



Shri Balasaheb Mane Shikshan Prasarak Mandal's
ASHOKRAO MANE GROUP OF INSTITUTIONS
Approved by A.I.C.T.E., New Delhi
D.T.E. Mumbai, Govt. of Maharashtra
Permanent Affiliation to DBATU, Lonere, Shivaji University, Kolhapur




NBA Accredited Programs *
* Mechanical, Electrical, Civil



NAAC Accredited with "A" Grade
With CGPA of 3.08



2.6.1- Dissemination of PO-CO

ASHOKRAO MANE GROUP OF INSTITUTIONS, VATHAR.	
	Doc. No.: AMGOI-ACAD-FRM-41
	Rev. Dt.: 03/08/202015v03
COURSE PLAN	
Department of Electronics & Telecommunication Engineering	Date: 10/02/2022
	Academic Year: 2021-22
Vision of Institute:	To become a globally renowned institute of excellence in technology and management education for rural community.
Mission of Institute:	<ul style="list-style-type: none"> ● To achieve excellence in technical and management education through effective teaching learning process. ● To develop professionals having values of ethics, lifelong learning, teamwork and social responsibility. ● To inculcate research and development culture. ● To enhance industry-institute interaction. ● To empower the rural community. ● To implement outcome based education (OBE).
Quality Policy:	We, at AMGOI, are committed to impart quality technical education and managerial skills with active involvement of all stakeholders and strive hard for our students' satisfaction by continual improvement and systematic approach.
Vision of Department:	To produce highly qualified and motivated electronics and telecommunication engineers who will participate in technological development and research activities to face global challenges.
Mission of Department:	<p>M1: To become benchmark for technologically sound branch of engineering with progressive improvement.</p> <p>M2: To make strategic alliance with industries and research institutes.</p> <p>M3: To equip with state of the art technologies by continuing education.</p> <p>M4: To promote rural community development through technology awareness.</p>

Program Educational Objective (PEOs):

The Program Educational Objectives of Electronics & Telecommunication Engineering Programme are:

PEO 1 :-To provide students with a solid foundation in the field of electronics and telecommunication which enable them to establish as a successful professionals.

PEO 2 :-To design and produce novel products and solutions to the real life problems for the satisfaction of community needs.

PEO 3 :-To prepare the students for a successful career with practical knowledge to handle advanced processes & team work skills.

PEO 4 :-To inculcate professional and ethical attitude and effective communication skills.

PEO 5 :-To foster awareness of the lifelong learning, research attitude and entrepreneurship skills

Programme Outcomes (POs)

Electronics and Telecommunication Engineering graduates will be able to

1. **PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
13. **PSO1:** Acclimatize the radical change in electronics technology in areas of Communication Engineering.
14. **PSO2:** Develop skills in analysis, approach, optimization, and implementation of embedded systems.
15. **PSO3:** Design and analyze various functional elements of different modes of Signal & Image Processing.

Consistency of PEOs with Mission of department :

PEO Statement	M1 (Effective Education)	M2 (Research Culture)	M3 (Continuous Learning)	M4 (Continuous Development)
PEO1: To provide students with a solid foundation in the field of electronics and telecommunication which enable them to establish as a successful professionals.	3	-	2	-
PEO2: To design and produce novel products and solutions to the real life problems for the satisfaction of community needs.	3	1	2	-
PEO3: To prepare the students for a successful career with practical knowledge to handle advanced processes & team work skills.	1	-	3	2
PEO4: To inculcate professional and ethical attitude and effective communication skills.	-	-	3	2
PEO5:-To foster awareness of the lifelong learning, research attitude and entrepreneurship skills.	-	2	-	3

1=Slight (Low) correlation, 2=Moderate (Medium) correlation, 3=Substantial (High) correlation

Name of Course Teacher:	Prof. Mrs.S.V.Sagavkar
Course Title	Signals and Systems
Course Code	BTETC402
Course Type: Theory / Practical	Theory
Required/Elective	Required
Prerequisite	Engineering Mathematics
Teaching Scheme (Lecture/Practical/Tutorial/Drawing)	02/00/01/00 Hours
Total contact Hours (Lecture/Practical/Tutorial/Drawing)	36/00/09/00 Hours
Evaluation Scheme: Theory Paper/TW/POE/PO	60/40/00/00

Course Objectives	
1.	To understand mathematical description of continuous & discrete time signals & systems.
2.	To classify signals into different categories.
3.	To analyze Linear Time Invariant (LTI) systems in time & transform domains.
4.	To build basics for understanding of courses such as signal processing ,control system & communication.

Course Outcomes (COs):

Upon completion of this course, students will be able to	
BTETC402.1	Understand mathematical description & representation of continuous & discrete time signals & systems.
BTETC402.2	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
BTETC402.3	Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms
BTETC402.4	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain& in Z domain

Correlation matrix of Course outcomes with Programme outcomes (CO-PO)

1=Low correlation, 2=Medium correlation, 3=High correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BTETC 402.1	3	3													2
BTETC 402.2	3	3													2
BTETC 402.3	3	3													2
BTETC 402.4	3	3													2
BTETC 402	3	3													2

