

Annasaheb Dange College of Engineering and Technology, Ashta, Sangli.
Department of Civil Engineering

Institutional Vision and Mission

Institutional Vision

- To be a Leader in producing professionally competent engineers.

Institutional Mission

- Imparting effective outcome based education,
- Preparing students through skill oriented courses to excel in their profession with ethical values
- Promoting research to benefit the society
- Strengthening relationship with all the stakeholders

Department Vision and Mission

Department Vision and Mission	
Vision	To develop graduates in the field of Civil Engineering with preeminence on Technical competency, research, employability, entrepreneurial skills and ethics.
Mission	Providing consistent, activities and programs for promoting academic excellence.
	Preparing students to serve the society with professional ethics.
	Encouraging the students for research, innovation and higher education.
	To strengthen our relationship with stake holders for overall development of the department.

Program Education Objectives

Program Education Objectives	
PEO1	Apply acquired skill in developing safe, sustainable, economical and environmentally sound solution to civil engineering problem (Domain Knowledge)
PEO2	Demonstrate technical competency by solving the problem diverse area of civil engineering (Core Competency)
PEO3	An ability to engage in lifelong learning for effective adaptation of technological developments (Lifelong Learning)
PEO4	Display leadership skills at workplace and function ethically in the professional world. (Professionalism)



Program Outcomes

- PO-1 Engineering knowledge:** Apply mathematical, scientific and technical knowledge to solve problems in Civil Engineering.
- PO-2 Problem analysis:** An ability to identify, formulate, review and solve Civil Engineering problems.
- PO-3 Design/development of solutions:** An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturing and sustainability.
- PO-4 Conduct investigations of complex problems:** An ability to design and conduct experiments, as well as to analyze and interpret data in the domain of Civil Engineering.
- PO-5 Modern tool usage:** Apply emerging modern tools and software for modelling and solutions for civil engineering projects.
- PO-6 The engineer and society:** A knowledge of contemporary issues relevant to professional Civil Engineering practices.
- PO-7 Environment and sustainability:** The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- PO-8 Ethics:** An understanding of professional and ethical responsibility.
- PO-9 Individual and team work:** Function effectively as an individual and as a team member in Civil Engineering projects encompassing multidisciplinary teams.
- PO-10 Communication:** Design and create project reports and associated documents, prepare presentations related to them and communicate both orally and in written form.
- PO-11 Project management and finance:** An ability to understand and apply the management principles along with engineering skill in their work to manage projects in Civil Engineering domain.
- PO-12 Life-long learning:** Engage in lifelong learning for updating oneself on Civil Engineering contemporary advancements.



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Program Specific Outcomes (PSOs):

Program Specific Outcomes	
PSO1	An ability to get acquainted with the contemporary trends in civil engineering and thereby demonstrate proficiency in the fields of structural health monitoring, Remotes Sensing, GIS and GPS, Construction technology, and management.
PSO2	Understand and provide solutions to issues faced during professional practice such as the procurement and interaction with stakeholders during the construction phase of the work.




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An Autonomous Institute

Curriculum Structure

S.Y.B.Tech.

CIVIL ENGINEERING

SEM III - IV

Academic Year- 2018-19

Teaching and Evaluation Scheme
B. Tech Civil Engineering: III Semester

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max	Min. for Passing	Max	Min. for Passing
0CVBS201	Applied Mathematics III	3	1	--	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC202	Surveying	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC203	Fluid Mechanics	4	--	--	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC204	Strength of Materials	4	--	--	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC205	Building Construction & Materials	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC251	Surveying Laboratory	--	--	2	1	ISE	---	---	50	20
						ESE	---	POE	25	10
0CVPC252	Fluid Mechanics Laboratory	--	--	2	1	ISE	---	---	50	20
						ESE	---	POE	25	10
0CVPC253	Strength of Materials Laboratory	--	--	2	1	ISE	---	---	50	20
						ESE	---	OE	25	10
0CVPC254	C Programming Laboratory	--	--	2	1	ISE	---	---	25	10
0CVPC255	Building Construction & Materials Laboratory	--	--	2	1	ISE	---	---	50	20
0CVAC256	Introduction to Psychology	2	--	--	--	ISE	--	Grade	--	--
Total		19	01	10	23	--	500	--	300	--
Total Contact Hours/Week: 30 hrs						Total-500+300=800				

* Grade will be assigned based on internal assessment.

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	00	04	00	19	00	00	00
Cumulative Sum	03	20	29	19	00	00	00


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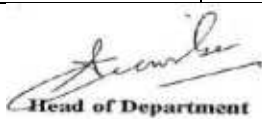

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Teaching and Evaluation Scheme
B. Tech Civil Engineering: IV Semester

Course code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max	Min. for Passing	Max	Min. for Passing
0CVPC206	Engineering Management	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVES207	Structural Analysis	3	1	--	4	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC208	Advanced Surveying	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC209	Building Design & Drawing	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC210	Concrete Technology	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVMC211	Environmental Studies	2	--	--	--	ISE	--	Grade	--	--
0CVHS257	General Proficiency Laboratory	--	--	2	1	ISE	---	---	25	10
0CVPC258	Advanced Surveying Laboratory	--	--	2	1	ISE	---	---	50	20
0CVPC259	Building Design & Drawing Laboratory	--	--	4	2	ISE	---	---	50	20
						ESE	---	POE	50	20
0CVPC260	Concrete Technology Laboratory	--	--	2	1	ISE	---	---	50	20
						ESE	---	OE	25	10
0CVPC261	CAD Practice Laboratory	--	--	2	1	ISE	---	---	50	20
Total		17	1	12	22	--	500	--	300	--
Total Contact Hours/Week: 30 hrs						Total-500+300=800				

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	01	00	04	17	00	00	00
Cumulative Sum	04	20	33	36	00	00	00


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Course Details:

Class	B. Tech, Sem.-III
Course Code and Course Title	0CVBS201, Applied Mathematics-III
Prerequisite/s	OBSBS 102, OBSBS 113
Teaching Scheme: Lecture/Tutorial	03/01
Credits	04
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Objectives:

01	Improve mathematical skills for enhancing logical thinking power of students.
02	Acquire knowledge with a sound foundation in mathematics and prepare them for graduate studies in Civil Engineering.
03	Awareness about mathematics fundamental necessary to solve and analyze engineering problem.

Course Outcomes : Upon successful completion of the course, the student should be able to

0CVBS201_1	Describe the statistical data numerically by using lines of regression and curve fittings. (K ²)
0CVBS201_2	Solve the problems of vector calculus. (K ³)
0CVBS201_3	Make use of Linear Differential Equation with constant coefficients to solve the Civil Engineering problem. (K ³)
0CVBS201_4	Solve the problems on Fourier Series, Laplace Transform and Partial Differential Equation. (K ³)
0CVBS201_5	Demonstrate numerical ability to solve the problem. (S ²)

Course Contents:

Unit No.	Title	Hrs
Unit 1	Vector Calculus	07
	Introduction, Scalar and vector point functions - vector operator del, Del applied to scalar point functions - gradient, Directional derivative, Del applied to vector point functions - Divergence and curl, Line integral, Green's theorem in the plane.	
Unit 2	Linear Differential Equations	07
	Linear Differential Equations, Definition, Complete solution, Operator D , Rules for finding the Complementary function, Inverse operator, Rules for finding the Particular integral, Working procedure to solve the equation, Applications of Linear Differential Equations with constant coefficients Cantilever, Strut, Beam.	
Unit 3	Partial Differential Equation	07
	Introduction, Formation of Partial Differential Equation, Solutions of	

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons, Inc.	9	2007
02	Advanced Engineering Mathematics.	Potter Merle C.	Oxford University Press	3	2005
03	Engineering Mathematics Volume I and II	ITL Education	Cengage Learning India Pvt. Ltd., New Delhi	1	2015
04	Advanced Engineering Mathematics.	ONeil Peter V	Cengage Learning India Pvt. Ltd., New Delhi	1	2012
05	Engineering Mathematics Vol- I.	Kandasamy P., Thilagavathy K. and Gunavathy K.	S Chand & Company Ltd, New Delhi	3	2000
06	Engineering Mathematics Vol- II.	Kandasamy P., Thilagavathy K. and Gunavathy K.	S. Chand & Company Ltd, New Delhi	4	1999

List of Tutorials		
Sr. No	Title of Tutorial	Contact Hrs
01.	Vector Differential Calculus.	01
02.	Linear Differential Equations	02
03.	Applications of Linear Differential Equations	01
04.	Partial Differential Equations	02
05.	Statistical Method and Curve Fitting	01
06.	Laplace Transform	02
07.	Inverse Laplace Transform and applications	02
08.	Fourier Series	01

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Course Details:

Class	B. Tech, Sem.-III
Course Code and Course Title	0CVPC202, Surveying
Prerequisite/s	OBSES104
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	To understand construction and permanent adjustment of Dumpy level
02	To understand the Contouring Methods and application of contour maps
03	To understand Plane Table Survey
04	To understand the use of Theodolite and trigonometric levelling
05	To understand the Theodolite Traversing and total station

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC202_1	Discuss the use of Total station (K ²)
0CVPC202_2	Explain plane table surveying methods and its applications (K ²)
0CVPC202_3	Describe various sections required for civil engineering projects (K ²)
0CVPC202_4	Illustrate various methods of leveling and contouring (K ³)
0CVPC202_5	Calculate horizontal angle by theodolite and length of a line by using gale's traverse table (K ⁴)

Course Contents:

Unit 1	Leveling and Contouring Types, components and use of levels, Types of levelling, objectives and applications, Adjustments of dumpy, auto level and tilting level, Sensitivity of bubble tube, Corrections – curvature and refraction Contouring – methods and applications.	08 Hrs.
Unit 2	Total Station Introduction to survey by total station, Handling of total station, Field Practice /observations, data acquisition. Field data Downloading and Processing	05 Hrs.
Unit 3	Plane Table Surveying Principle, accessories, Orientation, significance and adjustments ,Methods-Radiation, Intersection, Resection, Traversing and applications of plane table Survey. Two Point Problem and Three Point Problem (Graphical method, Mechanical method and method of trial and error method), and applications. Errors and precautions, Advantages and Disadvantages	06 Hrs.
Unit 4	Theodolite Transit Theodolite - Temporary adjustments. Vernier theodolite – components, uses and adjustments. Measurement of horizontal, vertical, deflection angle and magnetic bearing of line.Applications – Trigonometrical leveling. Permanent adjustments of theodolite.	06 Hrs.

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Unit 5	Theodolite Traversing- Introduction, Definition, Objectives, Method of traversing (Included angle, Deflection angle and Magnetic Bearing method. Balancing of traverses (Bowditch's Rule, Transit Rule). Procedure for traverse Survey with theodolite, Gale's Traverse table. Omitted measurements	11 Hrs.
Unit 6	Applications Hydrographic survey (Rain Gauging, River Gauging and Marine Survey) Tunnel survey. Reconnaissance, preliminary and detailed survey for roads & railways	06 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Surveying	B.C.Punmia and Jain	Laxmi Publications New Delhi	Fifteenth	2005
2	Surveying and Leveling	T.P.Kanetkar and S.V.Kulkarni	Vidhyarthi GrihaPrakashan,Pune	Twenty third	2010
3.	Surveying	K.L. Arora	Rajsons publishers Pvt. Ltd. -	Eleventh	2011
4.	Surveying and Levelling	Basak	Tata Mcgraw Hill Publications,New Delhi.	Nineteenth	2006
5.	Surveying	S.K.Duggal	Tata Mcgraw Hill Publications,New Delhi.	Third	2009

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Advanced Surveying	Agor Bannister	Khanna Publications,Delhi.	fourth	2010
2.	Surveying	Raymond and Baker	Pearson Education	Seventh	2011
3.	Engineering Surveying	W.Schofield and M. Breach	Elsevier India pvt.ltd.	Sixth	2010
4.	Advanced Surveying	S.Gopi,R.Satikumar and N.Madhu	Pearson Education	Fifth	2011
5.	Higher Surveying	A.M.Chandra	New Age International Publication.	Second	2011

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Course Details:

Class	B. Tech, Sem.- III
Course Code and Course Title	0CVPC203, Fluid Mechanics
Prerequisite/s	0BSBS102, 0BSES110
Teaching Scheme: Lecture/Tutorial	4/0
Credits	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	To understand various properties of fluids.
02	To summarize the application of knowledge of fluid statics, kinematics and dynamics
03	To identify various losses of fluid flow in pipes
04	To summarize the application of knowledge of fluid flow to channel section & study hydraulic jump.
05	To demonstrate measurement of discharge in notches & weirs.
06	To illustrate hydraulic turbines and centrifugal pumps.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC203_1	Use the basic properties of fluids and examine their behavior under application of various force systems. (K ²)
0CVPC203_2	Apply the principles developed in fluid statics, fluid kinematics and fluid dynamics in fluid flow problems. (K ³)
0CVPC203_3	Apply the principle and equation for pressure flow and momentum analysis in an open channel. (K ³)
0CVPC203_4	Apply the analytical knowledge of pressure and velocity distribution in an open channel in order to solve practical fluid problems. (K ³)
0CVPC203_5	Select the suitable type of turbine and pump according to site conditions. (K ³)
0CVPC203_6	Examine the applications of principles of continuity, momentum and energy to a fluid in motion. (K ⁴)

Course Contents:

Unit 1	Introduction: Physical Properties of Fluids, Types of Fluids. Dimensional Analysis: Dimensional Homogeneity: Importance and Use of Dimension Analysis, Buckingham's Pie Theorem. Buoyancy and Floatation: Archimedes Principle, Metacentric height, Stability of Submerged and Floating Bodies.	10 hrs
Unit 2	Fluid Statics: Types of Pressure, Hydrostatic Law, Pressure Measurement Devices, Pressure Diagram, Total Pressure and Centre of Pressure for Forces on Plane and Curved Surfaces. Fluid Kinematics: Types of Flows, Stream lines, Equipotential lines, stream function and velocity potential function, Flow Net (Construction and Uses).	09 hrs

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	Continuity equation (2D and 3D form)	
Unit 3	Fluid Dynamics: Euler's Equation along a Streamline, Bernoulli's Theorem: Assumptions & Limitations, Modified Bernoulli's Equation & Applications: Venturimeter (Horizontal and Vertical), Orificemeter, Orifice plate; Concept of HGL and TEL. Losses in Pipes: Major and Minor Losses, Darcy-Weisbach Equation, Concept of Equivalent Pipe, Pipes in Series & Parallel, Two Reservoir Problems, Concept of Water hammer & Siphon	09 hrs
Unit 4	Hydraulic Turbines: Classification of Turbines, Performance Characteristics, Selection of Type of Turbine, function of draft tube. Pumps: (Centrifugal) - Component Parts, Common Pump Troubles and Remedies, Selection of pumps.	06 hrs
Unit 5	Uniform Flow in Open Channel: Introduction, Types of Open Channels and flows, Velocity Distribution, Measurement of Velocity, Hydraulically Efficient Sections, Specific Energy & Specific Force (Definition and Diagram) Gradually Varied Flow (GVF): Classification of Channel Slopes & GVF Profiles, Dynamic Equation of GVF, Direct Step Method of Computation of GVF Profiles. Rapidly Varied Flow (RVF): Hydraulic Jump, Conjugate Depth Relationship, Uses and Types of Hydraulic Jump, Hydraulic Jump as an Energy Dissipater	15 hrs
Unit 6	Reynold's Experiment, Introduction to Moody's Chart, Boundary Layer Theory: Concept, Hydro dynamically smooth and Rough Boundaries, Separation of Boundary Layer, Control of Separation. Notches and Weirs: Types, Discharge Equations, Velocity of Approach, Francis Formula, Errors in Measurement of Discharge.	07 hrs



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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A text book of Fluid Mechanics	R.K. Rajput	Chand Pub.	9 th	2013
02	Engg. Fluid Mechanics	K.L.Kumar	Eurasia Pub.	7 th	2001
03	Fluid Mechanics	S. Ranmamurtham	Dhanpat Rai & sons	-	2009
04	Fluid Mechanics and Hydraulic Machines	R.K.Bansal	Khanna Pub.	10 th	2013

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fluid Mechanics – Hydraulic & Hydraulic Mechanics	Modi-Seth	Standard Book House, Delhi	10 th	2011
02	Fluid Mechanics	John F. Douglas et.al.	Pearson Education Co., Delhi	-	2002
03	Fluid Mechanics	Streeter, Wylie, Belford	Mc-Graw hill Pub.	7 th	2009
04	Fluid Mechanics	Frank M White	Mc-Graw hill Pub	9 th	2010
05	Fluid Mechanics	H. Rouse	Toppan C. Ltd. Tokyo	-	2010
06	Fluid Mechanics	Garde-Mirajgaonkar	Nemchand Bros., Roorkee	1 st	2011


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Course Details:

Class	B. Tech, Sem.-III
Course Code and Course Title	0CVPC204, Strength of Materials
Prerequisite/s	OBSES110, OBSES159
Teaching Scheme: Lecture/Tutorial	4/0
Credits	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	To understand calculation of simple stresses and strains.
02	To understand resistance offered by elastic material to bending, shear force and torsion.
03	To understand the stability of long column.
04	To understand bending & shear stresses in beam

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC204_1	Identify various types of stresses in various structural elements. (K ³)
0CVPC204_2	Construct shear force and bending moment diagrams for various beams and loadings (K ³)
0CVPC204_3	Solve for strength of materials in bending, shear and torsion. (K ³)
0CVPC204_4	Compute safe axial load on columns with different end conditions (K ³)
0CVPC204_5	Calculate shear stresses and bending stresses for different beam sections for given loading and support conditions. (K ⁴)

Course Contents:

Unit 1	Stress and Strain: Introduction to Elasticity, Plasticity, Brittleness and Strength. Types of stresses and strains, stress strain diagrams, Hooke's law, Behavior of composite sections, Stress distribution in the compound bar and bar of varying, temperature stresses. Elastic constants, relations amongst them, generalized Hooke's law.	10 Hrs.
Unit 2	Bending moment and shear force in beams: Introduction, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, SFD and BMD with salient values for cantilever beams, simply supported beams and overhanging beams considering point loads, UDL, UVL and Couple.	09Hrs.
Unit 3	Torsion of circular shaft Stresses, strains and deformation in determinate and indeterminate shafts of hollow and solid sections of homogenous and composite materials subjected to torque; Analysis of thin wall cylinders.	09 Hrs.
Unit 4	Bending Stresses: Theory of pure bending, Curvature of a beam, Assumptions, Derivation of flexure formula, Moment of resistance of cross section, Bending stress distribution diagrams for symmetrical and unsymmetrical sections.	09 Hrs.
Unit 5	Shear stresses: Shear Stresses in Beams of various commonly used sections such as rectangular, triangular, T, circular and I section	09Hrs

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Unit 6	Elastic stability of columns: Introduction – Short and long columns, Euler’s theory on columns, Effective length slenderness ration, radius of gyration, buckling load, Assumptions, derivations of Euler’s Buckling load for different end conditions, Limitations of Euler’s theory, Rankine’s formula and problems.	10Hrs.
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Strength of Materials	Subramanyam	Oxford University Press	2	2011
02	Text book of Mechanics of Materials	M.N. Shesha Prakash, G.S.Suresh,	PHI, Learning Pvt. Ltd., New Delhi	-	2011
03	Strength of Materials	Ramamrutham	Dhanapath Rai Publishers, New Delhi.	-	2011
04	Strength of Materials	Bhavikatti S.S	Vikas Publishers, New Delhi.	3	2009
05	Strength of Materials	Punmia B.C., Ashok Jain, Arun Jain	Lakshmi Publications, New Delhi.	-	2011
06	Strength of Material	Khurmi. R. S.,	Tata McGraw Hill Publishing Company	1	2006

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Solid Mechanics	Gambhir. M.L	PHI Learning Private Limited., New Delhi	1	2009
02	Mechanics of Materials	Ugural. A.C	Wiley India Pvt. Ltd., New Delhi	-	2013
03	Strength of Material	Timoshenko. S. & Young. D. H,	McGraw Hill Book Company Publication	4	2006
04	Mechanics of Material	Beer and Johnston	Mc Graw Hill publication	3	2004
05	Mechanics of Structures, Vol-I	S.B. Jurnarkar and Dr. H.J. Shah	Charotar Publishing house	26	2005
06	Strength of Materials	Basavarajaiah and Mahadevappa	CBS Publishers	2	2001
07	Strength of Materials	I.B.Prasad	Khanna Publishers	12	2006

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Course Details:

Class	B. Tech, Sem.-III
Course Code and Course Title	0CVPC205, Building Construction & Materials
Prerequisite/s	0BSES104
Teaching Scheme: Lecture	03
Credits	03
Evaluation Scheme: ISE I/MSE/ISE II/ESE	10/30/10/50

Course Objectives:

01	To study the properties and suitability of various building materials.
02	To understand different building components.
03	To understand different bonds in brick masonry.
04	To understand different types of roof coverings and flooring
05	To draw different building components.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC205 1	Explain the properties and suitability of various building materials((K ⁺)
0CVPC205 2	Discuss different building components. (K ⁺)
0CVPC205 3	Describe different bonds in brick masonry. (K ⁺)
0CVPC205 4	Explain different types of roof coverings and different types of flooring. (K ⁺)
0CVPC205 5	Draw different building components. (K ⁺)

Course Contents:

Unit 1	Engineering Properties of Building Materials: Stones - Requirements of good building stone, uses of building stones. Bricks - Manufacturing, Types (clay bricks, fly ash, cellular light weight concrete brick, aerated cement concrete brick or autoclave brick) and Engineering Properties. Aggregates - Fine Aggregates and coarse aggregates - Origin, types, particle size and shape, mechanical and physical properties, artificial sand. Timber - Characteristics, seasoning of timber, preservation of timber, their application in Civil Engineering. Steel - Standard structural sections, steel as reinforcement. High Yield Strength Steel and high tensile steel, uses of steel in Building Construction. Tiles - Ceramic, Vitrified, Natural Stone, Paving Blocks etc. Advanced Materials- composite materials, fibers , geosynthetics and Bamboo as structural member	09 Hrs.
Unit 2	Masonry: Stone masonry - Random Rubble, Uncoursed Rubble, Coursed Rubble and Ashlar Masonry. Brickwork and Brick Bonds - English, Flemish, and Rat trap bond (one- brick thick); Composite masonry, various types of composite masonry walls	05 Hrs.
Unit 3	Building components Foundations –Deep foundation Pile foundation-Classification based on function, Material and composition Pier foundation and Well foundation Arches: Technical terms in arches, types of arches.	07 Hrs.

