4	10	15	50	25	25
Course Code	23BTCEL204/ 23BTCEP204									
Teaching Mode	Offline	5 Hrs.			Total	75			50	
Duration of ESE	2Hrs.30Min					125				

Course Objectives	To understand the basic principles of surveying.
	To study the coordinate systems and measuring techniques.
	To study different types of survey and instruments used.
Course Outcomes	**CO1**: Understand the basic principles of survey.
	CO2: Apply the linear measurements.
	CO3: Analyze angular measurements & bearings.
	CO4: Evaluation of elevation of various points to Prepare topographical maps.
	CO5: Assemble the modern instruments in surveying work.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	-	-	3	3	-	-	-	3	-	-	3	-	-	3
CO2	3	-	-	3	3	-	-	-	3	-	-	3	-	-	3
CO3	3	-	-	3	3	-	-	-	3	-	-	3	-	-	3
CO4	3	-	-	3	3	-	-	-	3	-	-	3	-	-	3
CO5	3	-	-	3	3	-	-	-	3	-	-	3	-	-	3

Course Contents:

Unit	Contents	Hours
I	**Chain Traversing:** Geo-informatics, definition Concept of Geoids and reference spheroids, Geodetic & Plane Surveying, Classification of survey, Principles of Surveying, Linear measurements, Corrections to field measurements, Direct & Indirect ranging. Principle of Chain Surveying, Cross Staff Survey, Chain Traversing, Optical Square, Line Ranger, Prism Square, Obstacles in Chaining, Plotting of Chain Survey Work, Errors – Sources & Types.	8
II	**Compass Traversing:** Prismatic compass, Surveyor's compass, their use & adjustment. Compass Traversing: Reference meridians, Bearings & azimuths. Local attraction, magnetic declination & its variation. Open & closed traverses. Adjustment of closed traverse.	7

III	**Leveling:** Definition of terms, Principle of leveling, Reduction of levels, Classification of leveling, Dumpy level, Tilting level & Automatic level. Temporary & Permanent adjustments. Principle axes of Dumpy level, Relationship, Testing and adjustment of bubble axis and line of collimation. Profile leveling, Longitudinal sectioning, Cross Sectioning, Reciprocal leveling, Distance to vertical horizon, leveling methods, leveling staves, Booking & reduction of field notes, curvature & refraction. Sensitivity of bubble tube. **Contouring:** Definition, Characteristics & uses of contour maps, methods of contouring. Interpolation of Contours, Computation of area and volume – Trapezoidal and Simpson's Rule, Plannimeter, theory of Zero Circle. Use of Major & Minor instruments like EDM, Total Station, Abney level, Box sextant Planimeter Tangent Clinometer, Ghat Tracer	9
IV	**Theodolite Traversing:** Type of theodolite, Temporary & Permanent adjustment, Measurement of Horizontal & Vertical angles, Prolonging a line, Other uses of theodolite. Consecutive & Independent Coordinates, Adjustment of Closed traverse, latitude & departure, Gale's traverse table, area calculation by coordinates.	8
V	**Plane Table Traversing**: Equipments & accessories, methods two point & three point problems, orientation and resection, Advantages & disadvantages of plane tabling. Lehman's rules. Errors in plane tabling and solutions.	8

Text Books	1.	T. P. Kanetkar & S.V.Kulkarni, Surveying and Leveling Part II, 5th Edition, Laxmi Publication Ltd, 2005
	2.	B. C. Punmia, Surveying Vol. II and III, 5th Edition, Laxmi Publication Ltd, 2005
	3.	C.P. Lo, Albert K.W.Yeung, Concepts and Techniques of Geographic Information Systems, 2nd Edition, Prentice Hall, 2006, ISBN-13: 9780131495029
	4.	Alfred Leick, GPS satellite surveying, John Wiley & Sons Inc., 3rd Edition, 2004. ISBN: 978-0-471-05930-1
EBooks	1.	A Manual Of Land Surveying, F. Hodgman - F. Hodgman Co. , 1907
	2.	Land Development Handbook: Planning, Engineering, and Surveying, Third Edition, Sidney O. Dewberry
Reference Books	1.	D. Clark, Plane and Geodetic Surveying Vol II, 3rd Edition, New age international limited, 2005
	2.	Dr. A. M. Chandra, Surveying, 5th Edition, New age international limited, 2005
on line NPTLMaterial	1.	www.nptel.iitrr.ac.in/iitroorki.
	2.	www.nptel.iitg.ac.in/iitGuahati.