Text Books/Reference Books/ Other Books/E-material/Paper

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Signals & systems	Alan V. Oppenheim, Wilsky, Nawab	Pearson Education	Second	1997
2	Signals & systems	Ramesh Babu	SciTech Publication	Second	2009
3	signals & systems	Dr.S.L.Nalbalwar, A.M.Kulkarni and S.P.Sheth.	Synergy Knowledgeware	Second	2017
4	Signals & systems	Simon Haykin, Barry Van Veen	Wiley publication	Second	2004
5	Signals & systems-principles and applications	ShailaApte	Cambridge University press		2016
6	Probability ,Random variable, Random Processes	Peyton Peebles	Tata McGraw Hill	Fourth	
7	Signals & systems	A.NagoorKanni	McGraw Hill	Second	
8	http://www.nptel.iitm.ac.in				

Content Delivery and Assessment Tools

Class & Division: S.Y. E & TC				Academic Year: 2021-22				
U n i t N o	Le ct. N o	Details	Planned Date	Conducted Date	TM	TA	AT	CO Mapped
I	1.	Introduction to signals & Systems: Continuous time (CT) and Discrete time (DT) signals, analog & digital, periodic & non-periodic	07/03/2022	07/03/22	LT	CB	UT,QA , TT,EX	BTETC40 2.1
	2.	deterministic & non-deterministic, even & odd signals, energy & power signals	08/03/2022	07/03/22	LT	CB		
	3.	Elementary signals: impulse, step, ramp, exponential & sine, rectangular, triangular, signum, sinc	10/03/2022	08/03/22	LT	CB		
	4.	Operations on signals: Amplitude scaling, addition, multiplication, differentiation, integration (Accumulator for DT),	14/03/2022	10/03/22	LT	CB		
	5.	Operations on signals: time scaling, time shifting and time folding,	15/03/2022	14/03/22	LT	CB		
	6.	Sampling Theorem, Reconstruction of signals,	17/03/2022	15/03/22	LT	CB		
	7.	Concept of aliasing, examples on under sampled and over sampled signals.	21/03/2022	17/03/22	LT	CB		
	8.	System classification: linear and non-linear, time variant and invariant, causal and non-causal,	22/03/2022	21/03/22	LT	CB		
	9.	System classification: static and dynamic, stable and unstable, invertible.	28/03/2022	24/03/22	LT	CB		
II	10.	Time Domain Representation of Linear time-invariant system: System Modeling: Input-output relation	29/03/2022	25/03/22	LT	CB	UT,QA , TT,EX	BTETC 402.2
	11.	Definition of impulse response, Convolution integral	31/03/2022	04/04/22	LT	CB		
	12.	Convolution sum,	04/04/2022	04/04/22	LT	CB		

Class & Division: S.Y. E & TC			Academic Year: 2021-22					
Unit No.	Lect. No.	Details	Planned Date	Conducted Date	TM	TA	AT	CO Mapped
	13.	Properties of convolution,	05/04/2022	18/04/22	LT	CB		
	14.	Properties of the system based on impulse response.	07/04/2022	19/04/22	LT	CB		
	15.	Step response in terms of impulse response.	18/04/2022	20/04/22	LT	CB		
III	16.	Fourier series: FS representation of CT signal, Dirichlet condition.	19/04/2022	20/04/22	LT	CB,	UT,QA , TT,EX	BTETC 402.3
	17.	Exponential CTFS representation of signals.	21/04/2022	25/04/22	LT	CB,		
	18.	Properties of Fourier series	25/04/2022	26/04/22	LT	CB,		
	19.	Gibbs Phenomenon,	26/04/2022	28/04/22	LT	CB,		
	20.	Discrete time Fourier Series,	28/04/2022	02/05/22	LT	CB,		
	21.	Properties of Fourier series	02/05/2022	04/05/22	LT	CB,		
IV	22.	Fourier Transform : FT representation of aperiodic CT signal, Dirichlet condition,	09/05/2022	09/05/22	LT	CB,	UT,QA , TT,EX	BTETC 402.3
	23.	FT of standard CT signals,	10/05/2022	23/05/22	LT	CB,		
	24.	Properties of CTFT,	12/05/2022	24/05/22	LT	CB,		
	25.	FT of DT signals,	17/05/2022	26/05/22	LT	CB,		
	26.	Properties of DTFT,	19/05/2022	30/05/22				
	27.	Sampling & reconstruction in frequency domain.	23/05/2022	31/05/22	LT	CB,		
V	28.	Laplace & Z-Transform: Limitations of Fourier Transform & need of Laplace Transform,	24/05/2022	02/06/22	LT	CB	UT,QA , TT,EX	BTETC 402.4
	29.	ROC and its properties,	26/05/2022	06/06/22	LT	CB		
	30.	Properties of Laplace transform,	30/05/2022	09/06/22	LT	CB		
	31.	Laplace transform evaluation using properties,	31/05/2022	10/06/22	LT	CB		

Class & Division: S.Y. E & TC		Academic Year: 2021-22						
Unit No.	Le ct. N o	Details	Planned Date	Conducted Date	TM	TA	AT	CO Mapped
	32.	Inverse Laplace Transform,	02/06/2022	13/06/22 13/06/22	LT	CB		
	33.	Application of Laplace transform to the LTI system analysis.	06/06/2022	14/06/22	LT	CB		
	34.	Introduction to Z-transform & its properties,	07/06/2022	15/06/22	LT	CB		
	35.	Inverse Z-transform methods.	13/06/2022	16/06/22 17/06/22	LT	CB		
	36.	DT-LTI system analysis using Z-transform.	14/06/2022	20/06/22	LT	CB		
	37.	*Applications of Signal processing in communication.	16/06/2022	24/06/22	LT	PP		

*Content beyond syllabus

Note:

- TM-TeachingMethod- Lecture(LT),Demo(DM),LaboratoryVisit(LV),GroupDiscussion(GD),Seminar(SM),IndustrialVisits(IV),CaseStudies(CS)
- TA-TeachingAids-ChalkBoard(CB),PowerPointPresentation(PP),Models(MD),VideoFilm(VF),E-Learning(EL),
- AT-AssessmentTool- Assignments(AS),ClassTests(CT),QuestionAnswers(QA),UniversityExaminations(EX),Rubrics(RB),Tutorials(TT),FeedbackReport(FP),Seminar/ProjectReport(RP),Quiz(QZ), Unit Test (UT)

Plan for Class Test(CT)/ Unit Test (UT)/Mid Semester Exam(MSE):

Planned Date/Week	Type of CT	Based on Unit No.
24 th - 25 th Mar	UT-I	I,II
04 th - 07 th May	MSE	I,II,III
20 th - 23 rd June	UT-II	IV,V

Plan to Cover Contents beyond Syllabus:

Planned Date/Week	Topic Beyond Syllabus	Resource Person with Affiliation	Remarks
4 th week of June	Applications of Signal processing in communication.	Self	

Tutorial Questions:

Unit No.	Tutorials	CO Mapped
I	Numericals based on classification of signals	BTETC402.1
	Numericals based on operations on signals	
	Numericals based on classification of systems	
II	Numericals based on convolution Integral	BTETC402.2
	Numericals based on convolution sum	BTETC402.2
III	Numericals based on Exponential CTFS	BTETC402.3
IV	Numericals based on CT Fourier Transform	BTETC402.3
V	Numericals based on Laplace transform & Inverse Laplace transform	BTETC402.4
	Numericals based on Z-transform & Inverse Z-transform	



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2.6.1- PO & CO for Programme

2.6.1 Teachers and students are aware of the stated Programme and course outcomes of the Programmes offered by the institution. 15

Mechanism of Communication:

The College adapts Outcome based education rather than input oriented bell shaped curve of learning. The following mechanism is followed by the institution to communicate the learning outcomes to the teachers and students.

Faculty attended workshop based on “Outcome Based Education (OBE)”. After completion of workshop that faculty guided other faculty of department regarding OBE. Further these faculties delivered lecture on OBE in class room for students.

- Graduate attributes are described to the first year students at the commencement of the programme.
- At least five hours are spent by the teachers for introducing the subject to the students.
- Learning Outcomes of the Programs and Courses are observed and measured periodically.
- Soft Copy of Curriculum and Learning Outcomes of Programmes and Courses are uploaded on the Institution website for reference.
- The importance of the learning outcomes has been communicated to the teachers in every IQAC Meeting and Staff Meeting.
- The students are also communicated about the Programme outcomes, Programme Specific Outcomes and Course outcomes through Tutorial Meetings.

Program Outcomes (POs):

Civil Engineering graduates will have ability to,

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

Engineering Graduates will be able to:

1. Excel in the structural engineering courses by using software's.
2. Plan, produce detailed drawings, write specification, and prepare cost estimates.
3. Apply and analyze material testing process required for quality construction practices

CO-PO Mapping

Course Code	BTBSC301		
Course Name	Mathematics-III		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Develop an ability to find the Laplace Transform of functions and understand the properties of Laplace Transform.	1, 2	--
2	Find the Inverse Laplace Transform of functions & solve the linear differential equations, linear differential equations with constant coefficients.	1, 2	--
3	Develop an ability to find the Fourier Transform of functions and understand the properties of Fourier Transform.	1, 2	--
4	Solve Partial differential Equations & application to solve one dimensional heat flow equation, two dimensional heat flow equation.	1, 2	--
5	Understand analytic functions & mappings of functions of complex variables.	1, 2	--
6	Understand Cauchy's Integral theorem, Cauchy's Integral formula &	1, 2	--

	residue theorem & use it to solve complex integrations.		
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Course Code	BTCVC302		
Course Name	Mechanics of Solids		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain the different engineering properties and behavior of the construction materials.	1	--
2	Compute design forces like reaction, stress, strain, shear force and bending moment, elongation for determinate structures.	2	--
3	Investigate properties of different materials like comp. stg., tensile stg., shear stg., hardness, impact stg., water absorption etc.	1,2	3
4	Use modern tools to analyze the strength of engineering materials.	5	--
5	Design of thin cylinders subjected to internal pressure.	3	--

Course Code	BTCVC303		
Course Name	Hydraulics-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain various fluid properties, characteristics & various instruments related with pipe flow	1	--
2	Derive mathematical equation for fluid characteristics and fluid properties	2	--
3	Performing various experiments related with pipe flow	2	--
4	Solve problems on dimensional analysis	2	--

Course Code	BTCVC304		
Course Name	Surveying-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	To apply knowledge of principle of surveying, leveling, principles of plane table surveying principle of trigonometrically leveling, omitted measurements, hydrographic, tunnel, road, railway surveys and to use of minor instruments for Civil Engineering Works.	1	--
2	To analyze and interpret data for nature of ground, areas of irregular	2	--

	figures, volumes, sensitivity and corrections in surveying, linear and angular dimensions by omitted measurements and using theodolite etc.		
3	To analyze and interpret data related to linear and angular dimensions.	4	--
4	To use modern tools and techniques for determination of area by understanding limitations of existing analytical methods.	5	--
5	Apply reasoning of surveying to assess societal, health, safety, legal and cultural issues, and ethical principles in professional practice.	6	--
6	To plan, produce detailed drawings with specifications for field surveying.	8	--