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	Lintel: Necessity, types of lintels Formwork: Requirement, economy and material Basic requirements of a building as a whole: strength and stability, Dimensional stability, comfort and convenience, damp prevention, waterproofing techniques, heat insulation, day lighting and ventilation. Sound insulation and anti-termite treatment.	
Unit 4	Stairs Stairs: Technical terms, requirements of a good stair, uses, types, Materials for construction. Ramps, lifts and escalator. Design of stairs (Dog Legged, quarter turn and Open Well,).	07 Hrs.
Unit 5	Doors and Windows Doors - Classification, Teak wood Paneled Door, Flush Door, Aluminum Glazed Doors, Steel Doors, fixtures and fastening. Windows - Classification, Teakwood Glazed Windows, Aluminum, Glazed Windows, Steel Windows, UPVC Windows fixtures and fastening.	07 Hrs.
Unit 6	Roofs and Roof coverings: Terms used, types of roof, pitched roofs and their types, Steel Trusses types and their suitability; Roof covering materials and their selection, Concept of proflex (truss less) roof and their selection; Concrete Flooring (Tremix Flooring), Water proofing- materials and methods	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Building Construction	S.P.Bindra&S.P.Arora	DhanpatRai Publications (P)Ltd	5 th	2005
02	Building Construction	Dr.B.C .Punmia& Ashokkumar Jain	Laxmi Publications (P)Ltd	10 th	2008
03	Civil Engineering Design & Drawing	D.N. Ghose	CBS Publications, Distributors(P)Ltd	2 nd	2010
04	Civil Engineering Drawing	M.Chakraborty.	M.Chakraborti	4 th	2001

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year
01	SP 7- National Building Code Group 1 to 5	--	B.I.S. New Delhi	--	--
02	I.S. 962 - 1989 Code for Practice for Architectural and Building Drawings	--	B.I.S. New Delhi	--	--
03	Civil Engineering Drawing	V.B.Sikka	S.K.Kataria& Sons	5 th	2008
04	Neufert Architect's Data	Ernst and Peter Neufert	Wiley-Blackwell	4 th	2012

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Course Details:

Class	B. Tech, Sem.- III
Course Code and Course Title	CVPC251 Surveying Laboratory
Prerequisite/s	0BSES104
Teaching Scheme: Practical	2/0
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives

1	Show the use of dumpy level and auto level
2	Show the working Total station with its uses
3	Show the working of Theodolite with its uses
4	Communicate effectively during performing practical work on site and orally
5	Engage in lifelong learning for handling major surveying equipments

Course Outcomes (COs)

At the end of this course students will be able to:

1	Demonstrate the use of dumpy level and auto level (K^3)
2	Demonstrate the working Total station with its uses (K^3)
3	Demonstrate the working of Theodolite with its uses (K^3)
4	Communicate effectively during performing practical work on site and orally (S^2)
5	Engage in lifelong learning for handling major surveying equipments (A^2)

Course Contents
All experiments & projects are compulsory

Expt. No.	Name of experiments
1	Determination of Reduced level by using dumpy level
2	Study of different components of Transit Theodolite
3	Measurement of Horizontal Angle by Various Methods by Theodolite
4	Measurement of Magnetic Bearing and Vertical Angle by Theodolite
5	Demonstrate the working of Total station with its uses
6	Determination of distance by using Total station
7	Determination of large area by using Total station
8	Determination of horizontal and vertical angle by using Total station
9	Determination of Reduced level by using Total station.
Project 1	Block Contouring
Project 2	Theodolite Traversing

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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Surveying	B.C.Punmia and Jain	Laxmi Publications New Delhi	Fifteenth	2005
2	Surveying and Leveling	T.P.Kanetkar and S.V.Kulkarni	Vidhyarthi GrihaPrakashan,Pune	Twenty third	2010
3.	Surveying	K.L. Arora	Rajsons publishers Pvt. Ltd. -	Eleventh	2011
4.	Surveying and Levelling	Basak	Tata Mcgraw Hill Publications,New Delhi.	Nineteenth	2006
5.	Surveying	S.K.Duggal	Tata Mcgraw Hill Publications,New Delhi.	Third	2009

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Advanced Surveying	Agor Bannister	Khanna Publications,Delhi.	fourth	2010
2.	Surveying	Raymond and Baker	Pearson Education	Seventh	2011
3.	Engineering Surveying	W.Schofield and M. Breach	Elsevier India pvt.ltd.	Sixth	2010
4.	Advanced Surveying	S.Gopi,R.Satikumar and N.Madhu	Pearson Education	Fifth	2011
5.	Higher Surveying	A.M.Chandra	New Age International Publication.	Second	2011


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Course Details:

Class	B. Tech, Sem. - III
Course Code and Course Title	0CVPC252, Fluid Mechanics Laboratory
Prerequisite/s	0CVPC203
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives:

1	To understand various tools and equipments used in laboratory.
2	To understand the equations developed in fluid mechanics.
3	To understand the properties of fluid flow under various conditions.
4	To analyze the results obtained and plot the experimental results.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPC252_1	Explain the behavior of fluid flow rate under various conditions. (K ²)
0CVPC252_2	Illustrate and plot the graphical results and its comparison with experimental results. (K ²)
0CVPC252_3	Examine the fluid motion equations in laboratory. (K ⁴)
0CVPC252_4	Independently perform the experiments and communicate effectively about the laboratory work orally. (S ³)
0CVPC252_5	Follow the given instructions in laboratory for handling flow measurement equipments. (A ²)
0CVPC252_6	Summarize the practical application of hydraulic turbines and prepare a report based on the site visit. (K ² A ²)

Course Contents: Atleast 09 experiments from the following:

Expt 1	Calibration of Measuring Tank, Measurement of Discharge and Study of Pressure Measuring Devices
Expt 2	Determination of Metacentric Height for Floating Bodies
Expt 3	Verification of Bernoulli's Theorem
Expt 4	Calibration of Venturimeter and Orificemeter
Expt 5	Visualization of Laminar and Turbulent flow using Reynold's Apparatus and determination its sample value
Expt 6	Calibration of V notch / Rectangular notch
Expt 7	Study of hydraulic jump
Expt 8	Plotting specific energy diagram for different discharges
Expt 9	Study of centrifugal pump [only Efficiency is expected]
Expt 10	Study of factors affecting friction factor for pipe flow (at least for two different materials and two different diameters)
Expt 11	Determination of loss of head due to i) Sudden expansion, ii) contraction iii) elbow iv) bend v) Globe Valve etc. (At least Two minor losses)

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Expt 12	Calibration of a given weir (Sharp crested or Broad crested or ogee)
Expt 13	Determination of hydraulic coefficients of orifice

List of Submission:

1. Total number of Practical experiments
2. Report on visit to a hydro power plant

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A text book of Fluid Mechanics	R.K. Rajput	Chand Pub.	9 th	2013
02	Engg. Fluid Mechanics	K.L.Kumar	Eurasia Pub.	7 th	2001
03	Fluid Mechanics	S. Ramamurtham	Dhanpat Rai & sons	-	2009
04	Fluid Mechanics and Hydraulic Machines	R.K.Bansal	Khanna Pub.	10 th	2013

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fluid Mechanics – Hydraulic & Hydraulic Mechanics	Modi-Seth	Standard Book House, Delhi	10 th	2011
02	Fluid Mechanics	John F. Douglas et. al.	Pearson Education Co., Delhi	-	2002
03	Fluid Mechanics	Streeter, Wylie, Belford	Mc-Graw hill Pub.	7 th	2009
04	Fluid Mechanics	Frank M White	Mc-Graw hill Pub	9 th	2010
05	Fluid Mechanics	H. Rouse	Toppan C. Ltd. Tokyo	-	2010
06	Fluid Mechanics	Garde-Mirajgaonkar	Nemchand Bros., Roorkee	1 st	2011

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Course Details:

Class	B. Tech, Sem.-III
Course Code and Course Title	0CVPC253, Strength of Materials Laboratory
Prerequisite/s	OBSES110,OBSES159,0CVPC204
Teaching Scheme: Practical's/Tutorial	2/0
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPC253_1	Compute various properties of metal.(K ³).
0CVPC253_2	Identify various types of stresses in various structural elements.(K ²)
0CVPC253_3	Handle the equipments and instruments from laboratory.(A ²)
0CVPC253_4	Communicate effectively about properties of material and stresses involved in the material.(S ²)

Laboratory Contents:

Expt 1	Tension test on Mild and TOR steel.
Expt 2	Compressive strength test on brick and timber
Expt 3	Brinell and Rockwell Hardness test on different metals.
Expt 4	Impact test on different metals.
Expt 5	Bending test on Mild steel.
Expt 6	Flexure test on flooring tiles
Expt 7	Water absorption & compression test on burnt brick.
Assignments : One assignment per unit	

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Strength of Materials	Subramanyam	Oxford University Press	2	2011
02	Text book of Mechanics of Materials	M.N. Shesha Prakash, G.S.Suresh,	PHI, Learning Pvt. Ltd., New Delhi	-	2011
03	Strength of Materials	Ramanurtham	Dhanapath Rai Publishers, New Delhi.	-	2011
04	Strength of Materials	Bhavikatti S.S	Vikas Publishers, New Delhi.	3	2009
05	Strength of Materials	Purnima B.C.,Ashok Jain, Arun Jain	Lakshmi Publications, New Delhi.	-	2011
06	Strength of Material	Khurmi. R. S.,	Tata McGraw Hill Publishing Company	1	2006


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Course Details:

Class	B. Tech. Semester IV
Course Code and Course Title	0CVPC254, C Programming Laboratory
Prerequisite/s	0BSES112, 0BSES161, 0BSBS113
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE	25

Course Objectives:

01	To develop C Programs to solve various Civil Engineering problems.
02	To calculate quantities using C Programs for various Civil Engineering problems.

Course Outcomes (COs):

Upon successful completion of this laboratory, the student will be able to:

0CVPC254_1	Develop C Programs for various Civil Engineering problems. (K ²)
0CVPC254_2	Calculate quantities using C Programs for various Civil Engineering problems. (K ³)
0CVPC254_3	Communicate effectively in written and oral ways about laboratory work. (S ²)
0CVPC254_4	Practice professional and ethical behavior in his/her life. (A ²)

Expt. No.	Title of program: (Any 12 C programs from the below given list)
1	To find M. I. of known figure.
2	To find support reaction of simply supported beam.
3	To find shear force and bending moment of simply supported beam.
4	To find shear force and bending moment of cantilever beam.
5	To calculate area with the help of planimeter.
6	To estimate volume of cutting for alignment of road.
7	To calculate area included between chain and offset lines by Mid- ordinate rule.
8	To calculate discharge through a rectangular weir.
9	To calculate discharge through a triangular weir.
10	To calculate losses in pipe flow.
11	To determine capacity of reservoir.
12	To calculate consolidation of soil layer.
13	To calculate dry density of soil.
14	To calculate missing rainfall data over a watershed.
15	To calculate velocity of flow using Manning's formula.
16	To calculate velocity of flow using Chezy's formula.


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Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Complete knowledge in C	Sukhendu Dey, Debobrata Duita	Narosa Publishing House	2	2013
2	C/C++ For Engineers & Scientists	Harry Cheng	McGraw Hill Education	1	2009


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Course Details:

Class	B. Tech Sem-III
Course Code and Course Title	0CVPC255, Building Construction & Materials Laboratory
Prerequisite/s	0CVPC205
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE	50

Course Objectives:

01	Understand various types of building materials, their market rates and units
02	Draw drawing for Isolated footing, Combined Footing and Under Reamed Piles.
03	Draw drawing for various types of bonds in masonry
04	Draw drawing for Stairs, Doors and windows

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPC255_1	Explain various types of building materials, their market rates and units ($K^2 A^2$)
0CVPC255_2	Draw drawing for Isolated footing, Combined Footing and Under Reamed Piles. (K^3)
0CVPC255_3	Draw drawing for various types of bonds in masonry (K^3)
0CVPC255_4	Draw drawing for Stairs, Doors and windows (K^3)
0CVPC255_5	Communicate effectively about laboratory work both orally and while drawing sheet. (S^2)
0CVPC255_6	Engage in lifelong learning the drawing knowledge of various building components. (A^2)

Course Contents:

I	<p>Drawing to a scale, draw on half imperial drawing sheet.</p> <p>A. Foundations: Isolated, Combined Footing, Under Reamed Piles. (With reinforcement details)</p> <p>B. Detailed plan, elevation and section of T.W. Paneled door and Glazed Door.</p> <p>C. Detailed plan, elevation and section of Glazed window.</p> <p>D. Detailed plan, elevation and section of Stairs: Dog legged, quarter turn, Open well.</p> <p>E. Market survey of building materials its rates and units used on site.</p> <p>F. Construction of various types of bonds in masonry</p> <p>G. Identification of different building materials and its use.</p> <p>H. Site visit to understand various building materials and components</p>
II	<p>Sketch Book :</p> <p>A. Symbols, used in civil engineering drawing and dimensioning as per IS 962.</p> <p>B. Doors: Flush doors, Revolving door, Collapsible door and rolling shutter.</p> <p>C. Windows: Louvered window, Sliding Window, Bay window, Casement window, Dormer Window, Corner Window.</p> <p>D. Stairs: 2-Quarter turn open well, bifurcated, Spiral, and Geometrical.</p> <p>E. Formwork: footing, column and beam.</p>

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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Building Construction	S.P.Bindra&S.P.Arora	DhanpatRai Publications (P)Ltd	5 th	2005
02	Building Construction	Dr.B.C .Punmia&Ashokk umar Jain	Laxmi Publications (P)Ltd	10 th	2008
03	Civil Engineering Design & Drawing	D.N. Ghose	CBS Publications, Distributors(P)Ltd	2 nd	2010
04	Civil Engineering Drawing	M.Chakraborty.	M.Chakraborti	4 th	2001

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year
01	SP 7- National Building Code Group 1 to 5	--	B.I.S. New Delhi	--	--
02	I.S. 962 - 1989 Code for Practice for Architectural and Building Drawings	--	B.I.S. New Delhi	--	--
03	Civil Engineering Drawing	V.B.Sikka	S.K.Kataria& Sons	5 th	2008


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Course Details:

Class	B. Tech, Sem.-III
Course Code and Course Title	0CVAC256, Introduction to Psychology
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	2/0
Credits	-
Evaluation Scheme:	ISE (Grade)

Course Objectives:

01	To understand theoretical underpinnings of psychology.
02	To identify theoretical underpinnings of cognitive psychology and principles of learning.
03	To understand the Stress.
04	To understand the Cognitive Therapy.
05	To apply the Cognitive Therapy.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVAC256_1	Understand theoretical underpinnings of psychology. (K ²)
0CVAC256_2	Proficiently deal with various stresses (S ³)
0CVAC256_3	Integrate the Cognitive Behavior Therapy. (S ⁴)
0CVAC256_4	Be aware of the theoretical underpinnings of cognitive psychology. (A ²)
0CVAC256_5	Engage in lifelong learning to deal with stress and apply cognitive behavior therapy. (A ³)

Course Contents:

Unit 1	Basic Psychology: Introduction to psychology; Biology of behavior	05 Hrs.
Unit 2	Principles of learning and Cognitive Psychology Conditioning; Classical and Instrumental Conditioning; Introduction to Cognitive psychology; Theories of memory;	07 Hrs.
Unit 3	Motivation	04 Hrs
Unit 4	Stress What is Stress; Common Source of Stress; Effects of Stress on Body; Effects of Stress on Performance; Emotions and stress; Theories of Emotions	04 Hrs.
Unit 5	Cognitive Behavior therapy What is cognition; Thoughts and emotional connection; Schemas; Core cognitive, behavioral, and experiential techniques	05 Hrs.
	Activity Based Sessions on Cognitive Behavior therapy Students Will Prepare their Stress Profile	03 Hrs.

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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Psychology	Clifford T. Morgan	Mcgraw Hill Education	4	2004
02	Cognitive Psychology	Otto H. Maclin, M. Kimberly MacLin, Robert L. Solso	Pearsons	8	2014
03	Cognitive Behavior Therapy, Second Edition: Basics and Beyond	Judith S. Beck	Content Technologies	8	2012
04	Controlling Stress and Tension	Daniel A. Girdano George S. Everly Dorothy E. Duse	Allyn & Bacon	5	1996

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	An Introduction to the history of psychology	B.R.Hergenhahn and Tracy Henley	Jon-David Hague	7	2013
02	About Behaviorism	B.F.Skinner	Vintage Books		1974
03	Mind Over Mood: Change How You Feel by Changing the Way You Think	<u>Dennis Greenberger</u> , <u>Christine A. Padesky</u>	ROUTLEDGE	1	2015

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Annasaheb Dange College of Engineering
and Technology, Ashta
An Autonomous Institute
Curriculum Structure

S.Y.B.Tech.