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	i) Measurement of distance by Ranging and Chaining. ii) Locating various objects by Chain & Cross staff surveying. iii) Determination of area of polygon by Chain and Cross staff survey.
2	i) Measurement of bearings of sides of traverse with Prismatic Compass and computation of correct included angle.
3	i) One full size drawing sheet locating given building by Chain and Compass traversing.
4	i) Determination of elevation of various points with dumpy level by Collimation Plane Method and Rise & Fall Method. ii) One full size drawing sheet on L – section and C – section of Road. iii) One full size drawing sheet Contour Plan of given area.

5	i) Determination of elevation of various points with Dumpy Level by keeping staff inverted.
6	i) Fixing Bench Mark with respect to Temporary Bench Mark with Dumpy Level by Fly leveling and Check leveling.
7	i) Measurement of horizontal angles with Theodolite by means of Repetition Method. ii) Measurement of vertical angles using Theodolite. iii) One full size drawing sheet locating given building (traverse) by Theodolite traversing.
8	i) Locating given building traverse by Radiation Method by Plane Table Traversing (One full size drawing sheet)
9	i) Locating given building traverse by Intersection Method by Plane Table Traversing (One full size drawing sheet)
10	Open Ended Experiment.
Open Ended Experiments	
1	Determination of area of polygon by Total Station Instrument.
2	Determination of elevation of various points with Total Station Instrument.
Details of on line Laboratory Resource Material Instruction / Operating Manuals	

Text Books	1.	T. P. Kanetkar & S.V.Kulkarni, Surveying and Leveling Part II, 5th Edition, Laxmi Publication Ltd, 2005
	2.	B. C. Punmia, Surveying Vol. II and III, 5th Edition, Laxmi Publication Ltd, 2005
	3.	C.P. Lo, Albert K.W.Yeung, Concepts and Techniques of Geographic Information Systems, 2nd Edition, Prentice Hall, 2006, ISBN-13: 9780131495029
	4.	Alfred Leick, GPS satellite surveying, John Wiley & Sons Inc., 3rd Edition, 2004. ISBN: 978-0-471-05930-1
EBooks	1.	A Manual Of Land Surveying, F. Hodgman - F. Hodgman Co. , 1907
	2.	Land Development Handbook: Planning, Engineering, and Surveying, Third Edition, Sidney O. Dewberry
Reference Books	1.	D. Clark, Plane and Geodetic Surveying Vol II, 3rd Edition, New age international limited, 2005
	2.	Dr. A. M. Chandra, Surveying, 5th Edition, New age international limited, 2005
on line NPTL Material	1.	www.nptel.iitrr.ac.in/iitroorki.
	2.	www.nptel.iitg.ac.in/iitGuahati.

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	1. Measurement of distance by Ranging and Chaining. 2. Locating various objects by Chain & Cross staff surveying. 3. Determination of area of polygon by Chain and Cross staff survey.
2	ii) Measurement of Length by using Distomat.
3	iii) Measurement of bearings of sides of traverse with Prismatic Compass and computation of correct included angle. iv) One full size drawing sheet locating given building by Chain and Compass traversing.
4	i) Determination of elevation of various points with dumpy level by Collimation Plane Method and Rise & Fall Method.