Course Code	BTCVC305		
Course Name	Building Construction		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Describe building construction materials with their properties & significance of different building components & their types.	1	--
2	Explain the different types of formwork materials, foundations, bonds used in stone & brick masonry & classification of doors & windows.	1	--
3	Design the different types of foundations, arches, lintels, doors, windows, stairs, ramp, roofs with all required details.	3	--
4	Prepare the drawings of different types of arches, lintels, doors, windows, lift, ramp, stairs & roofs with all required details.	10	--
5	Draw the different types of foundations, arches, lintels, doors, windows, stairs & roofs with scale & dimensions & prepare a site visit report.	--	2

Course Code	BTCVC306		
Course Name	Engineering Geology		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	To understand the various geological processes and features with their civil engineering significance.	1	-
2	To understand the various rock types, structural features related to geology and civil engineering.	2	-
3	To understand the hydrogeological characteristics of aquifers.	7	-
4	To understand the suitability of various structural features while civil engineering works.	3	-

Course Code	BTHM303		
Course Name	Soft Skills Development		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	I acquire interpersonal communication skills.	10	-
2	Develop the ability to work independently	9	-
3	Develop the qualities like self-discipline, self-criticism and self-management	11	-
4	Have the qualities of time management and discipline.	11	-
5	Present themselves as an inspiration for others.	12	-

Course Code	BTCVS311		
Course Name	Seminar		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Demonstrate understanding of professional and ethical responsibility with knowledge of contemporary issues and recognize the need for engaging in life-long learning	1, 2, 6, 8, 12	--
2	Communicate effectively in oral, verbal and visual modes	10	--

Course Code	BTCVF312		
Course Name	Field Training		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Understanding & Explain the practical knowledge related to the civil engineering field in various aspects.	8, 10	--
2	Identify job and research opportunities in the civil engineering field.	12	--

Course Code	C301		
Course Name	Water Resource Engineering-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain concept of hydrology, meteorological parameters, and ground water hydrology and watershed management.	1	--
2	Solve problems on average precipitation, evaporation losses, and runoff and infiltration losses.	2	--

3	Compute flood discharge by using hydrograph, compute groundwater discharge and water requirement of crops.	3	--
4	Describe methods to measure stream flow discharge and flood discharge.	1	--
5	Explain different methods of efficient irrigation, soil water relationship and water requirement of crops.	1	--

Course Code	C302		
Course Name	Design of Steel Structures		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Apply the knowledge of mathematics, engineering fundamentals to the solution of the complex engineering problem of steel structures.	1	--
2	Identify, formulate and analyze bolted connection, welded connection, load carrying capacities for tension and compression members to reach substantial conclusions.	2	--
3	Identify, formulate and analyze forces acting on gantry girders to reach substantial conclusions.	2	--
4	Design solution for bolted, welded connection, tension, compression members.	3	--
5	Design solution for steel columns, column bases and its elements, laterally supported, unsupported beams with their connection, gantry girders.	3	--

Course Code	C303		
Course Name	Environmental Engineering-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	To understand the unit process and unit operations required for treatments.	1	--
2	To know the design parameters related with all treatment methods	1	--
3	To know characteristics of water and analyze the parameters	2	--
4	To design WTP assuming all the necessary data for treatment units	3	--
5	To understand the transmission of water	3	--
6	To understand the distribution systems of water supply	10	--

Course Code	C304		
Course Name	Geotechnical Engineering-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	explain the index properties of soil, its relations, classification and significance	1	--
2	explain the various engineering properties like compaction, consolidation, shear strength etc. and its significance	1	--
3	Solve numerical on various engineering and index properties of soil	2	--
4	perform experiment on soil to get information/properties of soil	2	--
5	answers related to course in oral confidently	-	3

Course Code	C305		
Course Name	Transportation Engineering-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	explain various terms in transportation engineering related to Highway & traffic engineering.	1	13
2	explain various terms in transportation engineering related to Airport , Dock Harbour and Tunnel.	1	-
3	analyse the various design parameters and perform experiments to determine properties of pavement materials.	2	-
4	design of pavement for safety and environmental consideration.	3	-
5	answers on course & experimental work confidently.	10	-

Course Code	C306		
Course Name	Building Planning and Design		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Specify dimensions and space requirements for various elements of building in relation to human body measurements.	1	--
2	Explain various principles of building and architectural composition.	1	--
3	Plan and design various public buildings using principles of planning.	2	1

4	Draw perspective drawing of various objects as well as building.	3	--
5	Prepare the submission and working drawings of various public buildings.	3	--

Course Code	BTCVC501		
Course Name	Design of Steel Structures		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Apply the knowledge of mathematics, engineering fundamentals to the solution of the complex engineering problem of steel structures.	1	--
2	Identify, formulate and analyze riveted, bolted connection, welded connection, load carrying capacities for tension and compression members to reach substantial conclusions.	2	--
3	Identify, formulate and analyze forces acting on gantry girders to reach substantial conclusions.	2	--
4	Design solution for bolted, welded connection, tension, compression members.	3	--
5	Design solution for steel columns, column bases and its elements, laterally supported, unsupported beams with their connection, gantry girders.	3	--