CIVIL ENGINEERING

SEM IV

Academic Year- 2018-19

Teaching and Evaluation Scheme B. Tech Civil Engineering: IV Semester

Course code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max	Min. for Passing	Max	Min. for Passing
0CVPC206	Engineering Management	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVES207	Structural Analysis	3	1	--	4	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC208	Advanced Surveying	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC209	Building Design & Drawing	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC210	Concrete Technology	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVMC211	Environmental Studies	2	--	--	--	--	--	ISE* (Grade)	--	--
0CVHS257	General Proficiency Laboratory	--	--	2	1	ISE	---	---	25	10
0CVPC258	Advanced Surveying Laboratory	--	--	2	1	ISE	---	---	50	20
0CVPC259	Building Design & Drawing Laboratory	--	--	4	2	ISE	---	---	50	20
						ESE	---	POE	50	20
0CVPC260	Concrete Technology Laboratory	--	--	2	1	ISE	---	---	50	20
						ESE	---	OE	25	10
0CVPC261	CAD Practice Laboratory	--	--	2	1	ISE	---	---	50	20
Total		17	1	12	22				300	--
Total Contact Hours/Week: 30 hrs						Total-500+300=800				

* Grade will be assigned based on internal assessment.

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	01	00	04	17	00	00	00
Cumulative Sum	04	20	33	36	00	00	00

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Course Details:

Class	B. Tech, Sem - IV
Course Code and Course Title	0CVPC206, Engineering Management
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I/ MSE /ISE II/ ESE	10/30/10/50

Course Objective :

1	Understand the concept of management and different technique in construction.
2	Apply various quantitative and economy technique in engineering.
3	Understand various construction act and importance of quality management in construction.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC206_1	Explain the importance of management in Construction. (K ²)
0CVPC206_2	Discuss various Techniques for Material Management. (K ²)
0CVPC206_3	Explain the importance of legal aspects and Quality management in construction. (K ²)
0CVPC206_4	Apply the various Quantitative Techniques in practice. (K ³)
0CVPC206_5	Apply the concept of Engineering Economy in construction. (K ³)


Course Contents:

Unit 1	Elements of Management Principle of management (Henry Fayol), Functions of management, Decision Making: Process, Decision Tree.	06 Hrs.
Unit 2	Material Management Objectives, Need for Inventory Control, EOQ Analysis, ABC analysis, Safety Stock, Purchase Procedure, Stores Record.	06 Hrs.
Unit 3	Quantitative Techniques Linear Programming – Simple LP model, Graphical Method, Transportation Problem, Assignment Problem.	08 Hrs.
Unit 4	Economics: Importance, Time Value of Money, Equivalence Economic Comparison Methods: Present Worth Method, EUAC method.	07 Hrs.
Unit 5	Other Economic Comparison Methods: Linear Break Even Analysis. Capitalized Cost method, Net Present Value, Rate of Return, Benefit- Cost Ratio, Payback Period Method, and Linear Break Even Analysis.	08 Hrs.
Unit 6	Industrial Act- Workman compensation act, Minimum wages act, Child labour act Quality Management: Quality Circle, difference between Quality control & Quality Assurance (QA/QC), Total quality control (TQC) and Total Quality Management (TQM), Need for TQM in construction industry, monitoring for quality - PDCA Cycle, 360° feedback for quality, Concept of Six Sigma.	07 Hrs.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year
01	Engineering Management	Stoner	Pearson Education	6 th	2003
02	Operation Research	Pradip Jha	Mcgraw Hill Publishing Ltd., ,	3 rd	2014
03	Engineering economics and financial accounting	Prasanna Chandra	Tata Mcgraw Hill Publishing Ltd., ,	4 th	2005
04	Management Information System	K. C. and J. P. Laudon	Prentice Hall	4 th	2011

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year
01	Construction project management	Kumar Niraj Jha	Pearson Education India	2 nd	2015
02	Material Management	Gopal Krishnan, Sdueshan	McGraw Hill Education	1 st	2001
03	Engineering Management	A K gupta	Chand publication	4 th	2007


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Course Details:

Class	B. Tech, Sem.-IV
Course Code and Course Title	0CVES207, Structural Analysis
Prerequisite/s	OBSES110, OBSES159, 0CVPC204
Teaching Scheme: Lecture/Tutorial	3/1
Credits	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:	
01	To introduce the students to basic theory and concepts of structural analysis and the classical methods for the analysis of buildings.
02	To review analysis of statically determinate structures.
03	To determine strain energy stored in material under different loading condition
04	Calculation of slope and deflection of beams under different loading conditions.
05	Influence line diagrams for shear force, bending moment on a girder due to rolling loads.

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
0CVES207_1	Describe concepts of structural analysis, degree of indeterminacy. (K ²)
0CVES207_2	Compute principal stresses and strains for a strained material. (K ³)
0CVES207_3	Calculate combined direct and bending stresses in the various structural elements. (K ³)
0CVES207_4	Calculate slope, deflections and strain energy stored in different types of materials. (K ³)
0CVES207_5	Analyze the structures subjected to moving loads. (K ³)

Course Contents:		
Unit 1	Structural Systems And Energy Concept Forms of structures, Conditions of equilibrium, Degree of freedom, Linear and Non linear structures. One, two, three dimensional structural systems, Determinate and indeterminate structures [Static and Kinematics]. Theorem of minimum potential energy, Law of conservation of energy, Principle of virtual work.	06 Hrs
Unit 2	Principal stresses and strains Concept of principal planes and principal stresses, normal and shear stresses on an oblique plane, magnitude and orientation of principal stresses and maximum shear stress. Mohr's circle for plane stresses.	09Hrs.
Unit 3	Combined direct and bending stresses Combined direct and bending stresses, eccentric load on short columns, kern of a section, eccentricity of load about both axes of section. Chimney subjected to wind pressure, problems on dams and retaining walls	08 Hrs.
Unit 4	Strain energy Concept, expression of strain energy for axially loaded member under gradual, sudden and impact loads. Strain energy due to self weight, bending and torsion.	08 Hrs.
Unit 5	Slope and deflection of determinate beams - double integration method and Macaulay's method. Moment area method, Conjugate beam method.	05 Hrs

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Unit 6	Influence line diagrams Muller-Breslau's principle, influence line diagram for simple and compound beams. Application of influence line diagram to determinate 2D trusses under dead load and live load.	06 Hrs
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Strength of Materials	Subramanyam	Oxford University Press	2	2011
02	Text book of Mechanics of Materials	M.N. Shesha Prakash, G.S.Suresh,	PHI, Learning Pvt. Ltd., New Delhi	-	2011
03	Strength of Materials	Ramamrutham	Dhanapath Rai Publishers, New Delhi.	-	2011
04	Strength of Materials	Bhavikatti S.S	Vikas Publishers, New Delhi.	3	2009
05	Strength of Materials	Punmia B.C., Ashok Jain, Arun Jain	Lakshmi Publications, New Delhi.	-	2011
06	Strength of Material	Khurmi. R. S.,	Tata McGraw Hill Publishing Company	1	2006

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Solid Mechanics	Gambhir. M.L	PHI Learning Private Limited., New Delhi	1	2009
02	Mechanics of Materials	Ugural. A.C	Wiley India Pvt. Ltd., New Delhi	-	2013
03	Strength of Material	Timoshenko. S. & Young. D. H,	McGraw Hill Book Company Publication	4	2006
04	Mechanics of Material	Beer and Johnston	Mc Graw Hill publication	3	2004
05	Mechanics of Structures, Vol-I	S.B. Jurnarkar and Dr. H.J. Shah	Charotar Publishing house	26	2005
06	Strength of Materials	Basavarajaiah and Mahadevappa	CBS Publishers	2	2001
07	Strength of Materials	I.B.Prasad	Khanna Publishers	12	2006

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Course Details:

Class	B. Tech, Sem. - IV
Course Code and Course Title	0CVPC208, Advanced Surveying
Prerequisite/s	0CVPC202
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	Discuss the principles of tacheometry and use of electronic distance measurement devices.
02	Discuss GPS and GIS concepts
03	Explain various remote sensing techniques
04	Discuss the curve concept

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC208_1	Discuss the vertical photograph concept (K ²)
0CVPC208_2	Describe the knowledge of GPS and GIS in agriculture and environmental applications. (K ²)
0CVPC208_3	Discuss the knowledge of remote sensing in civil engineering. (K ²)
0CVPC208_4	Calculate the horizontal and vertical distance by using methods of tachometry (K ³)
0CVPC208_5	Differentiate the various methods to set out curves (K ⁴)

Course Contents:

Unit 1	Measurement of distances and elevations Measurement of distances and elevations. Tacheometry – principles, suitability, methods. Stadia diaphragm, Stadia formulae. Tacheometric contouring Electronic distance measurements – principle, construction and use of Geodimeter, Tellurometer, Distomat and Total station	08 Hrs.
Unit 2	Global Positioning System (G.P.S.)-G.P.S. Segments: Spaces Segment, Control Segment, User Segment, Features of G.P.S. Satellites, Principle of Operation, Surveying with G.P.S.: Methods of observations, Absolute Positioning, Relative Positioning, differential G.P.S., Kinematics of G.P.S., G.P.S. Receivers: Navigational Receivers, Surveying Receivers, Geodetic Receivers, Computation of Co- ordinates:- Transformation from Global to Local Datum, Geodetic Coordinates to map co- ordinates, G.P.S. Heights and mean sea level Heights. Applications of G.P.S.	06 Hrs.
Unit 3	Remote Sensing (RS)- Electromagnetic remote sensing process. Physics of radiant energy: Nature of Electromagnetic radiation, Electromagnetic spectrum. Energy Source and its Characteristics. Atmospheric influences: Absorption, Scattering. Energy interaction with Earth Surfaces: Spectral reflectance Curve. Image Acquisition: Photographic sensors, Digital Data, Earth Resource satellites, Image resolution. Image Interpretation. Applications of RS.	04 Hrs.
Unit 4	Curves Significance of curves and curve setting, Type of horizontal curve, elements of simple, compound, transition and combined curve, setting out of simple curve by linear and angular methods. Vertical curves – types, lengths of vertical curves	12 Hrs.

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Unit 5	Photogrammetry Introduction, Basic Principles, Definitions, Types of photogrammetric (Aerial camera and Stereoscopic vision). Types of photographs. Photogrammetry – scale of vertical photographs, flight planning and mosaic. Stereoscopy and interpretations	06 Hrs.
Unit 6	Geographical Information System -Information systems, spatial and non-spatial information, geographical concept and terminology, advantages of GIS, Basic component of GIS. Commercially available GIS hardware and Software. Field data, statistical data, maps, aerial Photographs, satellite data, points, lines, and areas features, vector and raster data, data entry through keyboard, digitizer and scanners, preprocessing of data rectification and registration, interpolation techniques.	06 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Surveying vol. II,	B.C.Punmia and Jain	Laxmi Publications New Delhi	Fifteenth	2005
2	Surveying and Leveling	T.P.Kanetkar and S.V.Kulkarni	Vidhyarthi GrihaPrakashan,Pune	Twenty third	2010
3.	Surveying	K.L. Arora	Rajsons Publisher pvt. Ltd.	Eleventh	2011
4.	Surveying and Levelling	Basak	Tata Mcgraw Hill Publications,New Delhi.	Nineteenth	2006
5.	Surveying	S.K.Duggal	Tata Mcgraw Hill Publications,New Delhi.	Third	2009

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Advanced Surveying	Agor Bannister	Khanna Publications,Delhi.	fourth	2010
2.	Surveying	Raymond and Baker	Pearson Education	Seventh	2011
3	Advanced Surveying	S.Gopi,R.Satikumar and N.Madhu	Pearson Education	Fifth	2011
4	Higher Surveying	A.M.Chandra	New Age International Publication.	Second	2011


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Course Details:

Class	B. Tech, Sem.-IV
Course Code and Course Title	0CVPC209, Building Design and Drawing
Prerequisite/s	OBSES104,0CVPC205,0CVPC255
Teaching Scheme: Lecture	03
Credits	03
Evaluation Scheme: ISE I/MSE/ISE II/ESE	10/30/10/50

Course Objectives:

01	To understand principle of planning and building bye laws for the residential buildings
02	To study building permission procedure and phenomenon of energy efficient building
03	To understand the concept of ventilation, air conditioning, and thermal insulation, Building finishes, Acoustics and Fire resistance phenomenon in building
04	To understand plumbing system and electrification in building.
05	To draw drawing of residential buildings considering Building By-Laws and regulations

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC209_1	Discuss principle of planning and building bye laws for the residential buildings. (K ²)
0CVPC209_2	Describe building permission procedure and phenomenon of energy efficient building (K ²)
0CVPC209_3	Discuss the concept of ventilation, air conditioning, thermal & sound insulation, types of building finishes, Acoustics & Fire resistance phenomenon in building (K ²)
0CVPC209_4	Explain plumbing system and electrification in building.(K ²)
0CVPC209_5	Draw drawing of residential buildings considering Building By-Laws and regulations. (K ³)

Course Contents:

Unit 1	Introduction to Planning and bye laws Site Selection criteria, Principles of Building planning. Orientation of building and factors affecting, , Building Planning Byelaws & regulations as per SP-7, 1983. National Building code of India, Types of buildings	06Hrs.
Unit 2	Building Permission and techniques of energy efficient building Procedure of Building Permission, significance of commencement, plinth completion or occupancy certificate., Techniques used for low cost housing and energy efficient buildings, Repair and Rehabilitation of Structures.	06Hrs.
Unit 3	Planning of Residential Building: Understanding of municipal drawings. and working drawing Planning of Residential Building: Bungalows, Row Bungalows, Apartments and Twin Bungalows	10 Hrs.
Unit 4	Plumbing & Electrification : Plumbing: Plumbing system, Materials used for plumbing work. Various types of traps, Fittings, Chambers, Septic Tank, and Concept of Plumbing & Drainage plan.	07 Hrs.

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	Electrification: Types of wiring and materials, Requirements & Location of various points. Concept of Earthing.	
Unit 5	Building Finishes, Acoustics and Fire resistance in building Paints: Different types and application methods. Plastering, Pointing and various techniques. Wall cladding, skirting, dado work with various materials. Miscellaneous finishes such as POP, Gypsum plaster. Acoustics: Conditions for good acoustics Fire resistance in building: Fire resistant construction and fire safety requirements for buildings	7Hrs.
Unit 6	Ventilation, Air conditioning and Thermal insulation: Ventilation Definition and necessity of Ventilation, various systems. Air conditioning: - Necessity, Classification, Systems & Its various Components Thermal insulation: Materials and Methods.	06Hrs.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Building Construction	S.P.Bindra&S.P.Arora	Dhanpat Rai Publications (P)Ltd	5 th	2005
02	Building Construction	Dr.B.C.Punmia&Ashokkumar Jain	Laxmi Publications (P)Ltd	10 th	2008
03	Civil Engineering Design & Drawing	D.N. Ghose	CBS Publications, Distributors(P)Ltd	2 nd	2010
04	Building Drawing	M.G.Shah,C.M. Kale, S.Y.Patki	Tata McGraw- Hill Publications (P)Ltd	5 th	2011 (Reprint)

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year
01	SP 7- National Building Code Group I to 5	--	B.I.S. New Delhi	--	--
02	I.S. 962 - 1989 Code for Practice for Architectural and Building Drawings		B.I.S. New Delhi	--	--
03	SP 6 (Part I to Part 6) Handbook for structural engineers -Structural steel sections.	-	B.I.S, New Delhi	-	-
04	Civil Engineering Drawing	V.B.Sikka	S.K.Kataria & Sons	5 th	2008
05	Building Design and Drawing	Y. S. Sane	Allied Book Stall, Pune	-	-
06	Practical Building Construction & its Management.	Sandeep Mantri	Satya Prakashan	10 th	2011-12

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Course Details:

Class	B. Tech, Sem.- IV
Course Code and Course Title	0CVPC210, Concrete Technology
Prerequisite/s	0BSBS104
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives: The course aims to:

01	Understand the properties of ingredients of concrete & manufacturing process of concrete.
02	Discuss the effects of different admixtures on properties of concrete.
03	Understand concept of durability of concrete & illustrate non-destructive testing equipments.
04	Study different types of special concrete.
05	Understand the methods of concrete mix design.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC210_1	Explain properties of concrete & procedure of manufacturing of concrete. (K ²)
0CVPC210_2	Explain the factors affecting the properties of concrete.(K ²)
0CVPC210_3	Explain the different tests on concrete. (K ²)
0CVPC210_4	Classify different types of special concrete. (K ⁴)
0CVPC210_5	Determine the mix proportion for given grade of concrete.(K ³)

Course Contents:

Unit 1	Ingredients of Concrete Cement:- Manufacture of Portland cement, Chemical composition, Hydration of cement, Types of cement-Ordinary Portland, Portland pozzolana, Rapid Hardening Portland Cement, Quick setting cement, Sulphur resisting cement, Super sulphated cement, Expansive cement, Rediset cement, High strength cement, High Alumina, Low heat, White, Coloured, Oil well, Hydrophobic cement. Tests on cement- fineness, soundness, compressive strength, setting time. Aggregate:- Classification, requirements, size, shape, texture, Tests for coarse aggregates: Specific gravity, Grading of aggregate, Flakiness index, Elongation Index, Impact value, Abrasion value, Crushing value, Alkali aggregate reaction. Tests for fine aggregates: Specific gravity, Sieve analysis, Fineness modulus, Bulking of sand, Water: General requirements, Quality of water.	7 Hrs.
Unit 2	Fresh Concrete Workability: factors affecting workability, measurement of workability, different tests for workability, Segregation, Bleeding, Process of manufacture of concrete- Batching, Mixing, Transportation, Compaction, Curing of concrete, Curing methods. Admixtures in concrete: Air entraining agents, plasticizer and super plasticizer, accelerators, retarders, workability agents. Mineral admixtures: Fly ash, silica flumes, Ground Glass Blast Furnace Slag, Metakoline	8 Hrs.

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Unit 3	Hardened concrete Strength of concrete: w/c ratio, Gel/space ratio, Gain of strength with age, Maturity concept of concrete, Effect of maximum size of aggregate on strength, Relation between compressive and tensile strength, Factors affecting modulus of elasticity, Definition and factors affecting creep and shrinkage. Test on hardened concrete - Flexural strength, Comparison of cube test and cylinder test, Schmidt's rebound hammer, Ultrasonic pulse velocity method.	7 Hrs.
Unit 4	Durability of concrete Strength and Durability relationship, effect of w/c on durability, different exposure condition as per IS 456 minimum and maximum cement content, Effect of Permeability, Sulphate attack, Methods of controlling sulphate attack. Durability of concrete in sea water.	6 Hrs.
Unit 5	Special concrete Light weight concrete, No-fines concrete, High density concrete, Fiber reinforced concrete, Self compacting concrete, ferro-cement concrete, High strength concrete, High performance concrete, Manufacturing of ready mix concrete, Cold weather concreting, Hot weather concreting.	6 Hrs.
Unit 6	Concrete Mix Design Objectives of mix design, Different methods of Mix design, Factors affecting mix proportions, Quality control of concrete, Statistical methods, Acceptance criteria, Introduction to various mix design methods, Numerical on mix design by IS 10262- 2009 and IS 456. Mix design of fly ash concrete by IS 10262 – 2009 and Manufactured sand concrete.	8 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	M. L. Gambhir	Tata McGraw-Hill publishing Company Ltd, New Delhi	2 nd	2001
02	Concrete Technology	M. S. Shetty	S. Chand & Company Ltd, New Delhi	-	2007
03	Concrete Technology	Santakumar A.R.	Oxford University Press.	-	-
04	Textbook of Concrete Technology	P.D. Kulkarni, R.K. Ghosh	Newage International	3 rd	2007

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	A. M. Neville	Pearson Education, New Delhi	3 rd	2003
02	IS 456: 2000	-	-	-	2000
03	IS 10262 – 2009, ACI 211.1-91	-	-	-	2009
04	Concrete Technology	Dr. Aminul Islam laskar	Laxmi Publication	1 st	2013


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Course Details:

Class	B. Tech, Sem. IV
Course Code and Course Title	0CVMC211, Environmental Studies
Prerequisite/s	--
Teaching Scheme: Lecture	02
Credits	ISE (Grade)
Evaluation Scheme: ISE	50

Course Objectives:

01	To study the importance and scope of environmental studies.
02	To discuss the importance of public awareness on environmental problems.
03	To study about natural resources and biodiversity.
04	To discuss scientific, technological and economic solutions to environmental problems.
05	To study the pollution control and waste management

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVMC211_1	Explain importance of environmental studies with necessary of acts.(K ²)
0CVMC211_2	Explain importance of public awareness on environmental problems (K ²)
0CVMC211_3	Write a technical report in team regarding course and impacts of environment related issues.(S ²)
0CVMC211_4	Discuss current concern of environment issues.(A ²)
0CVMC211_5	Describe the need of environment protection and ethics.(A ²)

Unit 1: Nature of Environmental Studies

Definition, scope and importance. Multidisciplinary nature of environmental studies, Need for public awareness.