	ii) Determination of elevation of various points with Dumpy Level by keeping staff inverted.
5	ii) Fixing Bench Mark with respect to Temporary Bench Mark with Dumpy Level by Fly leveling and Check leveling. iii) One full size drawing sheet on L – section and C – section of Road. iv) One full size drawing sheet Contour Plan of given area.
6	iv) Measurement of horizontal angles with Theodolite by means of Repetition Method. v) Measurement of vertical angles using Theodolite. vi) One full size drawing sheet locating given building (traverse) by Theodolite traversing.
7	i) Determination of constant of Tacheometer. ii) Determination of elevation of point by Tacheometric surveying.
8	i) Determination of elevation of point and horizontal distance between them by Tacheometric survey. ii) Determination of gradient of given length if road by Tachometric survey.
9	i) Topographic survey & Setting out of any building by using Total Station. ii) One full size drawing sheet Contour Plan of given area.
10	Open Ended Experiment.
Open Ended Experiments	
1	Determination of area of polygon by Total Station Instrument.
2	Determination of elevation of various points with Total Station Instrument.
Details of on line Laboratory Resource Material Instruction / Operating Manuals	

Course Title: **Structural Analysis**										
Semester	IV	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	PCC5	3 Hrs.	.	2Hrs	4	10	15	50	25	-
Course Code	23BTCEL205/ 23BTCEP205									
Teaching Mode	Offline	5 Hrs.			Total	75			25	
Duration of ESE	2Hrs.30Min					100				

Course Objectives	To study basic concepts of analysis of structural components
	To study the behavior of structural components under the various combination of loads.
	To study various methods for the analysis of indeterminate structure.
Course Outcomes	**CO1**: Understand the basic concept used in the analysis of determinate & indeterminate structure.
	CO2: Apply the concept of Strain energy for the analysis of different structures.
	CO3: Analyse the columns using different failure theories.
	CO4: Evaluate the continuous beam with and without sinking of support, Non Sway and sway frames by different methods

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	-	-	-	-	-	-		-	3	3	2	1
CO2	3	3	2	-	-	-	-	-	-	3	-	3	3	2	1
CO3	3	3	2	-	-	-	-	-	-		-	3	3	2	1
CO4	3	3	3	-	-	-	-	-	-	3	-	3	3	2	1

Course Contents:

Unit	Contents	Hours
I	Static determinacy of structure Analysis of loads on simply supported beams with concentrated and uniformly distributed loads, maximum bending moment (BM) and shear force (SF). Influence lines for reactions, bending moments and shear forces in simply supported beams, cantilevers and beams with overhangs. Influence lines for forces in members of simple trusses and for BM and SF in panels of simple trusses.	7
II	Slope deflection method as applied to indeterminate beams & continues beams portal frames, frame with inclined legs up to 3 degrees of freedom.	8
III	Unit load Method & Strain energy method as applied to the analysis of redundant frames and redundant trusses up to two degrees. Determination of deflection of trusses. Willot Mohr diagram, Castiglanos theorems, Maxwell's reciprocal theorem. Betti's theorem, Analysis of Two- Hinged arches, S.F. and normal thrust, parabolic arches.	7
IV	Bucking of Columns and beams columns, Euler's and Rankine's formula.	8

Text Books	1.	R C Hibbeler, Structural Analysis, 9th Edition, Pearson, 2017
	2.	Intermediate Structural Analysis C.K. Wang Published by Tata McGraw-Hill Education Pvt. Ltd., 2014 ISBN 10: 0070702497 / ISBN 13: 9780070702493
	3.	S.S. Bhavikatti, Structural Analysis, Vol- I, 2nd Edition, Vikas Publication, 2009
	4.	Methods of Structural Analysis by Beer & Johnson.
EBooks	1.	Structural Analysis-I, 4th Edition eBook: Bhavikatti
	2.	STRUCTURAL ANALYSIS - I eBook: Dr. SURESH R. PAREKAR, H.M. SOMAYYA
Reference Books	1.	Wilbur J.B. & Norris C.H, Elementary Structural Analysis, 3rd Edition, McGraw Hill, 2009
	2.	Theory of Structures, Stephen P. Timoshenko, Donovan H. Young, McGraw-Hill Inc., US; 2nd edition, 1968
	3.	Structural Analysis: Thandavamoorthy—Oxford University Press
online TL Material	1.	Structural Analysis-I, Prof. Amit Shaw, Indian Institute of Technology Kharagpur