Course Code	BTCVC502		
Course Name	Structural Mechanics-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Identify determinate and indeterminate truss and analyze the truss by using energy theorem	1, 2	--
2	Describe concept of ILD, draw ILD of support reaction, SF, BM for determinate beam and truss.	1, 2	--
3	Describe concept of cable suspension bridge, arches and analysis the cable suspension bridge, arches.	1, 2	--
4	Analyse Indeterminate Structures by direct Flexibility Method	1, 2	--
5	Analyse Indeterminate Structures by direct stiffness Method	1, 2	--
6	Describe Finite Element Method.	1	--

Course Code	BTCVC503		
Course Name	Soil Mechanics		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	explain the index properties of soil, its relations, classification and significance	1	-
2	explain the various engineering properties like compaction, consolidation, shear strength etc. and its significance	1	-
3	Solve numerical on various engineering and index properties of soil	2	-
4	perform experiment on soil to get information/properties of soil	2	-
5	answers related to course in oral confidently	-	3

Course Code	BTCVC504		
Course Name	Environmental Engineering		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	To understand the unit process and unit operations required for treatments.	1	--
2	To know the design parameters related with all treatment methods	1	--
3	To understand the distribution systems of water supply	10	--
4	To design WTP assuming all the necessary data for treatment units	3	--
5	Apply the knowledge of effluent standards for wastewater disposal as per norms for the design of treatment units	2	--
6	To understand the various causes of air pollution & remedial measures	1	--

Course Code	BTCVC505		
Course Name	Transportation Engineering		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Comprehend various types of transportation systems and their history of the development	1	
2	Comprehend to various types of pavements	1	

3	Design the pavements by considering various aspects associated with traffic safety measures	2, 3	
4	Analyse the various design parameters and perform experiments to determine properties of pavement materials.	4	
5	Identify role and activities of transportation engineer in modern world	1	

Course Code	BTCVE506A		
Course Name	Materials Testing and Evaluation (Elective-II)		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain the importance & use of building materials	1	--
2	Explain the various types of building materials used in constructions	1	--
3	Explain the properties of different types of building materials	1	--
4	To enable students to know details of various tests to be performed on building materials	2	--
5	To evaluate their quality to know their suitability for use in construction.	2	--
CBS	Advanced test carried on building materials	2	--

Course Code	BTHM3507		
Course Name	Essence of Indian Traditional Knowledge		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	get knowledge about Indian ancient education System,	1	--
2	able to develop about Indian Linguistic Tradition	8	-
3	get knowledge about Philosophical Traditions in ancient India	1,8	-
4	acquire knowledge about Glimpses of ancient Indian science and technology	1	-
5	Developed the transportation and communication system	10	-

Course Code	BTCVL511		
Course Name	Seminar		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Demonstrate understanding of professional and ethical responsibility with knowledge of contemporary issues and recognize the need for	1, 2, 6, 8, 12	--

	engaging in life-long learning		
2	Communicate effectively in oral, verbal and visual modes	10	--

Course Code	C402		
Course Name	Design of Concrete Structures-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	explain various design philosophies and behavior of RCC	1	-
2	analyze the singly & doubly reinforced RCC sections	2	-
3	design member for shear and apply necessary checks	3	-
4	design RCC slabs, stairs, columns and isolated footings	3	-
5	design of members using software.	-	1

Course Code	C403		
Course Name	Earthquake Engineering		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Describe earthquake seismology, theory of vibration for SDOF system	1	--
2	Calculate parameters of damped and undamped system,	2	--
3	Evaluate lateral load due to EQ on multi-storey buildings as per IS: 1893.	3	1
4	Describe codal provision of IS: 13920, IS: 4326 and modern technique of earthquake resistant design.	1	--
5	Prepare a report on case study of strengthening and repairing.	8	--

Course Code	C404		
Course Name	Quantity Surveying and Valuation		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain significance, necessity & types of estimation, specifications & valuation of a building.	1	--
2	Explain significance, necessity & types of tender & contract document of a building.	1	--
3	Analysis of rate & calculate the quantities of various items of work & prepares a Bar Bending Schedule (BBS) of structural building components.	2	--
4	Analysis of rate & calculate the quantities of road, canal & factory shed of steel frame & valuation.	2	--

5	Produce plan, legal documents and cost estimation of building.	--	2
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Course Code	C405		
Course Name	Project Management and Construction Equipment		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain the project management tools like CPM, PERT .	1	--
2	Explain the importance of safety & risk in Project management	1	--
3	Explain the working of various construction equipments	1	--
4	Analyze & schedule the project by using CPM & PERT.	2	--
5	Prepare & explain the bar chart schedule of given projects by using project management tools.	12	--

Course Code	C409		
Course Name	Advanced Foundation Engineering (Elective-I)		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain shallow and deep foundation, foundation settlement and machine foundation	1	---
2	Find suitable dimensions for shallow foundation for given data	2	---
3	Find suitable dimensions for deep foundation for given data	2	---
4	Explain sheet pile, wall cofferdam its type and applications	1	---
5	Describe various problems with different soil and its stabilization	1	---

Course Code	C412		
Course Name	Advanced Engineering Geology (Elective-I)		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	To understand stratigraphy of India and its correlation with Civil Engineering.	3	-
2	To analyze the methods of geological prospecting and their interpretation, applications by using different geophysical methods. For investigating the various natural resources.	2, 5	-
3	To introduce the students the problems on bore data and structural geology.	1	-
4	To understand the environment impacts in relation to geology.	2	-
5	To study the renewable and non renewable natural resources with respect to energy.	1	-