(02Hrs)

Unit 2: Natural Resources and Associated Problems

a) Forest resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people; b) Water resources: Use and over-utilization of surface and groundwater, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Usage and exploitation. Environmental effects of extracting and using mineral resources. d) Food resources: World food problem, changes caused by agriculture effect of modern agriculture, fertilizer-pesticide problems. e) Energy resources: Growing energy needs, renewable and non renewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy, f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources.

(04Hrs)

Unit 3: Ecosystems

Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics features, structure and function of the following ecosystem :- a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(04Hrs)

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<p>Unit 4: Biodiversity and its conservation</p> <p>Introduction- Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega- diversity nation. Western Ghat as a biodiversity region. Hot-spots of biodiversity. Threats to biodiversity habitat loss, poaching of wildlife, man- wild life conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.</p> <p style="text-align: right;">(05Hrs)</p>
<p>Unit 5: Environmental Pollution</p> <p>Definition: Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.</p> <p style="text-align: right;">(04Hrs)</p>
<p>Unit 6: Social Issues and the Environment</p> <p>Disaster management: floods, earthquake, cyclone, tsunami and landslides Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products.</p> <p style="text-align: right;">(03Hrs)</p>
<p>Unit 7: Environmental Protection</p> <p>From Unsustainable to Sustainable development Environmental Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Population Growth and Human Health, Human Rights</p> <p style="text-align: right;">(06Hrs)</p>



Mini Project	<p>Mini project based on :</p> <p>Environmental assets River/Forest/Grassland/Hill/Mountain. OR A local polluted site Urban/Rural/Industrial/Agricultural. OR Study of common plants, insects, and birds. OR Study of simple ecosystems - ponds, river, hill slopes, etc.</p> <p>(Mini Project report is Mandatory.)</p>
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Assessment Method:		
<ol style="list-style-type: none"> 1. Mini Project report – 10 marks 2. ISE question paper format will be Multiple Choice Questions- 40 Marks 		
Unit No.	Topic Name	Weightage
1	Nature of Environmental Studies.	4 Marks
2	Natural Resources.	7 Marks
3	Ecosystems	7 Marks
4	Biodiversity and its conservation	7 Marks

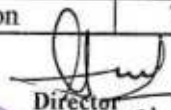
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	5	Environmental Pollution	7 Marks	
	6	Social Issues and the Environment	8 Marks	

IMPORTANT NOTES:

1. ISE will be conducted in 14th week of semester.
2. Mini Project report will be submitted to course coordinator in 10th week of semester.
3. Students should get minimum 40% marks to get PP (PASS) grade.
4. Students getting less than 40% marks will be offered NP (NOT PASS) grade.
5. To get B. Tech. Degree PP grade in Environmental Studies is mandatory.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Environmental Studies	Dr. B. S. Chauhan	University Science Press, New Delhi	1 st	2008
2	Environmental Studies	Dr. P. D. Raut	S. U. Kolhapur	3 rd	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Principals of Environmental Science and Engineering	Raman Sivakumar	Cengage learning Singapore	2	2005
02	Elements of Environmental Science and Engineering	P. Meenakshi	Prentice Hall of India Private Limited, New Delhi	-	2006
03	Environmental Science – working with the Earth	G.Tyler Miller Jr	Thomson Brooks /Cole	11	2006


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Laboratory Details:

Class	S.Y. B. Tech, Sem.-IV
Course Code and Course Title	0CVHS257, General Proficiency Laboratory
Prerequisite/s	--
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE	25

Course Objectives:	
01	To map one's competence and employability and improve the same.
02	To introspect, develop a thorough understanding of oneself by identifying one's strength and weakness.
03	To improve one's intrapersonal & interpersonal communication.
04	To apply knowledge for self development focusing on skill sets as per industry requirements.

Course Outcomes:	
Upon successful completion of this course, the student will be able to:	
0CVHS257_1	Identify the key traits in oneself comprising of attitude skill & knowledge (K ³)
0CVHS257_2	Proficiently apply skills for improving presentations of any format. (S ³)
0CVHS257_3	Professionally communicate in both technical and non technical terms. (S ⁵)
0CVHS257_4	Display the traits required to improve employability skills. (A ³)
0CVHS257_5	Exhibit effective communication techniques. (A ⁵)

Practical No.	Title of Activity
1	Self Awareness: Personality Development
2	Communication Skills & Letter Writing
3	Reading a News report
4	Group Discussions
5	Extempore
6	Role-play
7	Presentation Skills
8	Writing Curriculum Vitae
9	Searching Research Papers/Journals
10	Writing research article
11	SWOC Analysis & Decision Making
12	Book Reading & Review*

* indicates a book/novel should be issued by the student from the central library in the first week and its review should be presented at the end of the course.

Note: Any 10 activities from the above should be conducted compulsory.

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Laboratory Details:

Class	B. Tech, Sem.-IV
Course Code and Course Title	0CVPC258 Advanced Surveying Laboratory
Prerequisite/s	OBSES104, 0CVPC251, 0CVPC208
Teaching Scheme: practical	02
Credits	01
Evaluation Scheme: ISE	50

Course Objectives (COs)

1	Show various measurements by use of total station.
2	Compute horizontal distance between the various points and assess the grade of line by using tacheometer .
3	Calculate various measurements in simple and transition curves.
4	Calculate the area of polygon by using tacheometer.
5	Communicate effectively during performing practical work on site and orally
6	Engage in lifelong learning while using modern surveying equipments.

Course Outcomes (COs) { At the end of this course students will be able to learn}

1	Compute various measurements by use of total station (K ³)
2	Compute horizontal distance between the various points and assess the grade of line by using tacheometer. (K ³)
3	Calculate various measurements in simple and transition curves (K ³)
4	Calculate the area of polygon by using tacheometer (K ³)
5	Communicate effectively during performing practical work on site and orally (S ²)
6	Engage in lifelong learning while using modern surveying equipments (A ²)

Course Contents

Conduct any seven experiments & two projects compulsory

Experiment 1	To determine Constants of Tacheometer.
Experiment 2	To determine linear distance and elevation by Fixed Hair Method of Tacheometer
Experiment 3	To determine area of polygon by Tacheometer
Experiment 4	To determine gradient of line by Tacheometer.
Experiment 5	To Setting Out Simple Curve by any one method of Survey (namely, Deflection Angle Method or Rankine's Method).
Experiment 6	To Setting out transition curve
Experiment 7	To determination of Reduced level by using Total station.
Experiment 8	To Study GPS and its application.
Project 1	Road project – at least 500m /cannel alignment of at least 1km by total station
Project 2	Radial contouring by using total station

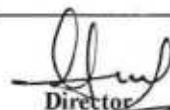
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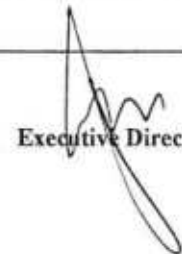
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Surveying vol. II,	B.C.Punmia and Jain	Laxmi Publications New Delhi	Fifteenth	2005
2	Surveying and Leveling	T.P.Kanetkar and S.V.Kulkarni	Vidhyarthi GrihaPrakashan,Pune	Twenty third	2010
3.	Surveying Vol. II	K.L. Arora	Rajsons Publisher pvt. Ltd.	Eleventh	2011
4.	Surveying and Levelling	Basak	Tata Mcgraw Hill Publications,New Delhi.	Nineteenth	2006
5.	Surveying	S.K.Duggal	Tata Mcgraw Hill Publications,New Delhi.	Third	2009

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Advanced Surveying	Agor Bannister	Khanna Publications,Delhi.	fourth	2010
2.	Surveying	Raymond and Baker	Pearson Education	Seventh	2011
3	Advanced Surveying	S.Gopi,R.Satikumar and N.Madhu	Pearson Education	Fifth	2011
4	Higher Surveying	A.M.Chandra	New Age International Publication.	Second	2011


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Laboratory Details:

Class	B. Tech, Sem.-IV
Course Code and Course Title	0CVPC259, Building Design and Drawing Laboratory
Prerequisite/s	0BSES104, 0CVPC205, 0CVPC255
Teaching Scheme: Practical	04
Credits	02
Evaluation Scheme: ISE/ ESE	50/50

Course Objectives:

01	Draw the plan elevation and section of existing residential building
02	Draw the plan of residential building (G+1).
03	Draw plan of foundation, furniture, electrification , water supply and drainage of residential building

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPC259_1	Draw the plan elevation and section of existing residential building (K ³)
0CVPC259_2	Draw the plan elevation and section of residential building (G+1). (K ³)
0CVPC259_3	Draw plan of foundation, furniture, electrification , water supply and drainage of residential building (K ³)
0CVPC259_4	Function effectively as an individual and as a team member while designing and drawing various Plans (S ¹)
0CVPC259_5	Engage in lifelong learning the drawing knowledge of residential building. (A ²)

Course Contents:

1. Collection of sample documents from licensed civil engineer required for building permission
 2. Measurement drawing of existing residential building consisting of plan, elevation, and section passing through staircase. Site plan. Area statement and brief specifications. Draw the sheet to a scale of 1:100 and also on Autocad.
Note: Minimum G+1 building, Maximum 2 students in each group each student having different building.
 3. Planning and design of residential building (G+1) building Full set of drawings for the building planned,
 4. (a) Municipal Submission drawing. Draw the sheet to a scale of 1:100 and also on Autocad.
(b) Working Drawings
 - Foundation / Center Line Drawing.
 - Furniture layout plan.
 - Electrification plan
 - Water supply and drainage plan
- Note: Each student should have different building also prepare project report of same
5. Study of various components of plumbing system
 6. Visit to construction site. Prepare site visit report including material used in

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construction and plumbing system.

7. Working drawing of foundation plan /Line out session for plan of any residential building

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Building Construction	S.P.Bindra & S.P.Arora	Dhanpat Rai Publications (P)Ltd	5 th	2005
02	Building Construction	Dr.B.C.Punmia & Ashokkumar Jain	Laxmi Publications (P)Ltd	10 th	2008
03	Civil Engineering Design & Drawing	D.N. Ghose	CBS Publications, Distributors(P)Ltd	2 nd	2010
04	Building Drawing	M.G.Shah, C.M. Kale, S.Y.Patki	Tata McGraw- Hill Publications (P)Ltd	5 th	2011 (Reprint)

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year
01	SP 7- National Building Code Group 1 to 5	--	B.I.S. New Delhi	--	--
02	I.S. 962 - 1989 Code for Practice for Architectural and Building Drawings	--	B.I.S. New Delhi	--	--
03	SP 6 (Part I to Part 6) Handbook for structural engineers -Structural steel sections.	--	B.I.S, New Delhi	--	--
04	Civil Engineering Drawing	V.B.Sikka	S.K.Kataria& Sons	5 th	2008
05	Building Design and Drawing	Y. S. Sane	Allied Book Stall, Pune	-	-
06	Practical Building Construction & its Management.	SndeePMantri	SatyaPrakation	10 th	2011-12

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Laboratory Details:

Class	B. Tech, Sem.- III
Course Code and Course Title	0CVPC260, Concrete Technology Laboratory
Prerequisite/s	-
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives	
1	Understand various properties of aggregate, cement and concrete
2	Design concrete mix.
3	Analyze the results obtained from various tests conducted on aggregate, cement and concrete.

Course Outcomes	
By the end of the practical's students should able to:	
0CVPC260_1	Explain the properties of ingredients of concrete. (K ²)
0CVPC260_2	Describe the properties of concrete. (K ²)
0CVPC260_3	Design concrete mix & prepare the concrete. (K ⁶)
0CVPC260_4	Independently perform the experiments and communicate effectively about the laboratory work orally. (S ³)
0CVPC260_5	Follow the given instructions in laboratory for handling testing equipments. (A ²)

List of experiments:

Course Contents:	
Atleast 11 experiments from the following:	
Tests on Cement:	
Expt 1	Determination of fineness of cement by Sieve analysis and Blaine's air permeability method.
Expt 2	Determination of the standard consistency of cement using Vicat's apparatus.
Expt 3	Determination of soundness of cement by Le-Chatelier's apparatus and Auto Clave.
Expt 4	Determination of initial and final setting time of cement using Vicat's apparatus.
Expt 5	Determination of compressive strength of cement.
Tests on Aggregates:	
Expt 6	Determination of particle size distribution of fine, coarse and all in aggregate by sieve analysis (grading of aggregate and FM).
Expt 7	Determination of specific gravity of fine aggregates. (Optional)
Expt 8	Determination of specific gravity and water absorption of coarse aggregates.
Tests on Concrete:	
Expt 9	Determination of workability of fresh concrete by using slump cone.
Expt 10	Determination of compaction factor for workability of fresh concrete.
Expt 11	Determination of workability of fresh concrete by using Vee Bee Consistometer.(Optional)

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Expt 12	Nondestructive test on concrete.
Expt 13	Tests for compressive strength of various grades of concrete cubes (IS 10262- 2009 and IS 456).

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	M. L. Gambhir	Tata McGraw-Hill publishing Company Ltd, New Delhi	2 nd	2001
02	Concrete Technology	M. S. Shetty	S. Chand & Company Ltd, New Delhi	-	2007
03	Concrete Technology	Santakumar A.R.	Oxford University Press.	-	-
04	Textbook of Concrete Technology	P.D. Kulkarni, R.K. Ghosh	Newage International	3 rd	2007

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	A. M. Neville	Pearson Education, New Delhi	3 rd	2003
02	IS 456: 2000	-	-	-	2000
03	IS 10262 – 2009, ACI 211.1-91	-	-	-	2009
04	Concrete Technology	Dr. Aminul Islam laskar	Laxmi Publication	1 st	2013


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Laboratory Details:

Class	B. Tech, Sem-IV
Course Code and Course Title	0CVPC261 , CAD Practice Laboratory
Prerequisite	0BSES104
Teaching Scheme : Practical (Drawing)	02
Credits	01
Evaluation Scheme: ISE	50

Course Objectives

1	To describe the Auto CAD Commands.
2	To prepare 2D AutoCAD municipal drawing.
3	To produce 2D AutoCAD working drawing.
4	To engage in lifelong learning the drawing knowledge of residential building.
5	To function effectively as an individual member while drawing various Plans of buildings.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

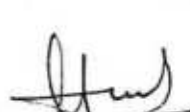
0CVPC261_1	List out the Auto CAD Commands (K ¹)
0CVPC261_2	Demonstrate the Auto CAD Commands (K ³)
0CVPC261_3	Draw the municipal drawing and working drawing of residential building (G+1) (Using principles of planning, orientation of building, building byelaws) (K ³)
0CVPC261_4	Engage in lifelong learning the drawing knowledge of residential building. (A ²)
0CVPC261_5	Function effectively as an individual member while drawing various Plans of buildings. (S ¹)

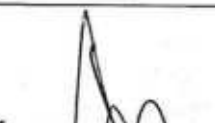
Course Syllabus:

Practical No.	Content
1	Study of Auto CAD Commands.
2	Preparation of 2D AutoCAD drawing consisting of plan and elevation of 2 BHK house with minimum needs.
3	Preparation of 2D AutoCAD municipal drawing.
4	Preparation of ANY one of the working drawings of Project prepared in of term work of subject Building Design and Drawing.


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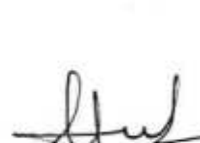



Reference books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Civil Engineering Drawing	V.B.Sikka	S.K.Kataria & Sons	5 th	2008
2	Building Design and Drawing	Y. S. Sane	Allied Book Stall, Pune	-	-
3	Practical Building Construction & its Management.	Sndeeep Mantri	Satya Prakation	10 th	2011-12
4	SP 7- National Building Code Group 1 to 5	--	B.I.S. New Delhi	-	-
6	AutoCAD	David Frey	BPB Sybex Publications	-	2011
7	AutoCAD	George Omura	Sybex	1 st	2012


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**Annasaheb Dange College of
Engineering and Technology, Ashta**

(An Autonomous Institute)

T. Y. B. Tech. Structure

CIVIL ENGINEERING

SEM V - VI

w. e. f. Academic Year- 2019-20

Teaching and Evaluation Scheme
B. Tech Civil Engineering: V Semester

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max	Min. for Passing	Max	Min. for Passing
0CVPC301	Design of Steel Structures	3	1	--	4	ISE I	10	40	--	--
						MSE	30		---	---
						ISE II	10		--	--
						ESE	50		--	--
0CVPC302	Soil Mechanics	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC303	Water Supply Engineering	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVES304	Engineering Geology	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC305	Infrastructure Engineering	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC351	Soil Mechanics Laboratory	--	--	2	1	ISE	---	---	50	20
0CVPC352	Water Supply Engineering Laboratory	--	--	2	1	ESE	---	POE	25	10
0CVES353	Engineering Geology Laboratory	--	--	2	1	ISE	---	---	25	10
0CVPC354	Infrastructure Engineering Laboratory	--	--	2	1	ISE	---	---	50	20
0CVPC355	Building Planning & Drawing Laboratory	--	1	4	3	ESE	---	OE	25	10
0CVAC306	Professional Lectures and Skill Practices	1	--	2	--	ISE	---	---	50	20
Total		16	02	14	23	ESE	---	POE	50	20
Total Contact Hours/Week: 32 hrs						--	--	ISE* (Grade)	--	--
						--	500	--	300	--
						Total-500+300=800				

* Grade will be assigned based on internal assessment.

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	00	00	04	19	00	00	00
Cumulative Sum	04	20	37	55	00	00	00

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Teaching and Evaluation Scheme
B. Tech Civil Engineering: VI Semester

Course code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max	Min. for Passing	Max	Min. for Passing
0CVPC307	Theory of Structures	3	1	--	4	ISE I	10	40	--	--
						MSE	30		---	---
						ISE II	10		--	--
						ESE	50		--	--
0CVPC308	Foundation Engineering	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC309	Waste Treatment & Pollution Control	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC310	Water Resources Engineering	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPE3**	Program Elective I	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
0CVPC357	Waste Treatment & Pollution Control Laboratory	-	--	2	1	ISE	---	---	50	20
		-	--	2	1	ESE	---	OE	25	10
0CVPE3**	Program Elective I Laboratory	-	--	2	1	ISE	---	---	50	20
		-	--	2	1	ESE	---	OE	25	10
0CVPR358	Mini Project I (SDD I)	-	--	4	2	ISE	---	---	50	20
0CVPC359	Self Study	--	--	2	1	ISE	---	---	50	20
0CVES360	Soft Computing Skills in Civil Engineering - I	--	--	4	2	ISE	--	--	50	20
Total		15	1	14	23	--	500	--	300	--
Total Contact Hours/Week: 30 hrs						Total-500+300=800				

Note: Students have to undergo Industrial Training/Internship for 21 days and present the work in next semester.