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	To calculate & compare the buckling loads for each column model with different end conditions
2	To determine experimentally the horizontal displacement of the two hinged arch and verify the same with theoretical value
3	To determine the sway of a fixed end portal frame under different loading conditions
4	To find the value of flexural rigidity (EI) for a given beam and compare it with theoretical value
5	To verify clerk Maxwell's reciprocal theorem for beam
6	To determine the deflection of a pin connected truss analytically & graphically and verify the same experimentally
7	To determine material fringe value by using diffused light research polariscope
8	To verify the moment area theorem regarding the slopes and deflections of the beam
9	To determine the moment required to produce a given rotation (rotational stiffness) at one end of the beam when the other end is pinned
10	To determine the horizontal thrust and to draw the ILD for horizontal thrust
11	To verify clerk Maxwell's reciprocal theorem by means of the truss
12	To verify the Muller Breslau theorem by using Begg's deformator set.
13	To determine the stress pattern and material fringe value of beam using Photo elastic method.
Open Ended Experiments / New Experiments	
1	Analysis of beam using SAP
2	Analysis of Frame using SAP
3	Analysis of Truss using SAP

Course Title: **Open Elective - II**										
Semester	IV	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	OE2	2 Hrs.	-	-	2	10	15	50	-	-
Course Code	23BTISL2XX									
Teaching Mode	Online									
To be offered based on courses available on NPTEL/SWAYAM										

Course Title: **Skill Enhancement Course-III (Computational tool for Survey)**										
Semester	IV	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	VSEC3	1	-	2	2	10	15		25	-
Course Code	23BTCEP2XX									

Teaching Mode	offline	3 Hrs	Total	25	25
Duration of ESE	-			50	

Course Outcomes	CO1. Assemble the modern Techniques and Instruments in Surveying work.
	CO2. Evaluation of Coordinates of various points.
	CO3. Prepare Topographical, Contour and Location Maps.
	CO4. Evaluate the Earth Works of Civil Engineering Projects
	CO5. Setting out of Civil Engineering Projects.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	-	-	3	-	-	-	3	-	-	3	3	-	-
CO2	3	-	-	-	3	-	-	-	3	-	-	3	3	-	-
CO3	3	-	-	-	3	-	-	-	3	-	-	3	3	-	-
CO4	3	-	-	-	3	-	-	-	3	-	-	3	3	-	-
CO5	3	-	-	-	3	-	-	-	3	-	-	3	3	-	-

Syllabus of skill course to be framed as per the industry trend / demand based on following topics.(any one)

1. Total Station -
2. DGPS
3. GPS / EDM

1. Introduction of Equipment, creating New file, opening Existing File closing a file saving
2. Determination of Horizontal Angle & Vertical Angle
3. Determination of Horizontal Distance & Vertical Distance
4. Determination of Area of Field
5. Determination of Volume of Earth Work, Traversing , Mapping & Contouring
6. Determination of remote height, Staking out Distance, gradient, difference,
7. Determination height between two inaccessible points, Topographic planning.
8. Determination of RTK and its application for various projects

Course Title: Aptitude & **Employability Skills**										
Semester	IV	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	AEC2	1Hrs	--	2 Hrs	2	10	15		25	--
Course Code	23BTHUL202 23BTHUP202									
Teaching Mode	offline	3 Hrs			Total	25			25	
Duration of ESE	-					50				

Course Objectives	To introduce them with the current market scenarios
	To equip the students with the essential skills for employability
	To demonstrate self-sufficiency to be highly employable or venture their start-ups
Course Outcomes	**CO1**-Students shall exhibit their ability to set clear and realistic professional objective
	CO2-Enabling them to make well informed choices and commercially equipped
	CO3-Master Verbal (LSRW) and non-verbal communication skills required in the process of recruitment
	CO4-Students shall exhibit improved Interpersonal skills for better professional conduct
	CO5-Students shall exercise higher order thinking skills, creativity skills, convincing and Negotiation skills