Course Code	C417		
Course Name	Project Phase-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Apply knowledge of civil engineering subjects to analyze, interpret and design the member, structure or a process to meet desired need of society within realistic constraints such as economic, environmental, social, political, ethical, health and safety, constructability, and sustainability	1, 2, 3, 4	
2	Function on multidisciplinary teams and communicate effectively in oral, verbal and visual modes	9, 10	
3	identify, formulate, solve engineering problems related to civil engineering and use the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	6, 7	
4	Demonstrate understanding of professional and ethical responsibility with knowledge of contemporary issues and recognize the need for	8, 12	1

	engaging in life-long learning by using software.		
5	Use the techniques, skills, and modern engineering tools necessary for engineering practice and apply knowledge and understanding of the engineering and management principles to manage projects in multidisciplinary environments.	5, 11	

Course Code	C401		
Course Name	Field Training		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Understanding & Explain the practical knowledge related to the civil engineering field in various aspects.	8, 10	--
2	Identify job and research opportunities in the civil engineering field.	12	--

CO-PO Mapping

Course Code	ME202		
Course Name	Engineering Mechanics		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Use fundamental knowledge to solve problems of mechanics.	1	--
2	Solve numerical of mechanics for bodies at rest.	2	--
3	Solve numerical of mechanics for bodies in motion	2	--
4	Communicate and document about application and effects of forces	1	--

Course Code	CV205		
Course Name	Basic Civil Engineering		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Understand the basic engineering properties and uses of various building materials	1	--
2	Understand the various building components and building planning	1	--
3	Understand the basic concepts of surveying	1	--

Course Code	BTCVC401		
Course Name	Hydraulics-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain basic knowledge of fluid properties and utilizing principles developed in fluid mechanics.	1	
2	Knowledge of pressure and velocity distribution in an open channel in order to solve practical problems	2	
3	Illustrate and develop the equations and design principles for open channel flows, including sanitary and storm sewer design and flood control hydraulics	6,7,9	1
4	Explain types of pumps, turbines and fluid machineries for various applications	4	
5	To understand the fluid characteristics of open channel flow	2	
6	To understand the working of fluid machineries	2	

Course Code	BTCVC402		
Course Name	Surveying-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Solve the problems in tachometry	1,3	--
2	Solve the problems in Triangulations	1,3	--
3	Understand concepts of Field Astronomy	1,3	--
4	Solve the problems in Curves	1,3	--
5	Solve the problems in Photogrammetric	1,3	--
6	Understand concepts of Remote sensing	1,3	--

Course Code	BTCVC403		
Course Name	Structural Mechanics-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Describe the concept of degree of indeterminacy	1	--
2	Describe concepts of strain energy and calculate slope and deflection at various locations for different types of indeterminate beams.	1, 2	--
3	Identify determinate and indeterminate truss and calculate forces in the members of truss	1, 2	--
4	Describe the concept of distribution of moments in the continuous beam and frame.	1, 2	--
5	Calculate circumferential and hoop stresses in wire wound thin cylinders, cylindrical shell	1, 2	--

Course Code	BTID405		
Course Name	Product Design Engineering		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Create simple mechanical or other designs	1,3,5	2
2	Idea Generate through various Techniques	1	--
3	Create design documents for knowledge sharing	3	--
4	Manage own work to meet design requirements	11	--
5	Work effectively with colleagues	4	--

Course Code	BTCVE404A		
Course Name	Numerical Methods in Engineering (Elective-I)		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Able to solve algebraic and transcendental equations by using numerical techniques and will be able to compare different numerical techniques used for this purpose and also will be able to choose a proper one as per the requirement of the problem	1, 2	--
2	Able to solve a system of linear equations with any number of variables using different direct and iterative numerical techniques.	1, 2	--
3	Understand the concept of interpolation, finite difference operators and their relations, and can apply different interpolation techniques on equi-spaced or non equi-spaced data values.	1, 2	--
4	Prepare them to write computer programs for the numerical computational techniques.	1, 2	--
5	Understand application of the NMCP course in many engineering core subjects like signal processing, digital communication, numerical techniques in electromagnetic etc	1, 2	--
6	Understand procedure-oriented and object oriented programming concepts. Capable of writing C and C++ programs efficiently	1, 2	--

Course Code	BTCVC406		
Course Name	Engineering Management		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain the various functions of Management	1	--
2	Explain the various principles of management.	1	--
3	Analyze & Evaluate problems related to quantitative techniques, Inventory control.	2	--
4	Analyze & Evaluate problems related to economic comparison.	2	--
5	Apply engineering management knowledge to ensure safety on site & to create value to civil engineering projects.	7	--
6	Apply Engineering management knowledge as an individual & as team leader to civil engineering projects.	11	--
CBS	Transportation Problem in Microsoft Excel (Hands on)	2	--

Course Code	BTHM3401		
Course Name	Basic Human Rights		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain the basic concept individual, state, group. civil society, nation	1	--
2	Explain the fundamental rights	1	--
3	Explain workers & human rights	1	--
4	Explain NGO's & human rights in India	1	--
5	Explain human rights in Indian constitution & law	1	--
6	Explain universal declaration of human rights & Indian Constitution	1	--

Course Code	BTCVM410		
Course Name	Mini Project		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Apply knowledge of civil engineering subjects to analyze, interpret and design the member, structure or a process to meet desired need of society within realistic constraints such as economic, environmental, social, political, ethical, health and safety, constructability, and sustainability	1, 2, 3	--
2	Apply software to excel in the structural engineering courses.	--	1
3	Communicate effectively in oral, verbal and visual modes	10	--