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	00	00	02	15	04	00	02
Cumulative Sum	04	20	39	70	04	00	02


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Sr. No.	Course Code	Program Elective I	Sr. No.	Laboratory Course Code	Program Elective I Laboratory
1	0CVPE311	Open Channel Flow	1	0CVPE361	Open Channel Flow Laboratory
2	0CVPE312	Pavement Design & Analysis	2	0CVPE362	Pavement Design & Analysis Laboratory
3	0CVPE313	Remote Sensing & GIS Applications in Civil Engineering	3	0CVPE363	Remote Sensing & GIS Applications in Civil Engineering Laboratory
4	0CVPE314	Design of Concrete Bridges	4	0CVPE364	Design of Concrete Bridges Laboratory
5	0CVPE315	Advanced Foundation Engineering	5	0CVPE365	Advanced Foundation Engineering Laboratory
6	0CVPE316	Town Planning & Transportation Engineering	6	0CVPE366	Town Planning & Transportation Engineering Laboratory
7	0CVPE317	Solid Waste Management	7	0CVPE367	Solid Waste Management Laboratory


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Course Details:

Class	B. Tech. Sem.-V
Course Code and Course Title	0CVPC301, Design of Steel Structures
Prerequisite/s	0BSES110, 0CVPC204, 0CVES207
Teaching Scheme: Lecture/Tutorial	3/1
Credits	04
Evaluation Scheme: ISE-I/MSE/ ISE-II /ESE	10/30/10/50

Course Objectives:

01	To understand the behavior of elements of steel structure
02	To understand the design concept of steel structure
03	To study design and analysis of steel structure

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPC301_1	Discuss different methods to design of steel member and failure modes and essential elements of steel structures (K ²)
0CVPC301_2	Calculate the various parameters of axially and eccentrically loaded welded and bolted connections and different members (K ³)
0CVPC301_3	Solve various steel truss members as tension and compression members. (K ⁴)
0CVPC301_4	Examine steel column, built up column and column bases. (K ⁴)
0CVPC301_5	Examine laterally supported & unsupported beams, plate girder and gantry girder, roofing system (K ⁴)


Course Contents:

Unit 1	Introduction Introduction to Design of steel structures, Design Philosophy, comparison of LSM & WSM, advantages and disadvantages of steel structures, types of steel structures, grades of structural steel, various rolled steel sections, loads and load combinations partial safety factors for load and materials, load calculation for roof trusses. Connection Types of bolts & welds, analysis and Design of axially and eccentrically loaded bolted and welded connections (subjected to bending and torsion).	06 Hrs.
Unit 2	Tension Members: Common sections, Net area, modes of failure, load carrying capacity, Design of axially loaded tension members, Design of end connections (Bolted and welded).	06 Hrs.
Unit 3	Compression Members as Struts Common sections, economical sections, effective length, slenderness ratio, modes of failure, classification of cross section, behavior of compression	07 Hrs.


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TYW-05/82


	member, load carrying capacity, Design of compression members. Design of column subjected to axial and eccentric loading	
Unit 4	Column Bases Design of slab bases & gusseted base subjected to axial and eccentric load and design of concrete pedestal	06 Hrs.
Unit5	Beams: Types of sections, behavior of beam in flexure, plastic analysis of beam, design of laterally supported, unsupported beams and built up beam using flange plates, curtailment of flange plates, check for deflection, shear, web buckling & web crippling. Secondary and main beam arrangement, beam to beam connections. Plate Girder: Introduction to plate girder and design concept. Design of plate girder: design of cross section, curtailment of flange plates, stiffeners and connections. Gantry girder: Forces acting on gantry girder, commonly used sections, design of gantry girder as laterally unsupported beam, connection details.	10 Hrs.
Unit 6	Roofing system: Trusses, Purlins, Dead load, Live load and wind load calculation. Analysis and design of truss. Connection of truss to column.	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Steel Structures	S. K. Duggal	Tata McGraw Hill	9 th	2012
02	Design of steel structure by Limit State Method as per IS: 800- 2007	Bhavikatti S. S	I K International Publishing House, New Delhi	4 th	2015
03	Design of Steel Structures	K.S. Sairam,	Pearson	1 st	2010
04	Limit state design in structural steel	Dr. M. R. Shiyekar.	PHI publications	2 nd	2016
05	Design of Steel Structures	Dr. N. Subramanian	Oxford	9 th	2012


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	IS: 816	Indian Standard Code	B.I.S, New Delhi	-	1985
02	IS: 808	Indian Standard Code	B.I.S, New Delhi	-	1995
03	Steel table	Indian Standard Code	B.I.S, New Delhi	-	-
04	SP6 (1)	Indian Standard Code	B.I.S, New Delhi	2 nd	1998
05	SP 6 (6)	Indian Standard Code	B.I.S, New Delhi	2 nd	1995
06	Design of Steel Structures	Edwin H. Gaylord, Charles N. Gaylord James, Stallmeyer	Mc-Graw-Hill	3 rd	2010
07	Design of Steel Structures	Punmia, A. K. Jain and Arun Kumar Jain,	Laxmi Publication	2 nd	2011
08	Design of Steel Structures	Dayaratnam,	Wheeler Publications, New Delhi	2 nd	1998
09	IS 800-2007	Indian Standard Code	B.I.S, New Delhi	1 st	2007
10	IS 875 Part I, II, III	Indian Standard Code	B.I.S, New Delhi	3 rd	1997

NOTE:

It is necessary to have knowledge of IS Code and Steel Table for Design of Steel Structures. Use of IS800:2007 codes and Steel table is allowed in examination.

List of Tutorials:		
Sr. No	Title of Tutorial	Contact Hrs
01	Analysis and design of bolted connection	01
02	Analysis and design of welded connection	01
03	Analysis and design of tension member	01
04	Analysis and design of compression member	01
05	Analysis and design of column	01
06	Analysis and design of Column bases	01
07	Analysis and design of Laterally supported	01
08	Analysis and design of unsupported beam	01
09	Analysis and design and gantry girder	01
10	Analysis and design plate girder	01
11	Calculation of design forces of roofing truss	01
12	Analysis of members roofing truss	01
13	Design of roof truss	01


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Course Details:

Class	B. Tech, Sem.-V
Course Code and Course Title	0CVPC302, Soil Mechanics
Prerequisite/s	0CVPC203
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	To Understand the index properties of soil
02	To Characterize the soil based on size, shape, index properties plasticity
03	To Study the concept of Permeability & Seepage in soil
04	To Discuss the process of compaction and consolidation

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC302_1	Explain the concept of permeability & seepage in soil. (K ²)
0CVPC302_2	Explain the process of compaction and consolidation. (K ²)
0CVPC302_3	Calculate the shear strength of soil under different loading condition.(K ²)
0CVPC302_4	Illustrate the various phase diagrams and derive various phase relationship of the soil. (K ³)
0CVPC302_5	Compute the vertical stresses in soil mass due to various loading conditions.(K ³)
0CVPC302_6	Calculate Earth pressure on retaining structure.(K ³)

Course Contents:

Unit 1	Properties of Soil: Introduction to Soil Mechanics, formation of soil & soil structure, three phase soil system, weight volume relationships, detail index properties of soil-methods of determination and its significance, particle size analysis, I.S classification of soil, Atterbergs consistency limits, field identification of soils.	08 Hrs.
Unit 2	Permeability and Seepage: Permeability- Darcy's law, Factors affecting permeability, Determination of permeability by constant head and falling head method as per IS-2720, Permeability of layered soils. Seepage- Seepage forces, General flow equation (Laplace equation). Flow net construction and practical applications, Concept of effective neutral & total stress in soil mass. Quick sand condition, Piping phenomenon	07 Hrs.
Unit 3	Compaction and Consolidation: Compaction:- phenomenon. Factors affecting compaction, Dry density and moisture content relationship (MDD&OMC). Zero air voids line. Effect of compaction on soil structure, Standard Proctor test and Modified Proctor test as per IS – 2720. Field compaction equipment and methods, Field control of compaction. Concept of soil stabilization	08 Hrs.



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	<p>Consolidation:-Spring analogy, Terzaghi's theory of one dimensional consolidation, Lab consolidation test; c_c, c_v, m_v and a_v Determination of coefficient of consolidation-square root of time fitting method and logarithm of time fitting method. normally consolidated and over consolidated soils,</p>	
Unit 4	<p>Stress Distribution in Soil: Boussinesq theory-point load, line load, strip load, uniformly loaded circular area, pressure distribution diagram on a horizontal and vertical plane, pressure bulb, Westergaard's theory (Concept) , equivalent point load method, Newmark Influence chart.</p>	06 Hrs.
Unit 5	<p>Shear Strength: Concept of shear strength, Coulomb's theory and failure envelope, Principle stress, stress analysis, representation of stresses on Mohr's circle for different types of soil such as cohesive and cohesion less, saturated and partly saturated soil etc. (Mohr's Coulomb Envelope) Application of shear stress parameters in the field Unconsolidated undrained, consolidated untrained and consolidated drained (CU,UU,CD) , type of test-box shear test, triaxial compression test with pore pressure and volume change measurement, unconfined compression test, vane sheartest.</p>	07 Hrs.
Unit 6	<p>Earth Pressure: Lateral Earth Pressure - Concept, Area of application, and earth pressure at rest, active and passive condition. Earth Pressure theory- Rankines and Coulomb's theory of earth pressure, horizontal backfill with surcharge, backfill with inclined surcharge</p>	06 Hrs.

Text Book:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Soil mechanics and Foundation engineering	B. C. Punmia	A Saurabh and Company Pvt. Ltd., Madras	17 th	2014
02	Soil Mechanics and Foundation Engineering	K. R. Arora	Standard Publication	15 th	2010
03	Geotechnical Engineering	B. J. Kasamalkar	Pune Vidyarthi Griha	3 rd	2012
04	Geotechnical Engineering	P. Purushottam Raj	Tata Mcgraw Hill Company Ltd. New Delhi	2 nd	2008



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Reference Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Text book of soil mechanics in theory and practice	Dr. Alam Singh	Asian Publishing House, Bombay	3 rd	2002
02	Soil mechanics and Foundation engineering	V. N. S. Murthy	U. B. S. Publishers and distributors New Delhi	5 th	2005
03	Soil mechanics	Terzaghi and Peak	John Willey and Sons, New- York	3 rd	2000
04	Geotechnical Engineering	SK Gulhati	Tata McGraw Hill Delhi	1 st	2005
05	Soil Mechanics and Foundations	Muni Budhu	Wiley India Pvt Ltd	2 nd	2008


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Course Details:

Class	B. Tech, Sem.-V
Course Code and Course Title	0CVPC303, Water Supply Engineering
Prerequisite/s	Basic Chemistry
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I/MSE/ISE II/ESE	10/30/10/50

Course Objectives:

01	To study various sources of water with respect to quality and quantity of water
02	To illustrate the various water treatment units.
03	To discuss various water supply appurtenances and distribution of water.
04	To outline the principles of Nanotechnology in Water Treatment

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC303_1	Summarize the various sources of water with respect to quality (K ²)
0CVPC303_2	Explain the suitability of water to satisfy different water demand. (K ²)
0CVPC303_3	Discuss various point of use technologies in water treatment. (K ²)
0CVPC303_4	Compute the various components related to transmission and distribution of water. (K ³)
0CVPC303_5	Illustrate the various units of water treatment plant. (K ³)


Course Contents:

Unit 1	Basics of Water Supply Engineering: Sources of water supply, quality of Water and objectives of water quality management, Concept of safe water, Palatable water, wholesome water and Pure water. Population forecasting, Design Period, Water demand: Types, Factors affecting, Fluctuations and effect, Estimation of demand, Conveyance of raw water: Intake structures- types, design of intakes, design of rising main. Pumping Station Design. Concept of water budgeting.	07 Hrs.
Unit 2	Water Quality Parameters: Sampling of water for examination, Physical, Chemical and biological water quality parameters, Drinking water quality standards- BIS.	05 Hrs.
Unit 3	Water Treatment Units: Principle, application & Design of following Unit Operations in water treatment - Aeration, Coagulation, Flocculation, Sedimentation, Filtration, Disinfection. Sequencing of treatment unit processes for surface water and groundwater treatment.	09 Hrs.


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Unit 4	Storage of Treated Water: Reservoirs: Necessity, types, Capacity determination by analytical & graphical method. Transmission of water: Pumping & gravity mains, Different types of pipes, choice of pipe materials, forces acting on pressure pipes.	06 Hrs.
Unit 5	Distribution of water: Basic requirements, methods of distribution, layout patterns, Methods of network analysis: Equivalent pipe, Hardy-Cross method, Design problems. Use of softwares in network analysis. Appurtenances: Sluice valve, air relief valve, gate valve, non-return valve, scour valve, Fire hydrants, Water meter, Service connections, Maintenance & Leak detection of water distribution system.	08 Hrs.
Unit 6	Point of Use Water Treatment Methods: Basic concepts of Adsorption, Ion exchange, Membrane filtration, Reverse osmosis, and Electro dialysis. Applications and Emerging Opportunities: Nano-filtration .	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water Supply Engineering	S. K. Garg	Khanna Publishers, New Delhi	21 st	2012
02	Water Supply Engineering	Dr. B. C. Punmia	Laxmi Publishers, New Delhi	2 nd	2011
03	Water Technology	Gray, N. F	Elsevier Science & Technology Books	2 nd	2009
04	Water Supply Engineering	Dr. P. N. Modi	Standard Book House, New Delhi	18 th	2007
05	Water Supply and Sanitary Engineering.	G.S.Birde	Dhanpat Rai& Sons	2 nd	1990


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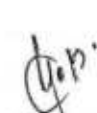

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water and Waste water Technology	Hammer M.J.	Prentice-Hall of India Private Limited	6 th	2011
02	Water Chemistry: An Introduction to the Chemistry of Natural and Engineered Aquatic Systems	Patrick L. Brezonik, William A. Arnold,	Oxford University Press, New York,	2 nd	2011
03	Nanotechnology in Water Treatment Applications -	T. Eugene Cloetel, Michele de Kwaadstenietl	Caister Academic Press	2 nd	2010
04	Chemistry for Environmental Engineering and Science	C.N. Sawyer, P.L. McCarty and G.F. Parkin	Tata McGraw Hill	5 th	2003
05	Water Works Engineering – Planning, Design and Operation	S.R. Qasim, Edward and Motley and Zhu, H.	Prentice Hall, India.	2 nd	2002
06	Environmental Engineering	H.S. Peavy, D.R. Rowe	McGraw Hill	2 nd	1985


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Course Details:

Class	B. Tech, Sem.- V
Course Code and Course Title	0CVES304, Engineering Geology
Prerequisite/s	High school Geography
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II /ESE	10/30/10/50

Course Objectives:

01	To understand the different types of mineral, rocks and geological structures with emphasis on civil engineering aspects.
02	To identify the phenomenon of earthquake and landslides along with their civil engineering mitigation.
03	To study the suitability of site for construction of dams, reservoirs, bridges and tunnels etc.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVES304_1	Describe the phenomenon of weathering, erosion, earthquake and landslides along with their civil engineering significance. (K ²)
0CVES304_2	Describe the different types of geological structures with importance on civil engineering aspects (K ²)
0CVES304_3	Summarize the different types of minerals and rocks with their civil engineering significance (K ²)
0CVES304_4	Explain the concepts of groundwater and building stones. (K ²)
0CVES304_5	Apply the knowledge of geology to know the suitability of site for construction of dams, reservoirs, bridges and tunnels etc. (K ³)
0CVES304_6	Solve numerical problems related to RQD, aquifer parameters (K ³)

Course Contents:

Unit 1	Introduction & Physical Geology: Definition, Branches of geology useful to civil engineering, Importance of geology from Civil Engineering point of view, Case studies of case histories of failure of some civil engineering structures due to geological draw backs. Interior of the Earth Weathering - Types and civil engineering significance. River and its action.	07 Hrs.
Unit 2	Mineralogy & Petrology: Classification of minerals, physical properties of minerals, use of minerals in the production of construction material - Quartz Group (Glass); Feldspar Group (Ceramic wares and Flooring tiles); Kaolin (Paper, paint and textile); Asbestos (AC sheets); Carbonate Group (Cement); Gypsum (POP, gypsum sheets, cement); Mica Group (Electrical industries); Ore minerals – Iron ores (Steel); Bauxite (aluminum). Igneous rocks: Origin, Concordant and discordant forms, Civil	08 Hrs.

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	<p>Engineering significance.</p> <p>Secondary rocks: Formation, Classification, Civil Engineering significance. Grain size classification of sedimentary rocks, Civil Engineering significance.</p> <p>Metamorphic rocks: Agents and Types of Metamorphism, Civil Engineering significance.</p>	
Unit 3	<p>Structural Geology:</p> <p>Strike and Dip, Unconformity-Types.</p> <p>Fold and Fault: Parameters, Classification, Causes, Civil Engineering significance.</p> <p>Joint: Types, Civil Engineering considerations.</p>	06 Hrs.
Unit 4	<p>Dynamic Geology & Groundwater:</p> <p>Earthquake: Terminology, Causes, Seismic waves, Seismograph, Seismogram, Scale, Effects, RIS.</p> <p>Landslides: Types, Causes, Prevention of Landslides.</p> <p>Groundwater: Sources of groundwater, Zones of groundwater, Types of Aquifer, Hydrological properties of aquifers and numerical problems.</p> <p>Building Stones: Engineering properties of rocks, Requirement of good building stone.</p>	07 Hrs.
Unit 5	<p>Geological Investigations:</p> <p>Preliminary Geological Investigations, Steps in geological investigations for project site.</p> <p>Exploratory drilling: Observations, Preservation of cores and Core logging, Core recovery, R.Q.D., numerical problems.</p> <p>Geology of Tunnel and Bridge: Difficulties during tunneling Influence of geological conditions on tunneling, Geological consideration while choosing tunnel alignment, Tunnel in folded strata, sedimentary rocks and Deccan traps.</p> <p>Dependence of types of bridges on geological conditions.</p>	07 Hrs.
Unit 6	<p>Geology of Dams and Reservoirs:</p> <p>Influence of geological conditions on Location, Alignment, Design and Type of a dam, Suitable and Unsuitable geological conditions for locating a dam site, Dams on carbonate rocks, sedimentary rocks, folded strata and Deccan traps, Suitable and unsuitable geological conditions for reservoir site.</p>	07 Hrs.


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Text Books:					
S.N.	Title	Author	Publisher	Edition	Year of Edition
01	A Text book of Applied Engineering Geology.	M. T. Maruthesha Reddy	New Age International Publishers, New Delhi	1 st	2007
02	Engineering and General Geology	Prabin Singh, S. K.	Katariya and sons, Delhi	8 th	2008
03	A Text Book of Geology	G. B. Mahapatra	CBS Publication	2 nd	2009
04	A Text Book of Engineering Geology	R. B. Gupte	Vidyarthi Griha Prakashan, Pune	1 st	2009
05	Textbook of Engineering Geology	N. Chenna Kesavulu	Laxmi Publications Pvt Ltd.	3 rd	2018

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Geology of India and Burma	M. S. Krishnan	Bharat Law House, New Delhi.	2 nd	2001
02	Coping with Natural Hazards: Indian Context	K.S. Valdia	Orient Blackswan	1 st	2004
03	Groundwater Hydrology	Tood D. K.	Wiley & Son. New York	2 nd	2010
04	Engineering Geology for Civil Engineers	Varghese P. C.	Prentice Hall India Learning Private Limited	1 st	2012
05	Engineering Geology	Anil Kumar Mishra	S. Chand Publication	1 st	2013
06	Introduction to Rock Mechanics	Verma B. P.	Khanna Publisher Delhi	3 rd	2014
07	Engineering Geology for Civil Engineers -	Dr. D. V. Reddy	Vikas Publishing House Pvt. Ltd.	1 st	2010


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Course Details:

Class	B. Tech, Sem-V
Course Code and Course Title	0CVPC305, Infrastructure Engineering
Prerequisite/s	0BSES104, 0CVPC202
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I/ MSE / ISE II/ ESE	10/30/10/50

Course Objectives:

01	To study various types of pavement and pavement materials
02	To describe railway engineering and highway engineering design parameters and its importance
03	To explain the different terminologies of docks and harbors, various methods of tunneling and the safety measures
04	To understand different techniques of Intelligent Transport System & study engineering aspects of airport

Course Outcomes (COs):


Upon successful completion of this course, the student will be able to:

0CVPC305_1	Explain various types of pavement materials used in rigid and flexible pavement (K^2)
0CVPC305_2	Describe railway engineering design parameters and its importance (K^2)
0CVPC305_3	Explain the different terminologies of docks and harbors, various methods of tunneling and the safety measures (K^2)
0CVPC305_4	Describe different techniques of Intelligent Transport System (K^2)
0CVPC305_5	Summarize various engineering aspects of airport (K^2)
0CVPC305_6	Apply the knowledge of highway engineering in geometric design (K^3)

Course Contents:

Unit 1	Highway Engineering: Introduction and Importance of transportation, Different modes of transportation, Scope of Highway Engineering, Classification of roads and road patterns. Highway Geometric Design, Highway Cross sectional elements, Highway alignment. Recently launched highway projects in India Bridges: Classification of bridges, selection of site, Bridge Hydrology	08 Hrs.
Unit 2	Pavement; Pavement Materials: Subgrade, Aggregate, Bitumen; Rigid and flexible pavement; Wastes used in highway construction. Highway Drainage: surface drainage, sub-surface drainage. Introduction to Traffic Engineering;	07 Hrs.
Unit 3	Intelligent Transportation Systems (ITS): Definition of ITS and Identification of ITS Objectives, Historical Background, Benefits of ITS, ITS Data collection techniques, Telecommunication in ITS, ITS Functional areas, ITS user needs and services, Automated Highway Systems.	06 Hrs.