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1						**1**		**2**	**1**	**2**		**1**	**1**	**3**	**2**
CO2						**1**				**1**			**1**	**3**	**2**
CO3						**1**			**1**	**3**			**1**	**3**	**2**
CO4						**2**		**3**	**2**			**2**	**1**	**3**	**2**
CO5									**1**		**2**	**1**	**1**	**3**	**2**

Course Contents:

Unit	Contents	Hours
I	**Orientation - Researching Job and Company- Emerging Market Trends:** Experience sharing of Major Campus interviews, Skill Requirements, Current Market trends, Researching the Job and company	4
II	**Personal and company commercial:** Guidelines for preparing a 30- 90 second self-Introduction .Questions to think about in developing a commercial Understand " What to avoid" in a commercial - **Self Selling Proficiency**: What to say and do, How to demonstrate commercial awareness in an interview ,Post Interview activity, Telephone etiquette in a phone Interview **Resume Building :** Guidelines on framing resume and cover letter Checklist to ensure completeness , Sample resumes and cover letter references Basic Guidelines on Video Resume an its difference with conventional	4
III	**Verbal and Non-Verbal Communication:** Format of Business Correspondence, Email and Letter writing etiquette, Hands on training on email and letter writing with case study, Body Language in an Interview- Dos' and Donts',Tips and techniques on Essay Writing How to knot the crux on Essay writing Practise on some common essay writing topics in an interview - **Voice Versant** **Neutralization :** Voice Modulation, Pitch and tone training and Accent Neutralization	4
IV	**Personal Interview- Group Discussion**: Preparation tips on GD and Extempore: Dos' and Donts', Presentation on PI Preparation and FAQs - Role Plays/ Mock Interview with Technical Faculty and Mock Interview by Faculty **Assessment and feedback series:**	3

Course Title: **Project Planning and Construction Management**										
Semester	IV	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	HSSM2	2 Hrs.	-	-	2	10	15	50	-	-
Course Code	23BTCEL207									
Teaching Mode	offline	2 Hrs.			Total	75			-	
Duration of ESE	2Hrs.30Min					75				

Course Objectives	To learn elements of management in civil engineering projects, organization structure and quality control.
	To study project planning, project monitoring, cost planning, and resource allocation through network techniques.
	To understand engineering economics and laws related to contracts, labor safety etc.
Course Outcome	CO1 Understand the project life cycle and organization.
	CO2 Solve problems related to Network and total duration of the project using different network techniques.
	CO3 Compare the construction techniques for optimal performance.
	CO4 Evaluate the operational cost, owning and hiring cost of the equipment.
	CO5. Estimate the Material cost Requirement

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	3	-	-	3	-	-	-	3	-	3	-	3	2	2
CO2	-	3	-	-	3	-	-	-	3	-	3	-	3	2	2
CO3	-	3	-	-	3	-	-	-	3	-	3	-	3	2	2
CO4	-	3	-	-	3	-	-	-	3	-	3	-	3	2	2
CO5	-	3	-	-	3	-	-	-	3	-	3	-	3	2	2

Course Contents:

Unit	Contents	Hours
I	**Elements of Management:** Introduction, Definition, functions of management, advances and societal influences in construction management, Project life cycle, Quality control. Phases of a project, agencies involved, Indian standards on construction and project management Stages of project planning Process of development of plans and schedules, work break-down structure role of client and contractor	8

II	**Network Techniques & Resource Scheduling:** Bar charts, milestone charts, preparation of CPM, PERT & GERT networks, analysis of networks, Application of network Techniques. Line of balance technique, resource constraints and conflicts, resource, allocation, smoothening and leveling	10
III	**Engineering Economics Contract Management & Industrial Relations** Time value of money, Present economy studies, Equivalence concept, financing of projects, cash flow diagrams, evaluating alternatives by equivalence, balance sheet and profit and loss statement. Classification of costs, time cost trade-off.	8
IV	**Construction projects:** Types of contracts, Legal aspects of contraction, laws related to contracts, prequalification of contracts, Elements of tender preparation, process of tendering, Evaluation of tenders, contract negotiation and award of work, Payment of wages Act, Employees State Insurance Act, Industrial safety and welfare provision. Dispute resolving techniques	7
V	**Materials & equipment management** Functions and objective, procurement, Inventory control, ABC analysis & material codification. Classification, selection, operation & maintenance, depreciation & replacement cost, cost of owning of equipment	7