Course Code	BTCVF411		
Course Name	Seminar		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Demonstrate understanding of professional and ethical responsibility with knowledge of contemporary issues and recognize the need for engaging in life-long learning	1, 2, 6, 8, 12	--
2	Communicate effectively in oral, verbal and visual modes	10	--

Course Code	C307		
Course Name	Theory of Structures		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Identify static and kinematic indeterminacy of given structure by applying engineering knowledge.	1	--
2	Solve indeterminate structure of (SI < 2) by displacement method.	1	--
3	Solve indeterminate structure of (SI < 2) by force method.	1	--
4	Able to draw SFD and BMD for indeterminate beams and frames.	1	--
5	Use modern tools to analyze the structural components by recognizing the limitations of manual analysis.	5	--
6	Use proficiency in mathematics, structure and physical science will excel in the core areas of civil engineering such as structural.	--	1

Course Code	C308		
Course Name	Geotechnical Engineering-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	To explain importance & different techniques of site investigation/ soil exploration	1	-
2	To explain concept and evaluate various parameters related to stability of slope & bearing capacity of soil	2	-
3	Explain and evaluate bearing capacity of soil by IS code method	2	-
4	To explain different foundation techniques and its application	2,4	-
5	To formulate and proportionate different shallow foundations	2	-
6	To evaluate efficiency and capacity of pile or pile groups	2,5	-

Course Code	C309		
Course Name	Engineering Management		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain the various functions of Management	1	--
2	Explain the various principles of management.	1	--
3	Analyze & Evaluate problems related to quantitative techniques, Inventory control.	2	--
4	Analyze & Evaluate problems related to economic comparison.	2	--

5	Apply engineering management knowledge to ensure safety on site & to create value to civil engineering projects.	7	--
6	Apply Engineering management knowledge as an individual & as team leader to civil engineering projects.	11	--
CBS	Transportation Problem in Microsoft Excel (Hands on)	2	--

Course Code	C310		
Course Name	Engineering Geology		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Identify and classify various types of rocks and minerals according to Requirement of construction works.	1	-
2	Analyze the data with mathematical interpretations for solving the structural geological map.	2	-
3	Demonstrate the knowledge of engineering geology for sustainable development.	7	-
4	Develop the various types of landscapes to meet the needs of society.	2	-

Course Code	C311		
Course Name	Environmental Engineering-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Identify, formulate and analyze complex engineering problems for solutions	1,5	--
2	Design solutions for complex engineering problems and design system components or processes	3	1
3	Apply the knowledge of effluent standards for wastewater disposal as per norms for the design of treatment units	2	--
4	Apply reasoning informed by the contextual knowledge to assess societal, health, safety and to the professional engineering practice.	3	--
5	Understand the impact of the professional engineering solutions in societal and environmental contexts	8	--

6	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	6	--
7	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	4	--

Course Code	C312		
Course Name	Structural Design and Drawing-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Analyse the owner's requirement for the industrial building and design the same	1, 3	1
2	Calculate the different forces acting on the roof truss and analyze its effect on truss members.	2, 4	1
3	Design Primary secondary beam, column.	3, 4	1
4	Exhibit professional responsibility by using appropriate code of design.	8	1
5	Report work in team for design of structural components and prepare its working drawing	9	1
6	Communicate effectively by preparing effective design document, drawings.	10	1
7	Use software for analysis of industrial structure.	5	1

Course Code	C313		
Course Name	Seminar		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Demonstrate understanding of professional and ethical responsibility with knowledge of contemporary issues and recognize the need for engaging in life-long learning	1, 2, 6, 8, 12	--
2	Communicate effectively in oral, verbal and visual modes	10	--

Course Code	BTCVC601		
Course Name	Design of Concrete Structures-I		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	explain various design philosophies and behavior of RCC	1	-
2	analyze the singly & doubly reinforced RCC sections	2	-
3	design member for shear and apply necessary checks	3	-
4	design RCC slabs, stairs, columns and isolated footings	3	-

5	Design of members using software.	-	1 3
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Course Code	BTCVC602		
Course Name	Foundation Engineering		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Introduction	1	--
2	Bearing Capacity Analysis	1, 10	--
3	Foundation for Difficult Soils	1, 3	--
4	Shallow Foundations	1	--
5	Deep Foundations, Caissons Foundations, Sheet piles	1	--
6	Slope Stability	1	--

Course Code	BTCVC603		
Course Name	Concrete Technology		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Understand the various types and properties of ingredients of concrete.	1	--
2	Understand behavior of the fresh and hardened concrete	1	--
3	Understand effect of admixtures on fresh and hardened concrete	1	--
4	Understand effect of Creep and Shrinkage on Concrete	1	--
5	Formulate concrete design mix for various grades of concrete	2	--

Course Code	BTCVC604		
Course Name	Project Management		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Understand basic structure of project management	1	--
2	Find the critical path of network	2	--

3	Find the floats in network	2	--
4	Solve the problems of economic comparisons	2	--
5	Understand concepts of Quality Control	1	--
CBS	Know software used in Project Planning and scheduling	5	--

Course Code	BTCVE605E		
Course Name	Advanced Soil Mechanics (Elective-III)		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Behavior of soil based on its particle size and mineral content	1	--
2	Ability to understand the Earth work equipment	1	--
3	Ability to understand the necessity of ground improvement and potential of a ground for improvement	1, 2	--
4	Understand the soil reinforcement mechanisms	1, 2	--
5	Understand the grouting and injection methods	1, 2	--