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Unit 4	Airport Engineering: Introduction, Air transportation in India, Terminologies, Aircraft characteristics. Airport Planning: Airport surveys, site selection, Airport obstructions and zoning; Airport layout.	06 Hrs.
Unit 5	Railway Engineering Introduction, Permanent Way, Geometric design; Points & Crossing; Stations and yards; Signaling and interlocking; Construction and maintenance of railway track; Safety in railways; High speed rail engineering	08 Hrs.
Unit 6	Dock Harbour & Tunnel Engineering: Dock Harbour: Introduction, planning and layout of ports, classification of ports and harbours, site selection, breakwater, jetties, locks, shore protection works. Tunnel Engineering: Introduction, Classification of tunnels: tunneling in hard rock and soft material, tunnel lining, safety measures, ventilation, lighting and drainage in tunneling, TBM	07 Hrs.


Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Highway Engineering	Khanna and Justo	Nemchand Bros, Roorkee	8 th	2015
02	A textbook of Railway Engineering	S.C. Saxena & S.P. Arora	Dhanpat rai Publications	6 th	2011
03	Harbor Dock and Tunnel Engineering	R Shrinivasan	Charotar Publications	28 th	2016
04	Airport Planning & Design	Khanna and Arora	Nemchand Bros, Roorkee	6 th	2012
05	Perspective on ITS	Sussman, J. M.	Artech House Publishers	5 th	2005


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Reference Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Transportation Engineering – An Introduction	Nemchand & Bros., Roorkee, Khistry	Prentice Hall of India Ltd., New Delhi	2 nd	2001
02	Principles of Transportation Engineering	Partha Chakraborty and Animesh das	Prentice Hall of India Ltd., New Delhi	1 st	2004
03	A Course in Railway Engineering	Saxena and Arora	Dhanpatrai & Sons, New Delhi	6 th	2011
04	Tunnel engineering	S. C. Saxena	Dhanpatrai & Sons, New Delhi	2 nd	2015
05	National ITS Architecture Documentation	US Department of Transportation	US Department of Transportation	5 th	2007

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Course Details:

Class	B. Tech, Sem.-V
Course Code and Course Title	0CVPC351, Soil Mechanics Laboratory
Prerequisite/s	0CVPC203
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives:

01	Study Index Properties & Engineering Properties of soils.
02	Determine the permeability & field density of soil.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC351_1	Compute the various index properties of given soil. (K ³)
0CVPC351_2	Calculate Engineering Properties of soil.(K ³)
0CVPC351_3	Demonstrate the shear strength test (K ³)
0CVPC351_4	Communicate effectively about laboratory work both orally and in writing journals. (S ²)
0CVPC351_5	Practice professional and ethical behavior to carry forward in their life. (A ²)

Exp. No.	Title of Experiments (Compulsory)
1	Determination of water content by oven drying.
2	Specific gravity determination by pycnometer / density bottle.
3	Particle size distribution-Dry Mechanical sieve analysis
4	Determination of consistency limits (LL & PL) and its use in soil classification.
5	Field density test by core cutter method
6	Field density test by sand replacement method
7	Determination of coefficient of permeability by constant head method.
Exp. No.	Title of Experiments (Any 3)
1	Determination of co-efficient of permeability by variable head method.
2	Standard proctor test
3	Calculation of C- ϕ value of various soil samples by direct shear test
4	Unconfined Compression Test
5	Triaxial shear test
6	One dimensional consolidation test


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Text Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Soil mechanics and Foundation engineering	B. C. Punmia	A Saurabh and Company Pvt. Ltd., Madras	17 th	2014
02	Soil Mechanics and Foundation Engineering	K. R. Arora	Standard Publication	15 th	2010
03	Geotechnical Engineering	B. J. Kasamalkar	Pune Vidyarthi Griha	3 rd	2012
04	Geotechnical Engineering	P. Purushottam Raj	Tata Mcgraw Hill Company Ltd. NewDelhi,	2 nd	2008

Reference Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Text book of soil mechanics in theory and practice	Dr. Alam Singh	Asian Publishing House, Bombay	3 rd	2002
02	Soil mechanics and Foundation engineering	V. N. S. Murthy	U. B. S. Publishers and distributors New Delhi	5 th	2005
03	Soil mechanics	Terzaghi and Peak	John Willey and Sons, New- York	3 rd	2000


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Course Details:

Class	B. Tech, Sem.-V
Course Code and Course Title	0CVPC352, Water Supply Engineering Laboratory
Prerequisite/s	Basic chemistry
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE	25

Course Objectives:

01	To understand the practical aspect of water supply engineering
02	To study basic concepts of water treatment methods for safety of society
03	To identify various physico-chemical and biological water quality parameters

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC352_1	Identify various physical, Chemical parameters of water.(K ²)
0CVPC352_2	Describe various units of water treatment plant.(K ²)
0CVPC352_3	Illustrate the various units of water treatment Plant. (K ³)
0CVPC352_4	Use of EPANET software for designing the pipe network (S ²)
0CVPC352_5	Understand water supply system in environmental and societal context (A ³)

Sr. No.	Title of Experiment
1	Determination of various water quality parameters (Physical, Chemical parameters)
2	Determination of total Solids
3	Determination of dissolved and suspended solids
4	Determination of Optimum Alum dose (Jar Test)
5	Determination of Residual chlorine in water
6	Study, use and application of software in network analysis
7	Visit to water treatment plant.
8	Design of complete water treatment plant for small community (Not more than 5000 population)

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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water Supply Engineering	S. K. Garg	Khanna Publishers, New Delhi	21 st	2012
02	Water Supply Engineering	Dr. B. C. Punmia	Laxmi Publishers, New Delhi	2 nd	2011
03	Water Technology	Gray, N. F	Elsevier Science & Technology Books	2 nd	2009
04	Water Supply Engineering	Dr. P. N. Modi	Standard Book House, New Delhi	18 th	2007
05	Water Supply and Sanitary Engineering.	G.S.Birde	Dhanpat Rai & Sons	2 nd	1990

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water and Waste Water Technology	Hammer M.J.	Prentice-Hall of India Private Limited	6 th	2011
02	Water Chemistry: An Introduction to the Chemistry of Natural and Engineered Aquatic Systems	Patrick L. Brezonik, William A. Arnold	Oxford University Press, New York	2 nd	2011
03	Nanotechnology in Water Treatment Applications	T. Eugene Cloetel, Michele de Kwaadstenietl	Caister Academic Press	2 nd	2010
04	Chemistry for Environmental Engineering and Science	C. N.Sawyer, P. L. McCarty and G.F. Parkin	Tata McGraw Hill	5 th	2003
05	Water Works Engineering – Planning, Design and Operation	S.R. Qasim, Edward, Motley and Zhu.	Prentice Hall, India	2 nd	2002
06	Environmental Engineering	H.S. Peavy, D.R. Rowe	McGraw Hill	2 nd	1985



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Course Details:

Class	B. Tech, Sem.-V
Course Code and Course Title	0CVES353, Engineering Geology Laboratory
Prerequisite/s	High school Geography
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE/ ESE	25

Course Objectives:

Laboratory practice aims to

01	To draw the section of geological maps
02	To identify and describe physical and engineering properties of minerals as well as rocks
03	To study engineering geological aspects in field

Course Outcomes (CO):

On successful completion of laboratory practice, student will be able to,

0CVES353_1	Identify engineering properties in mineral and rocks. (K ²)
0CVES353_2	Draw sections of geological structural maps. (K ³)
0CVES353_3	Distinguish different physical properties in common rock forming and ore minerals. (K ⁴)
0CVES353_4	Communicate effectively about laboratory work both orally and in writing journals. (S ²)
0CVES353_5	Practice professional and ethical behavior to carry forward in their life. (A ²)

Exp. No.	Title of Experiment
1	Megascopic study of Rock forming minerals
2	Megascopic study of Ore forming minerals
3	Megascopic study of Igneous rocks
4	Megascopic study of Secondary rocks
5	Megascopic study of Metamorphic rocks
6	Study of geological maps a) Single horizontal series b) Single inclined series c) One horizontal and one inclined series d) Both series are inclined with sill e) Both series are inclined with dyke
7	Study tour to the places of Engineering Geological importance
8	Compulsory activity based on engineering geology.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering and General Geology	Prabin Singh, S. K.	Katariya and sons, Delhi	8 th	2008
02	A Text Book of Engineering Geology	R. B. Gupte	Vidyarthi Griha Prakashan, Pune	1 st	2009
03	A Text Book of Geology	G. B. Mahapatra	CBS Publication	2 nd	2009
04	Engineering Geology for Civil Engineers -	Dr. D. V. Reddy	Vikas Publishing House Pvt. Ltd.	1 st	2010
05	Textbook of Engineering Geology	N. Chenna Kesavulu	Laxmi Publications Pvt. Ltd.	3 rd	2018

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Practical Geologist: The Introductory Guide to the Basics of Geology and to Collecting and Identifying Rocks	Dougal Dixon	Touchstone Publisher	8 th	1992
02	Groundwater Hydrology	Tood D. K.	Wiley & Son. New York	2 nd	2010
03	Introduction to Rock Mechanics	Verma B. P.	Khanna Publisher Delhi	3 rd	2014
04	Principles of Engineering Geology and Geotechnics	D. P. Krynine & W. R. Judd	CBS Publishers & Distributors, New Delhi	5 th	2018
05	Practical Field Geology	J H Farrell	Forgotten Books	1 st	2018


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Course Details:

Class	B. Tech, Sem.-V
Course Code and Course Title	0CVPC354, Infrastructure Engineering Laboratory
Prerequisite/s	0BSES104, 0CVPC251
Teaching Scheme: Practical	2
Credits	01
Evaluation Scheme: ISE/ESE	50/25

Course Objectives:

01	To find out grade of bitumen and its use according to IRC
02	To understand worldwide scenario of infrastructure engineering
03	To Study the Planning of airport components

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC354_1	Report on construction of rigid pavement and identify different waste materials in highway construction (K ²)
0CVPC354_2	Observe advanced techniques adopted in infrastructure engineering (K ²)
0CVPC354_3	Compute the grade of bitumen as per IRC recommendations (K ³)
0CVPC354_4	Draw airport layout for particular location (K ³)
0CVPC354_5	Communicate effectively about laboratory work orally while performing experiments. (S ²)
0CVPC354_6	Practice professional and ethical behavior to carry forward in their life. (A ²)

Exp. No.	Title of Experiment
1	Bitumen penetration test
2	Softening point of bitumen
3	Flash and fire point of bitumen
4	Ductility test of bitumen
5	Viscosity of bitumen
6	Stripping value of bitumen
7	Presentation on construction of rigid pavement : Transverse joints, Longitudinal joints, fillers and sealers
8	Report based on identification of different wastes used in highway construction along with its optimum content.
9	Report based on ITS implementation in developed and developing countries: Case study
10	Report based on Layout of an airport for particular location.
11	Report based on High speed rail: Case study
12	Presentation on methods of tunneling: Case study
13	Visit to highway construction (rigid and flexible pavement), Railway (station and track), Tunnel


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Highway Engineering	Khanna and Justo	Nemchand Bros, Roorkee	8 th	2015
02	A textbook of Railway Engineering	S.C. Saxena & S.P. Arora	Dhanpat rai publications	6 th	2011
03	Harbor Dock and Tunnel Engineering	R Shrinivasan	Charotar publications	28 th	2016
04	Airport Planning & Design	Khanna and Arora	Nemchand Bros, Roorkee	6 th	2012
05	Perspective on ITS	Sussman, J. M	Artech House Publishers	5 th	2005

Reference Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Transportation Engineering – An Introduction	Nemchand & Bros., Roorkee, Khistry, C.J.	Prentice Hall of India Ltd., New Delhi	2 nd	2001
02	Principles of Transportation Engineering	Partha Chakraborty and Animesh das	Prentice Hall of India Ltd., New Delhi	1 st	2004
03	A Course in Railway Engineering	Saxena and Arora	Dhanpatrai & Sons, New Delhi	6 th	2011
04	Tunnel engineering	S. C. Saxena	Dhanpatrai & Sons, New Delhi	2 nd	2015
05	National ITS Architecture Documentation	US Department of Transportation	US Department of Transportation	5 th	2007


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Course Details:

Class	B. Tech, Sem.-V
Course Code and Course Title	0CVPC355, Building Planning & Drawing Laboratory
Prerequisite/s	0CVPC205, 0CVPC255, 0CVPC211, 0CVPC258
Teaching Scheme: Lecture/Tutorial/Practical	00/01/04
Credits	03
Evaluation Scheme: ISE / ESE	50/50

Course Objectives:


01	To study dimensions and space requirements for various elements of the building in relation to human body measurements
02	To study the submission and working drawing of various public buildings

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:


0CVPC355_1	Draw the line plan of public buildings (K ³)
0CVPC355_2	Draw the municipal drawing of public building considering the design aspect (K ³)
0CVPC355_3	Make the various working drawings of public building (K ³)
0CVPC355_4	Use AutoCAD as a modern tool and software for drawing of public building (S ²)
0CVPC355_5	Practice professional and ethical behavior to carry forward in their life (A ²)

Sr. No.	Tutorial Contents:	
1	Dimensions & space requirement in relation to body measurements	01 Hrs.
2	Space design for passage between walls, service access, stair, ramps, and elevators	01 Hrs.
3	SP 7- National Building Code Group 1 to 3	01 Hrs.
4	SP 7- National Building Code Group 4 to 5	01 Hrs.
5	Rules for municipal council given by Government of Maharashtra	01 Hrs.
6	Rules for municipal council given by Government of Maharashtra	01 Hrs.
7	Planning and Design, site selection, site layout for any four types of public building as: a) Educational buildings: Younger age range, middle age range b) Building for health - health centers, hospitals c) Assembly buildings- recreational halls, cinema theatres, restaurants, clubs d) Business and mercantile buildings- shops, banks, markets and malls Industrial buildings- factories, workshops e) Office buildings- administrative buildings, corporate office f) Buildings for transportation- Bus stations, railway stations	08 Hrs.


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Exp. No.	Title of Experiment
1	Visit to three different types of public building and prepare merits and demerits point of existing public buildings
2	Line plan of above buildings
3	Municipal Drawing of public building (Area of Building 300-1000 m ²) Note -Drawing shall be done individually and this type of public building shall not be covered in Exp. No. 1
4	Layout plan of public building of Exp.No.3
5	Working drawing of Exp.No.3- details of water supply and drainage
6	Working drawing of Exp.No.3 - electrification, furniture layout
7	Project Report on Exp.No.3
8	Two exercises on parallel and angular perspective of simple civil engineering objects

Note- All Drawings should be on Auto-CAD except Exp. No. 8


Text Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Civil Engineering Design & Drawing	D. N. Ghose	CBS Publications, Distributors (P) Ltd	2 nd	2010
02	Building Drawing	M. G. Shah, C. M. Kale, S. Y. Patki	Tata McGraw-Hill Publications (P) Ltd	5 th	2011 (Reprint)
03	A Course in Civil Engineering Drawing	V.B.Sikka	S.K.Kataria and Sons	7 th	2013
04	Practical Building Construction & its Management	Sandeep Mantri	Satya Prakashan	10 th	2012

Reference Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	SP 7- National Building Code Group 1 to 5	-	B. I. S. New Delhi	-	-
02	I.S. 962-1989 code for practice for Architectural and Bilding Drawing	-	B. I. S. New Delhi	-	-
03	Civil Engineering Drawing	V. B. Sikka	S. K. Kataria & Sons.	5 th	2018


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Course Details:

Class	B. Tech, Sem.- V
Course Code and Course Title	0CVAC306, Professional Lectures and Skill Practices
Prerequisite/s	0CVPC205,0CVPC255,0CVPC211, 0CVPC258
Teaching Scheme: Lectures/Tutorial/Practical	1/0/2
Credits	--
Evaluation Scheme: ISE	Grade

Course Objectives:

01	Understand the recent trends and developments in the field of civil engineering
02	To study the working drawings of residential building
03	To know the various construction tools, equipments and construction activities

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVAC306_1	Explain the latest developments to improve the civil engineering knowledge. (K ²)
0CVAC306_2	Use various tools and equipments required for construction (K ³)
0CVAC306_3	Demonstrate various construction activities on field (K ³)
0CVAC306_4	Function effectively as an individual and as a team member while performing various construction activities (S ²)
0CVAC306_5	Practice various construction activities (A ²)

Course Contents:

Every week a guest lecture by Industry expert/academician/any other relevant key speaker will be arranged for all the students.

The topics will be generally based on:

1. Structural engineering
2. Construction management
3. Environmental engineering
4. Advanced construction techniques
5. New materials
6. Automization in construction industry etc.

Sr. No.	Title of Experiment
1	To study the document required for municipal permission of building from Competent authority
2	To carry out Lineout activity for G+1 R.C.C. residential building
3	To study the method of preparation of formwork and check its dimensions on site.
4	To study the various tools and equipments on site required for construction
5	To carry out various procedures adopted for different construction work (Footing, Column, Brickwork, RCC wall, Beam, Plaster, Flooring, Formworks)
6	To carry out 230 mm thick brickwork activity for wall of size 1m X 1m.
7	To prepare model of various building components using steel bars, wood, plywood, aluminum (e.g. column along with footing, beam, door, bridge, road, window)
8	To do measurements of brick work, footing, PCC, column, beam, slab


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Building Construction	B.C.Punmia, A.K Jain	Laxmi Publications	11 th	2017
02	Basic Civil Engineering A Text Book of Building Construction	G. K. Hiraskar	Dhanpat Rai Publications	5 th	2010
03	Building Construction	S.P. Arora, S.P. Bindra	Dhanpat Rai Publications	7 th	2010
04	Engineering Materials	R.K.Rajput	S. Chand	3 rd	2012
05	A Course in Civil Engineering Drawing	V.B.Sikka	S.K.Kataria and Sons	7 th	2013

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	SP 7- National Building Code Group 1 to 5	-	B.I.S. New Delhi	-	-
02	I.S. 962 - 1989 Code for Practice for Architectural and Building Drawings	-	B.I.S. New Delhi	-	-



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TYCV-3/82

Course Details:

Class	B. Tech, Sem.-VI
Course Code and Course Title	0CVPC307, Theory of Structures
Prerequisite/s	0CVPC204, 0CVPC207
Teaching Scheme: Lecture /Tutorial	03/01
Credits	04
Evaluation Scheme: ISE I / MSE/ ISE II/ ESE	10/30/10/50

Course Objectives:

01	To understand the concept of static and kinematic indeterminacy (degrees of freedom) of the structures such as beams & rigid pin jointed frames.
02	To know the different techniques available for the analysis of structures.
03	To apply these methods for analyzing the indeterminate structures to evaluate the response of such structures in the form of bending moment, shear force and axial force.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC307_1	Explain the concept of statically and kinematically indeterminate structures. (K ²)
0CVPC307_2	Examine the statically indeterminate structure by using Consistent deformation method. (K ⁴)
0CVPC307_3	Interpret statically indeterminate structure by using Strain energy method. (K ⁴)
0CVPC307_4	Investigate kinematically indeterminate structure by using Slope deflection method and Moment distribution method. (K ⁴)
0CVPC307_5	Solve the indeterminate structure by using Matrix methods. (K ⁴)

Course Contents:

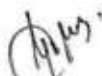
Unit 1	Introduction to Structures: Types of structures, Stable and unstable structures, Indeterminate structures Statically and kinematically with problems.	6 Hrs.
Unit 2	Consistent Deformation Method Applications to propped cantilever and fixed beams, beams with varying M.I. (Degree ≤ 2)	6 Hrs.
Unit 3	Strain Energy Method Strain energy due to various forces, Unit load method and Castigliano's theorems - Applications to statically indeterminate structures- Portal Frame. (Degree ≤ 2)	7 Hrs.
Unit 4	Slope Deflection Method Slope deflection equations, Application to beams, Portal frames without sway. Modified slope deflection method (Degree ≤ 2)	7 Hrs.