Text Books	1.	Chitkara K K, Construction Project Management, Tata McGraw Hill
	2.	Jha K N, Construction Project Management, Pearson, 2011
E--Books	1.	Fundamental of construction management by Dr. Abimbola Windapo
	2.	Construction management by Eugenio Pellicer.
Reference Books	1.	Srinath L, CPM & PERT, East-West Press Pvt.
	2.	S.K. Bhatnagar, Network Analysis Techniques,1st Edition, Willey Eastern Ltd., 1986
on line TL Material	1.	www.nptel.iitm.ac.in/iitkanpur.
	2.	www.nptel.iitb.ac.in/iitBombay
	3.	Koshy Varghese from IIT Madras

Course Title: **Universal Human Values 2: Understanding Harmony**										
Semester	IV	Teaching Scheme				Evaluation Scheme				
						Theory			Practical	
Term	EVEN	Th	Tu	Pr	Credits	TAE	CAE	ESE	INT	EXT
Course Category	VEC2	2 Hrs.	-	-	2	10	15	50	-	-
Course Code	23BTHUL204									
Teaching Mode	Offline	2 Hrs.			Total	75			-	
Duration of ESE	2Hrs.30Min					75				

Course Objectives	Development of a holistic perspective based on self- exploration about themselves (human being), family, society and nature/existence
	Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
	Strengthening of self-reflection and development of commitment and

	courage to act.
Course Outcomes	CO1: Students are expected to become more aware of themselves
	CO2: Students are expected to become more aware of their surroundings (family, society, nature).
	CO3: Students should become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind..
	CO4: Students would have better critical ability, they would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	CO5: Students would be able to apply what they have learnt to their own self in different day-to-day settings in real life.

Mapping of Course Outcomes with Program Outcomes and Program Specific Outcomes:

Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1						2		1	1			2	2	3	1
CO2						3	2					1	2	3	1
CO3						1	3	2				1	2	3	1
CO4						2		2				1	2	3	1
CO5						1		1	1			2	2	3	1

Course Contents:

Unit	Contents	Hours
I	**Course Introduction - Need, Basic Guidelines, Content and Process for Value Education:** Purpose and motivation for the course, Self-Exploration, Continuous Happiness and Prosperity, Right understanding relationship and physical facility, Understanding happiness and prosperity correctly, Method to fulfil the above human aspirations.	8
II	**Understanding Harmony in the Human Being - Harmony in Myself!** Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body', Understanding the Body as an instrument of 'I', Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body.	8
III	**Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship**-Understanding values in human-human relationship, Understanding the meaning of Trust, Understanding the meaning of Respect, Understanding the harmony in the society, Visualizing a universal harmonious order in society	8
IV	**Understanding Harmony in the Nature and Existence - Whole existence as Coexistence** Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature, Understanding Existence as Co-existence, Holistic perception of harmony	8
V	**Implications of the above Holistic Understanding of Harmony on Professional Ethics** Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order,	8

	Competence in professional ethics, Strategy for transition from the present state to Universal Human Order: a) At the level of individual, b) At the level of society.	

Text Books	1.	Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010
Reference Books	1.	JeevanVidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
	2.	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
	3.	The Story of Stuff (Book)
	4.	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi.
	5.	Small is Beautiful - E. F Schumacher.
	6.	Slow is Beautiful - Cecile Andrews
	7.	Economy of Permanence - J C Kumarappa
	8.	Bharat Mein Angreji Raj - PanditSunderlal
	9.	Rediscovering India - by Dharampal
	10.	Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
	11.	India Wins Freedom - Maulana Abdul Kalam Azad
	12.	Vivekananda - Romain Rolland (English)
	13.	Gandhi - Romain Rolland (English)
on line TL Material		-