Course Code	BTCVC606		
Course Name	Building Planning and Design		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Apply the knowledge & To prepare a report on various systems used in residential building (G+1).	1	--
2	Design, planning & drawing of residential buildings (G+1) with their various criteria & basic requirements & also to assess societal, health, safety, legal & cultural issues.	3, 6	--
3	Draw various plans of existing residential buildings (G+1).	9	--
4	Students should be able to give the orally answer about the various standards & criteria of residential building.	10	--
5	Students should be able to produce plans for residential buildings (G+1) & draw through advanced tools, use Auto-CAD.	2	--
CBS	Building Planning as per "Vastu-shastra".	1	--

Course Code	BTCVL609		
Course Name	Community Project		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Apply knowledge of civil engineering subjects to analyze, interpret and design the member, structure or a process to meet desired need of society within realistic constraints such as economic, environmental, social, political, ethical, health and safety, constructability, and sustainability	1, 2, 3	--

2	Apply software to excel in the structural engineering courses.	--	1
3	Communicate effectively in oral, verbal and visual modes	10	--

Course Code	BTCVL610		
Course Name	Seminar		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Demonstrate understanding of professional and ethical responsibility with knowledge of contemporary issues and recognize the need for engaging in life-long learning	1, 2, 6, 8, 12	--
2	Communicate effectively in oral, verbal and visual modes	10	--

Course Code	BTCVL611		
Course Name	Field Training		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Understanding & Explain the practical knowledge related to the civil engineering field in various aspects.	8, 10	--
2	Identify job and research opportunities in the civil engineering field.	12	--

Course Code	C419		
Course Name	Design of Concrete Structures-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	design RCC members subjected to torsion and shear	3	-
2	design continuous beams and slab.	3	-
3	design water tank as per IS code provisions	3	-
4	describe concept of prestress concrete, prestress system and losses of prestress	1	-
5	design prestressed members and evaluate losses in prestressed members	2,3	-
6	recognize the need for engaging in life-long learning	-	1

Course Code	C420		
Course Name	Water Resources Engineering-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Explain reservoir and earthen dams, gravity dams.	1	--
2	Calculate storage capacity of reservoirs and design height of dams.	2	--
3	Explain canals and their regulatory works,	1	--
4	Describe river training work.	1	--
5	Describe hydropower plants	1	--

Course Code	C421		
Course Name	Transportation Engineering-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Identify and explain the role of town planning principles in development.	1	
2	Understate and explain importance of transportation modes in modern world	1	
3	Describe role of ethical behavior in infrastructure development	1	
4	Explain skill set required for a Town Planner and Railway engineer	2	
5	Understate and explain importance Bridge Engineering	1	

Course Code	C425		
Course Name	Structural Design of Foundation and Retaining Structures (Elective-II)		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Understand concept, forces and its effect on special R.C.C. structures like combined footing, pile foundation, well foundation, raft foundation, retaining wall etc.	1	--
2	Analyze and calculate forces acting on special R.C.C. structures like combined footing, pile foundation, well foundation, raft	2	--

	foundation, retaining wall etc.		
3	Design of special R.C.C. structures like combined footing, pile foundation, well foundation, raft foundation etc.	3	--
4	Analyze & design of footing by using structural software.	--	1

Course Code	C433		
Course Name	Site Investigation Methods and Practices (Elective-III)		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	He will learn to apply the knowledge of site investigation for safe and durable civil engineering structures	1	--
2	He will learn to work in terms for good quality work and effective solutions for civil engineering problems	1	--
3	He will identify, formulate and engineering problems related to types of sites and their characteristics in relation with civil engineering	2	--
4	He will learn to use the techniques, skills, and modern engineering tools of site investigations which are necessary for engineering practice	2	--
5	He will understand the importance of landscape in civil works , become knowledgeable about their design, planning and selection of proper plants for landscaping.	2	--

Course Code	C436		
Course Name	Advanced Construction Techniques (Elective-III)		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Classify types of construction process and methods for its execution.	1	--
2	Demonstrate knowledge of the designing process for construction of formwork.	2	--

3	Identify, formulate problem solving on site, applying modern technique.	4	--
4	Demonstrate understanding to manage and execute advanced / modern techniques in the construction process.	4	--

Course Code	C422		
Course Name	Structural Design and Drawing-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Calculate the different forces acting on the framed building structure and analyze its effect on structural members.	2	-
2	Design components of framed building structure.	3	-
3	Analyze the owner's requirement for the residential building and design the same.	4	-
4	Exhibit professional responsibility by using appropriate code of design and conduct.	8	-
5	Report work in team for design of structural components and prepare its working drawing.	9	-
6	Communicate effectively by preparing effective design document, drawings.	2	2
7	Recognize the need for human beings and have the preparation and ability to engage in independent and life-long learning.	12	-
8	Use software for analysis of framed building structure.	5	-

Course Code	C418		
Course Name	Project Phase-II		
CO	DESCRIPTION (Student should be able to...)	PO	PSO
1	Apply knowledge of civil engineering subjects to analyze, interpret and design the member, structure or a process to meet desired need of society within realistic constraints such as economic, environmental, social, political, ethical, health and safety, constructability, and sustainability	1, 2, 3	--
2	Apply software to excel in the structural engineering courses.	--	1
3	Communicate effectively in oral, verbal and visual modes	10	--