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Unit 5	Moment Distribution Method Relative and absolute stiffness, Distribution factors, Sinking of supports, Applications to beams, Portal frames without sway (Degree ≤ 2)	8 Hrs.
Unit 6	Matrix Methods Introduction to Flexibility and Stiffness method. Flexibility and Stiffness coefficients, Development of Flexibility matrix and Stiffness matrix, Analysis of simple beams (Degree ≤ 2)	8 Hrs.

Tutorials:

One hour per week tutorial is to be utilized for problem solving to ensure that students have properly learnt the topics covered in the lectures. This shall include Software applications (STADD PRO & E-TABS) / Assignments / Tutorials / Quiz / Surprise test. The teacher may add any of the other academic activity to evaluate student for his/her in semester performance. It consists small investigations are as follows:

List of Tutorials:	
Sr. No.	Title of Tutorial
1	Computation of static and kinematic indeterminacy
2	Investigate statically indeterminate structure by consistent deformation method.
3	Solve statically indeterminate structure by strain energy method.
4	Interpret kinematically indeterminate structure by slope deflection method.
5	Investigate kinematically indeterminate structure by moment distribution method.
6	Solve indeterminate structure by any matrix methods.
7	Solve indeterminate structure by any software and compare it with manual investigation.

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Basic Structural Analysis	Reddy C. S.	Tata McGraw Hill Publication Company Ltd.	2 nd	2001
02	Structural Analysis – Matrix approach	Pandit and Gupta	Tata McGraw Hill Publication Company Ltd.	4 th	2004
03	Mechanics of Structures (Vol. II)	S.B. Junnarkar	Charator Book Publishing House.	24 th	2015
04	Structural Analysis	R.C. Hibbeler	Pearson Prentice Hall	8 th	2011
05	Structural Analysis Vol-I	S. S. Bhavikatti	Vikas Publishing House	4 th	2010

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Theory of Structures	Timoshenko & Young	Tata McGraw-Hill Publishing Company Ltd.	2 nd	1965
02	Modern Methods in Structural Mechanics - I	B.N. Thadani	Asia Publishing House, New Delhi.	1 st	1964
03	Indeterminate Structural Analysis	C. K. Wang	Tata McGraw Hill Publication Company Ltd.	1 st	1983
04	Structural Analysis Vol-2	S. S. Bhavikatti	Vikas Publishing House	4 th	2013
05	Advanced Structural Analysis	Devdas Menon	Alpha Science International Ltd	1 st	2009



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Course Details:

Class	B. Tech, Sem.-VI
Course Code and Course Title	0CVPC308, Foundation Engineering
Prerequisite/s	0BSES104,0CVPC205
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I/ MSE / ISE II/ ESE	10/30/10/50

Course Objectives:

01	To investigate different methods of soil exploration
02	To analyze and design the shallow foundation and understand its selection criteria
03	To classify and analyze different types of deep foundations

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC308_1	Summarize the methods of soil exploration (K ²)
0CVPC308_2	Calculate various dimensions of shallow foundation. (K ²)
0CVPC308_3	Calculate bearing capacity of soil with different methods (K ²)
0CVPC308_4	Compute capacity of deep foundations by various methods (K ³)
0CVPC308_5	Examine slope failures by different methods and modern foundation techniques in civil engineering. (K ⁴)

Course Contents:

Unit 1	Soil & Rock Exploration: Necessity, Planning, No & depth of bore holes, Exploration Methods- auger boring, and wash boring, rotary drilling. Soil sampling, Rock drilling and sampling, Site investigation report with bore log analysis	05 Hrs.
Unit 2	Bearing Capacity Evaluation: Definitions, Modes of failure, Terzaghi's bearing capacity theory, I.S. Code method of bearing capacity evaluation, Effect of various factors on bearing capacity (Size & Shape, Depth, WT, Eccentricity), Plate load test, S.P.T. (By I.S. Code method) and pressure meter tests with detailed procedure	08 Hrs.
Unit 3	Shallow Foundation & Settlement: Types and their selection, minimum depth of footing, Assumptions & limitations of rigid design analysis. Design of Isolated, combined, strap footing (Rigid analysis), Raft foundation (elastic analysis). Immediate settlement- computations from I.S. 8009-1976 (Part I) approach, consolidation settlement computations, Concept of total settlement, differential settlement and angular distortion.	08 Hrs.
Unit 4	Pile Foundation: Classification and their uses, single pile capacity evaluation by static and dynamic methods, pile load test. Negative skin friction, Group action piles, spacing of piles in group, Group efficiency. Under reamed piles – equipment, construction and precautions	08 Hrs.



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Unit 5	Well foundations, Caisson, Cofferdam: Element of wells, types, methods of construction, tilt and shift, remedial measures. Pneumatic caissons: sinking method- Sand island method, Caisson disease, Cofferdam, Common types of cofferdam	05 Hrs.
Unit 6	Stability of Slope & Modern Foundation Techniques: Slope classification, slope failure, modes of failure. Infinite slope in cohesive and cohesion less soil, Taylor's stability number, Swedish slip method and Friction circle method, Stone columns, Vibroflotation, Preloading technique, Civil engineering application of geo synthetics.	08 Hrs.

Text Book:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Soil Mechanics and Foundation Engineering	Dr. K. R. Arora	Standard Publishers and Distributors	2 nd	2009
02	Soil Mechanics and Foundations	BC Punmia	Laxmi publications Pvt Ltd	16 th	2005
03	Soil Mechanics and Foundation engineering	VNS Murthy	Saikripa Technical Consultants Bangalore	8 th	1991
04	Geotechnical Engineering	SK Gulhati	Tata McGraw Hill Delhi	1 st	2005
05	Soil Mechanics and Foundations	Muni Budhu	Wiley India Pvt Ltd	2 nd	2008
06	Geotechnical Engineering	P. Purushottam Raj	Tata McGraw Hill Company Ltd. New Delhi	1 st	2005

Reference Book:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Foundation Analysis and Design	JE Bowles	McGraw Hill International Edition	5 th	1996
02	Foundation Design and Construction	MJ Tomlinson	ELBS	7 th	2001
03	Design Aids in Soil Mechanics and Foundation Engineering	S:R. Kaniraj	TMH New Delhi	5 th	2004
04	Soil Mechanics and Foundations	Muniram Budhu	John Wiley & Sons Publishers	2 nd	2007



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Course Details:

Class	B. Tech, Sem.-VI
Course Code and Course Title	0CVPC309, Waste Treatment & Pollution Control
Prerequisite/s	Basic chemistry
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I/MSE/ISE II/ESE	10/30/10/50

Course Objectives:

01	To understand the characteristics, generation rate and methods of Wastewater collection
02	To illustrate the various processes for wastewater treatment
03	To study various methods of wastewater disposal
04	To explain various aspects of solid waste management

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC309_1	Explain the sources, characteristics and methods of wastewater collection (K ²)
0CVPC309_2	Discuss the concept of solid waste management. (K ²)
0CVPC309_3	Compute the various units of low cost wastewater treatment. (K ³)
0CVPC309_4	Apply the knowledge of effluent standards for wastewater disposal as per norms. (K ³)
0CVPC309_5	Compute the primary and secondary wastewater treatment units. (K ³)


Course Contents:

Unit 1	Waste Water Treatment: Necessity, methods of sewage disposal, types of sewerage systems and their suitability, Wastewater sources and flow rate, Components of wastewater flow, Variations in flow rates and strength, Constituents, Characteristic of Municipal wastewater, Problems on B.O.D. calculations	07 Hrs.
Unit 2	Design of Sewerage System: Dry weather flow, factors effecting dry weather flow, Estimation of storm water flow, rational method and empirical formulae of design of storm water drain, hydraulic formulae for velocity, effects of flow variations on velocity, self cleansing and non scouring velocities, design of hydraulic elements for circular sewers flowing full and for partially full. Application of softwares in sewer network design	07 Hrs.
Unit 3	Treatment of Sewage: Principle, application and design of following unit operations: Primary Treatments: screening, grit chambers, skimming tanks, primary sedimentation tank, Secondary Treatments: Activated sludge process, principle and flow diagram. Modifications, F/M ratio, designs of ASP. Trickling filter, Rotating biological Contactor.	07 Hrs.


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Unit 4	<p>Sludge Treatment: Characteristics, Treatment and disposal, Sludge volume index, Concept of anaerobic digestion, Types of reactors. Sludge drying beds, sludge digestion and filter beds.</p> <p>Low Cost Treatments: Waste stabilization pond, Oxidation pond, Aerobic & anaerobic Lagoons, Aerated Lagoon, Oxidation ditch. Design of Septic tank. Selection of alternative Treatment process flow sheets, Concept of recycling and reuse of sewage</p>	07 Hrs.
Unit 5	<p>Stream pollution: Stream Classification, Concept of Self Purification and DO sag curve. Streeter Phelp's Equation. Disposal of wastewater: methods, Effluents standards for stream and land disposal as per MPCB standards and legislation. Wetland and aquatic treatment systems; Types, application. Concept of environmental impact assessment.</p>	07 Hrs.
Unit 6	<p>Solid waste management: Definition, types, sources, characteristics. Functional outlines, Generation, storage, Collection, Treatment techniques. Concept of Hazardous waste management.</p> <p>Air Pollution: Definition, Sources and classification of pollutants, Effects on man material and vegetation. Introduction to Meteorological aspects such as atmospheric stability, mixing heights, and plume behavior. Control of industrial air pollution- Settling Chamber, Bag Filters, Cyclone separators, Scrubbers, Electrostatic precipitators.</p>	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Sewage disposal and air pollution engineering	S.K.Garg	Khanna publishers	33 rd	2015
2	Water Supply & Sanitary Engineering	G. S. Birdie	Dhanpat Rai & Sons, New Delhi	18 th	2007
3	Waste Water Treatment, Disposal and Reuse	Metcalf and Eddy Inc.	Tata McGraw Hill Publications	2 nd	2000
4	Wastewater Engineering	B.C. Punmia, Jain	Laxmi Publications (P) Ltd	2 nd	1998
5	Air pollution	Rao M. N. and Rao H.V.	Tata McGraw Hill	2 nd	1990

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Environmental Engineering	Peavy, Rowe and Tchobanoglous;	McGraw-Hill	2 nd	2015
2	Industrial Wastewater Treatment, Recycling and Reuse.	Bhandari and Ranade	Elsevier	2 nd	2014
3	Water and Waste water Technology	Hammer M.J.	Prentice-Hall of India Private Limited	6 th	2011
4	Water supply & sanitary engineering	E.W.Stec	Khanna Publishers	2 nd	2008
5	Wastewater Treatment for Pollution Control	Arcievala, S.J.	Tata McGraw Hill.	2 nd	2000
6	Environmental Engineering	H.S.Peavy, D. R. Rowe	McGraw Hill	2 nd	1985
7	Introduction to Environmental Engineering and Science	Masters, G.M.	Prentice Hall of India.	2 nd	1998



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Course Details:

Class	B. Tech, Sem.-VI
Course Code and Course Title	0CVPC310, Water Resources Engineering
Prerequisite/s	0CVPC208, 0CVPC212
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	To instruct about surface and ground water hydrology
02	To explain Soil-water relationship, Water requirement of crops and irrigation methods
03	To explain the different types of irrigation structures

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC310_1	Describe the hydrological cycle, and its components. (K ²)
0CVPC310_2	Discuss the basic concepts of stability of Earthen and gravity dam. (K ²)
0CVPC310_3	Explain the basic concepts of ground water hydrology (K ²)
0CVPC310_4	Illustrate different components of hydrograph and problems on it. (K ³)
0CVPC310_5	Calculate water requirements for crops. (K ³)

Course Contents:

Unit 1	Introduction of Hydrology: Hydrological cycle and its components; Precipitation -types and forms, measurement, annual average precipitation measurement, optimum number of rain gauge station, Hyetograph. Infiltration - factors affecting and measurement methods. Evaporation and evapotranspiration - factors affecting and measurement methods.	07 Hrs.
Unit 2	Hydrograph and Floods: Runoff- factor affecting, Component parts of hydrograph, Storm hydrograph, Base flow and Separation of base flow, direct runoff hydrograph, Unit hydrograph, theory, assumptions, limitations and use, S-curve hydrograph, Synthetic unit hydrograph.	07 Hrs.
Unit 3	Ground water hydrology: Occurrence, distribution and classification of ground water, Darcy's law, aquifer parameters— Permeability, specific yield, specific retention, porosity, storage coefficient, Transmissibility, Hydraulics of well under steady flow conditions in confined and unconfined aquifers, Specific capacity of well, Recuperation Test.	07 Hrs.



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Unit 4	Introduction to Irrigation and Water Requirement of Crops: Definition and necessity of irrigation, types and methods of irrigation, Water logging and land drainage. Principal crops and crop seasons, Classes and availability of soil water, Duty, delta, base period and their relationship, factors affecting duty, methods of improving duty, Assessment and efficiency of irrigation water. Gross command area, cultural command area and command areacalculations based on crop water requirement. Depth and frequency of irrigation.	07Hrs.
Unit 5	Introduction to dams: Types of dams, selection of site for dams, selection of type of dam, Control levels. Gravity dam: Component parts, Forces acting on dam, Design Criterion-theoretical and practical profile, Stability analysis, dam instrumentation. Earthen dam: Component parts, Construction and types of earthen dam, plotting of phreatic line, Modes of failure, seepage control measures.	08 Hrs.
Unit 6	Spillway, Canals and diversion heads works: Spillway: Component parts of spillway, Types of spillway and spillway gates. Diversion head work: Weirs and barrage, Causes of failure, Introduction to Theory of seepage-Bligh's creep theory, critical exit gradient, Khosla's theory.	06 Hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Irrigation, Water Resources and Water power Engineering	Dr P.N. Modi	Standard Book House Delhi	9 th	2014
02	Irrigation and water power engineering'	B. C. Punmia	Laxmi Publications	16 th	2009
03	Engineering Hydrology	Subramany K	Tata McGraw Hill, New Delhi	4 th	2013
04	Engineering Hydrology	Raghunath, H.M.	New Age International Publishers	3 nd	2014
05	Watershed Management in India	J.V.S.Murthy	Wiley Eastern Publications, Delhi	2 nd	2004
06	Applied Hydrology	K N Muthreja	Tata McGraw Hill, New Delhi	16 th	1996
07	Irrigation Engineering	Gl Asawa	New Age International (P) Ltd	1 st	1996



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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Irrigation Engineering.	S. K. Garg	Dhanpat Rai Publications	5 th	1999
02	Hydrology and water resources	R.K.Sharma	Dhanpatrai and sons, New Delhi	1 st	1987
03	Theory and design of irrigation structures vol. I and II and III	Varshney, Gupta and Gupta	Newchand and Brothers	1 st	1988
04	Water and Soil Conservation	Ghanshyam Das	Eastern economy edition	2 nd	2009



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Course Details:

Class	B. Tech, Sem.-VI
Course Code and Course Title	0CVPE311, Open Channel Flow
Prerequisite/s	0CVPC203
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

1	To study the basic concepts of open channel flows
2	To understand various types of hydraulic models.
3	To study the principles and equations for pressure flow and momentum analysis.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE311_1	Explain the basic concepts of fluid flow in open channels. (K ²)
0CVPE311_2	Describe the various types of hydraulic models. (K ²)
0CVPE311_3	Explain the phenomenon of dispersion and hydraulics of mobile beds in open channels (K ²)
0CVPE311_4	Apply the principles and equations of open channel flows for pressure flow and momentum analysis. (K ³)
0CVPE311_5	Apply the analytical knowledge of pressure and velocity distribution in an open channel in order to solve practical problems. (K ³)

Course Contents:

Unit 1	Basic Fluid Flow Concepts: Classification of open channels and O.C.F., Basic equations (Continuity, Energy, Momentum), Energy and Momentum coefficients, Specific energy and Critical depth, Establishment of Uniform flow in open channels, Uniform flow formulae, Section factor and conveyance factor, First and Second hydraulic exponent, Uniform flow computations.	07 Hrs.
Unit 2	Non-Uniform Flow in Open Channel: Types of Non-Uniform flow, Governing equation for GVF, Characteristics and classification of surface curves, Computation of GVF in prismatic channels, Hydraulic jump in rectangular channels (Types and characteristics), Jump on sloping floor, Jump in non rectangular channels, Use of jump as Energy Dissipater, Spatially-Variied Flow, Side weir, Bottom racks.	08 Hrs.
Unit 3	Flow in Non-linear alignment and Non prismatic Channels: Nature of Flow, Spiral Flow, Energy Loss, Super elevation, Cross Waves, Design Considerations for Subcritical and Supercritical flow Transitions and contractions in open channel flow, Subcritical & Supercritical flow through sudden transitions and constrictions, Standing wave flume, flow between bridge piers, flow through culvert.	07 Hrs.
Unit 4	Unsteady Flow in Open Channels: Gradually Varied Unsteady Flow, Waves and their classification, Celerity of a wave, Rapidly Varied Flow, Surges, Positive and negative Surges, Surges in Power Canals, Dam-break problem	06 Hrs.
Unit 5	a) Dispersion in Open Channels: Diffusion and dispersion, Some classical	08 Hrs.


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	solutions of the diffusion equation, Discharge measurement using tracer techniques b) Hydraulics of Mobile Bed Channels: Initiation of motion of sediment, Bed forms, Sediment Load, design of Erodible Channels, Regime Theory for Alluvial Channels	
Unit 6	Hydraulic Models: Fixed bed river models (Distorted and Undistorted), Moveable bed Models, Model materials and construction, Physical model calibration and verification, Special-Purpose models	06 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A text book of Fluid Mechanics	R.K. Rajput	Chand Publication	9 th	2013
02	Engg. Fluid Mechanics	K.L.Kumar	Eurasia Publication	7 th	2001
03	Fluid Mechanics	S. Ranmamurtham	Dhanpat Rai & sons	8 th	2009
04	Fluid Mechanics and Hydraulic Machines	R.K.Bansal	Khanna Pub.	10 th	2013

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Open Channel Hydraulics	Ven Te Chow	McGraw-Hill International Editions	9 th	2013
02	Open Channel Hydraulics	Richard H. French	McGraw-Hill International Editions	7 th	2001
03	Flow in Open Channels	K. Subramanyam	Tata McGraw Hill Publsh. Co. Ltd.	10 th	2013
04	Open-Channel Flow	M. Hanif Chaudhary	Prentice-Hall International Publications	5 th	2011



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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE312, Pavement Design & Analysis
Prerequisite/s	0BSES104, 0CVPC202, 0CVPC305
Teaching Scheme: Lecture/Tutorial	03/00
Credits	3
Evaluation Scheme: ISE I/ MSE / ISE II/ ESE	10/30/10/50

Course Objectives:

01	To study different stresses and deflections in rigid and flexible pavements
02	To make a use of analytical method to design flexible and rigid pavement
03	To understand the method of overlay over flexible and rigid pavements
04	To analyze the distress condition of flexible pavements using various techniques

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE312_1	Illustrate different stresses and deflections in flexible pavements. (K ³)
0CVPE312_2	Illustrate different stresses and deflections in rigid pavements. (K ³)
0CVPE312_3	Make use of analytical method to design flexible and rigid pavement. (K ³)
0CVPE312_4	Adapt the method of overlay over flexible and rigid pavements. (K ³)
0CVPE312_5	Investigate the distress condition of flexible pavements using various techniques. (K ⁴)

Course Contents:

Unit 1	Stresses and Deflections in Flexible Pavements: Types and component parts of pavements, Factors affecting design and performance of pavements. Comparison of highway and airfield pavements. Stresses and deflections in homogeneous masses. Burmister's two layer theory, three layer and multi layer theories; wheel load stresses, various factors in traffic wheel loads; ESWL of multiple wheels. Repeated loads and EWL factors; sustained loads.	7 Hrs
Unit 2	Flexible Pavement Design Methods for Highways: Empirical, semi-empirical and theoretical approaches, development, principle, design steps, advantages and application of the different pavement design methods McLeod Method, CBR Method, including IRC: 37-2012.	7 Hrs
Unit 3	Stresses in Rigid Pavements: Types of stresses and causes, factors influencing the stresses; general considerations in rigid pavement analysis, Westergaard's Analysis, EWL; wheel load stresses, warping stresses, frictional stresses, combined stresses	7 Hrs
Unit 4	Design of Rigid Pavements: Design of CC pavement for roadway, Types of joints in cement concrete pavements and their functions, joint spacing; design of joint details for longitudinal joints, contraction joints and expansion joints. IRC:58-2011 method of design, Design of continuously reinforced concrete pavements.	7 Hrs


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Unit 5	Pavement Evaluation: Visual rating, Pavement Serviceability Index, Roughness, Skid resistance and Deflection measurements, Use of modern equipment for pavement surface condition measurements-Analysis of data, interpretation and application, Functional evaluation, Structural evaluation of flexible pavements by rebound deflection method, analysis of data, interpretation and applications, FWD, and Benkelman Beam Deflection Technique (IRC:81-1997).	7 Hrs
Unit 6	Pavement overlay: Choice and Design of overlay type and pavement materials over existing flexible and rigid pavements with different degrees of distress. Rehabilitation and Recycling of bituminous pavement	7 Hrs

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Principles and Practice of Highway Engineering (Including Expressways and Airport Engineering)	Kadiyali L.R. and N.B. Lal	Khanna Publishers, New Delhi	8th	2004
02	Pavement Design	Yoder and Witzech	McGraw-Hill	2nd	1982
03	Functional Designing of Pavements	Teng	Mc Graw - Hill	1st	1980
04	Pavement Analysis and Design	Yang H. Huang	Pearson Prentice Hall	7th	2004
05	Highway Engineering	Khanna and Justo	Nemchand Bros, Roorkee	8th	2015
06	Principles of Pavement Design	Yoder E.J. and Witczak M.W	John Wiley & Sons, New York	1st	1975


References: IRC Codes:

Sr. No	IRC No.	Title	Year
01	IRC-58	Guidelines for the Design of Rigid Pavements for Highways	2002
02	IRC-15	Guidelines for the Design of Rigid Pavements for Highways	2002
03	IRC-37	Guidelines for the Design of Flexible Pavements for Highways	2012
04	IRC-82	Code of Practice for Accelerated Strength Testing and Evaluation of Concrete Road and Air field Constructions	1983
05	IRC-76	Tentative Guidelines for Structural Strength Evaluation of Rigid Airfield Pavement	1979


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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE313, Remote Sensing & GIS Applications in Civil Engineering
Prerequisite/s	0CVPC208, 0CVPC304
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	To study the evolution of Remote Sensing and GIS.
02	To get a basic and advanced knowledge of remote sensing & GIS techniques.
03	To get knowledge of photo interpretation with the help of stereoscope, Parallax bar & GIS software

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE313_1	Discuss the brief history of Remote Sensing Technology and GIS. (K ²)
0CVPE313_2	Discuss the various applications of remote sensing technique in civil engineering (K ²)
0CVPE313_3	Explain different photographic elements in aerial photographs. (K ²)
0CVPE313_4	Explain photo interpretation with the help of stereoscope, Parallax bar & computer (K ²)
0CVPE313_5	Apply the results from GIS software in civil engineering field. (K ³)
0CVPE313_6	Solve numerical problems on scale of aerial photographs. (K ³)

Course Contents:

Unit 1	Introduction: Definition, History, Types of satellites based upon uses, Programs of different countries, India's position, etc. Scope - Various fields of applications, Users in India, Data requirements of users.	06 Hrs.
Unit 2	Space System: Technique of aerial photography, Photographic flight mission, Factors influencing flight mission, Numbering of aerial photographs. Important units of satellite and functioning of satellite, height, and coverage. Stages in remote sensing, Electromagnetic radiation, and electromagnetic spectrum, Interaction of electromagnetic radiation with atmosphere and earth surface. Sensors, Digital Image processing.	08 Hrs.
Unit 3	Geomorphology: Geomorphology and its scope in photo interpretation as well as in engineering, Drainage analysis, Drainage patterns, Drainage density and Drainage frequency. Landforms associated with igneous, secondary and metamorphic rocks, Landforms developed due to structural features like dip strike, fractures, faults, folds etc.	07 Hrs.


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Unit 4	Structure of GIS: Cartography, Geographic mapping process, GIS data models, database management systems, Raster data representation, Vector data representation, transformations, map projections, Geographic Data Representation, Storage, Quality and Standards, Assessment of data quality, Managing data errors, Geographic data standards. GIS Data Processing, Analysis and Modeling: Raster based GIS data processing – Vector based GIS data processing – Queries – Spatial analysis – Descriptive statistics – Spatial autocorrelation–Quadrant counts, and nearest neighbor analysis – Network analysis – Surface modeling – DEM.	09 Hrs.
Unit 5	Application of RS and G.I.S in Environment & Water Resources: a. Environment. b. Water Resources. c. Disaster Management	06 Hrs.
Unit 6	Application of RS and G.I.S in Civil Engineering: a. Town Planning. b. Geology. c. Transportation. d. Mapping & Surveying.	06 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Textbook on remote sensing in natural resources monitoring and management	C.S.Agrawal and P.K.Garg,	Wheeler Publishing, New- Delhi.	1 st	2000
02	Basics of Remote Sensing and GIS	Dr. S.Kumar	Laxmi publications Ltd. New- Delhi	1 st	2005
03	Fundamental of Remote Sensing	Gorge Goseph	University Press (India) Pvt. Ltd.	1 st	2005
04	Remote Sensing Principles and Applications	Dr. B. C. Panda	Viva Books Pvt. Ltd	1 st	2005
05	Remote Sensing And GIS	Chandra	Narosa Publication	2 nd	2015

Reference Books:

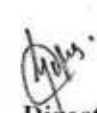
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	American Society of Photogrammetry	-	Washington D. C. Manual	1 st	1960
02	Remote Sensing and Image Interpretation	Lillesand	Wiley Publication	6 th	2011
03	Remote Sensing and GIS	Basudeb Bhatta	Oxford	2 nd	2011
04	Satellite Remote Sensing	Nicola Masini	Springer	1 st	2012
05	An Introduction to Geoinformatics	G. S. Srivastava	McGraw Hills	1 st	2014




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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE314, Design of Concrete Bridges
Prerequisite/s	0CVPC304 , 0CVPC305
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I/ MSE / ISE II/ ESE	10/30/10/50

Course Objectives:

01	Study various construction techniques of bridges
02	Discuss design considerations for bridges.
03	Study basics of pre-stress bridges

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE314_1	Describe various construction techniques of bridges (K ²)
0CVPE314_2	Explain types bearings and expansion joints (K ²)
0CVPE314_3	Discuss basics of pre-stress bridges (K ²)
0CVPE314_4	Illustrate various types of bridges and its specification (K ³)
0CVPE314_5	Illustrate design consideration of R.C.C. and P.S.C. bridges (K ³)

Course Contents:

Unit 1	Introduction of Bridges Introduction & brief history of bridges, Classification, Importance of bridges, Components of bridges, Investigation for Bridges.	06 Hrs.
Unit 2	Design loads for Bridges Standard specification for road bridges. I.R.C. bridge code, width of carriage way, clearances, loads to be considered i.e. D.L., L.L., impact load, wind load, earthquake load, longitudinal force, centrifugal force, buoyancy, Earth pressure, water current force, thermal force etc.	08 Hrs.
Unit 3	Design of Bridges General design considerations for R.C.C. & P.S.C. bridges. Traffic aspects for highway bridges. Aesthetics of bridge design, Relative costs of bridge components, Pigeaud's theory, Courbon's theory.	07 Hrs.
Unit 4	Construction Techniques Construction of sub structure footing, piles, cussions, construction of reinforced earth retaining wall and reinforced earth abutments, super structure – erection method for bridge deck construction by cantilever method.	07 Hrs.
Unit 5	Bridge Bearings Different types of bridge bearing and expansion joints – forces on bearings –Types of bearings, elastomeric bearings, expansion joints.	06 Hrs.
Unit 6	Pre-stress Bridge Introduction to Pre-stress Bridges, Pre-stress T- beam type bridge, Pre-stress Box-type, Losses of Pre-stress of Bridges , Torsional Analysis of bridges, Transverse and Longitudinal Analysis	08 Hrs.

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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Reinforced Concrete Structures – Vol. II	Dr.B.C.Punmia and Jain	Laxmi Publications New Delhi	4 th	1992
02	Concrete Bridge Practice, Analysis, Design and Economics	Dr. V.K. Raina	Tata McGraw- Hills Publishing Company Limited.	2 nd	2004
03	Bridge Engineering	S. Ponnuswamy	Tata McGraw-Hills Publishing	2 nd	2007
04	Design of Bridges	N. Krishna Raju	Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi	4 th	2009

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of bridge structures	T. R. Jagadeesh	PHI Learning Pvt. Ltd.	2 nd	2010
02	Essential of Bridge engineering	D. Johnson Victor	Oxford & IBH Publishing Co. Pvt. Ltd.	6 th	2007
03	Design of concrete bridges	M. G. Aswani	Khanna	3 rd	2001
04	Design & construction of highway bridges	K. S. Rakshit	NCB Pvt. Ltd	2 nd	1992
05	Handbook on Repair and Rehabilitation of R. C. C. Buildings	Director General Works	CPWD, New Delhi, India	2 nd	1992


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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE315, Advanced Foundation Engineering
Prerequisite/s	0BSES104, 0CVPC205
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	To know different type of shallow foundation and their design criteria
02	To classify the piles and calculate their capacities in single and group action
03	To know soil stabilization and different types of soil stabilization

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE315_1	Discuss soil stabilization and their different types. (K ²)
0CVPE315_2	Explain types and various uses of sheet pile and coffer dam. (K ²)
0CVPE315_3	Calculate various dimensions of shallow foundation. (K ²)
0CVPE315_4	Compute various dimensions of machine foundation for static and dynamic loading condition. (K ³)
0CVPE315_5	Compute the pile capacities and their efficiency. (K ³)

Course Contents:

Unit 1	Shallow foundations: Types, Depth of foundation, calculation of bearing capacity by various approaches (Terzaghi, IS code method), Proportioning of footing (isolated, combined rectangular and combined trapezoidal), Eccentrically loaded footing, Calculation of foundation settlement (immediate and consolidation settlement)	08 Hrs.
Unit 2	Raft foundations: Types of rafts, Bearing capacity and settlements of raft, Design considerations and I.S. Code method of analysis	06 Hrs.
Unit 3	Deep foundation: Classification of piles, Calculations of load capacity of single pile by static and dynamic formulae, Group action of piles, Negative skin friction and its estimation, Under reamed piles, Settlement of piles, Cyclic pile load test, calculation of individual pile and group	07 Hrs.
Unit 4	Design of machine foundations: Static and dynamic design criteria-permissible amplitude of vibrations for different types of machines. Foundations for reciprocating machines-design criteria- calculation of induced forces and moments- multi cylinder engines	08 Hrs.
Unit 5	Sheet Pile walls and Cofferdams: Types and uses of sheet piles, design of cantilever sheet pile walls in granular and cohesive soils, anchored bulkhead, free earth support and fixed earth support method, coffer dams, types, uses of cofferdams	05 Hrs.



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Unit 6	Foundations in difficult soils and soil stabilization: Foundation in expansive soil, soft and compressible soils, problems associated with foundation installation- ground water lowering and drainage, shoring and underpinning, different methods, damage and vibrations due to constructional operations Soil stabilization: Mechanical stabilization, cement stabilization, lime stabilization, bituminous stabilization, chemical stabilization, stabilization by grouting	08 Hrs.
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Text Book:


Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Soil Mechanics and Foundation Engineering	Dr. K. R. Arora	Standard Publishers and Distributors	2 nd	2009
02	Soil Mechanics and Foundations	BC Punmia	Laxmi publications Pvt Ltd	16 th	2005
03	Soil Mechanics and Foundation engineering	VNS Murthy	Saikripa Technical Consultants Bangalore	2 nd	1991
04	Geotechnical Engineering	SK Gulhati	Tata McGraw Hill Delhi	1 st	2005
05	Soil Mechanics and Foundations	Muni Budhu	Wiley India Pvt Ltd	2 nd	2008

Reference Book:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Foundation Analysis and Design	JE Bowles	McGraw Hill International Edition	5 th	1996
02	Foundation Design and Construction	MJ Tomlinson	ELBS	7 th	2001
03	Design Aids in Soil Mechanics and Foundation Engineering	S.R. Kaniraj	TMH New Delhi	5 th	2004
04	Soil Mechanics and Foundations	Muniram Budhu	John Wiley & Sons Publishers	2 nd	2007


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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE316, Town Planning & Transportation Engineering
Prerequisite/s	0BSES104, 0CVPC202, 0CVPC305
Teaching Scheme: Lecture/Tutorial	03/00
Credits	3
Evaluation Scheme: ISE I/ MSE / ISE II/ ESE	10/30/10/50

Course Objectives:

01	To study the importance of town planning and its past trends
02	To understand types of urban strategies and management for sustainable urban growth.
03	To study the traffic behavior and traffic parameters
04	To study the transportation planning for a city & public transportation modes

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC316_1	Explain importance of town planning and growth patterns (K ²)
0CVPC316_2	Discuss acts and town planning development aspects. (K ²)
0CVPC316_3	Discuss engineering aspects of traffic (K ²)
0CVPC316_4	Describe the urban transportation planning (K ²)
0CVPC316_5	Explain the planning of various public transportation systems (K ²)

Course Contents:

Unit 1	Town Planning & Growth Pattern of Towns: Necessity, scope and principles of Town Planning, Present status of town planning in India. Natural and Planned, Elements of town, Types of zoning and importance. Treatment of traffic islands, open spaces, walks ways, public sit-outs, and continuous park system, Green ways), Rehabilitation of slum and urban renewal	08 Hrs.
Unit 2	Town/Village Development: Development control rules with respective to town planning; Different town planning works with reference to M.R.T.P. Act. (Brief idea about various provisions); Land acquisition act – necessity and procedure of acquisition; Village planning- Necessity and principles; Multilevel planning, Decentralization concepts, Rural developments- Growth centre approach, Area Development approach, Integrated rural development approach	08 Hrs.
Unit 3	Traffic Engineering: Driver behavior, traffic information and control systems; Traffic studies: volume, speed and delay studies; Elements of traffic flow theory; LOS; Characteristics of interrupted traffic; Trends in traffic engineering	05 Hrs
Unit 4	Traffic Flow Theory: Traffic stream parameters - Fundamental diagram of volume-speed-density surface, critical gaps and their distribution, Shock waves and bottleneck control approach, Application of queuing, car following models	05 Hrs




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Unit 5	Urban Transportation Planning: Introduction to transportation planning; Systems approach to transportation planning; travel demand and supply; Study area, zoning principles, cordon and screen lines, data collection through primary and secondary sources; sampling techniques; Four-stage sequential modeling approach: trip generation, trip distribution, modal split, trip assignment; land use transport models;	08 Hrs
Unit 6	Public Transportation Systems Planning: Modes of public transportation and application of each to urban travel needs; comparison of transit modes and selection of technology for transit service; transit planning: demand; functional design and costing of transit routes, integrated public transport planning.	08 Hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Town and country Planning	G.K. Hiraskar & K. G. Hiraskar	Dhanpat Rai Publication (p) Ltd., New Delhi	19 th	2018
2	Town Planning	S.C.Rangawala	Charotar Publications, Pune	13 th	2015
3	Traffic Engineering and Transportation Planning.	L. R. Kadiyali	Khanna Publishers	9 th	2017
4	Principles Of Highway Engineering And Traffic Analysis	Fred Mannering, Walter Kileraski and Scott Washburn	Wiley India	3 rd	2007
5	Urban Transportation Planning	Michael Meyer and Eric J. Miller	McGraw-Hill Publications	2 nd	2000
6	Public Transportation	Gray G. E. and Hoel L. A.	Prentice Hall	2 nd	1992
7	Urban Transit: Operations, Planning and Economics.	Vuchic Vukan R.	Prentice Hall	8 th	2005



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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	M RTP Act 1966	-	-	-	-
2	Land Acquisition Act – 1894	-	-	-	-
3	Highway Capacity Manual 2000, MORTH Codes, All relevant IRC codes	-	-	-	-
4	Rural development Planning – Design and method	Misra S.N.	Satvahan Publications New Delhi	8 th	2009
5	Economic development in Third world	Todaro Michael	Orient Longman Publication, New- Delhi	13 th	2013
6	Modeling Transport	Juan De Dios Ort, Luis G Willumsen, and Juan De Dios Ortuzar	John Wiley and Sons	5 th	2011
7	Transportation Engineering and Planning	C. S. Papacostas and P. D. Prevedouros	Prentice-Hall	3 rd	2000
8	Traffic Flow Fundamentals	Adolf May	McGraw-Hill Publications	9 th	2014
9	Accessibility and the Bus System – Concepts and Practice	Tyler N	Thomas Telford	8 th	2002
10	Urban Transport for Growing Cities – High Capacity Bus System	Tiwari G.	MacMillan India Ltd	6 th	2002


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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE317, Solid Waste Management
Prerequisite/s	Basic chemistry
Teaching Scheme: Lecture/Tutorial	3/0
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Objectives:

01	To study the importance of solid waste management.
02	To understand various operations of material and energy recovery in SWM
03	To describe concept of land filling and its controlling techniques.
04	To study different economical aspects and methods of refuse

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE317_1	Discuss the sources ,objective and functional outlines of Solid Waste Management (K ²)
0CVPE317_2	Describe the various types of material and energy recovery operations .(K ²)
0CVPE317_3	Explain various types of waste management systems (K ²)
0CVPE317_4	Illustrate various economical aspects and methods of refuse (K ³)
0CVPE317_5	Illustrate the concept of land filling and leachate controlling techniques. (K ³)

Course Contents:

Unit 1	Solid Waste Management: Definition, objectives, effects, Functional outlines of solid waste, sources, types, refuse analysis, composition and quantity of refuse. Special MSW: waste from commercial establishments and other urban areas, solid waste from construction activities, biomedical wastes, Effects of solid waste on environment: air, soil, surface and ground water, health hazards.	07 Hrs
Unit 2	Integrated Solid Waste Management System: Collection, Storage, Segregation, Reuse and Recycling possibilities. Generation rate, Factors affecting generation rate, different methods of collection, collection systems, Storage, transfer and transportation of refuse, economic aspects of refuse collection & transport.	07Hrs
Unit 3	Management of Wastes Municipal, Biomedical, Nuclear, Electronic and Industrial Solid Wastes and the rules and regulations. Introduction to Hazardous waste management and Agricultural & animal waste management. Hazardous Waste: Risk assessment, Environmental legislation, characterization and site assessment.	07Hrs
Unit 4	Reduce, Recycle, Reuse of solid waste (3R techniques) Segregation and salvage, recovery of bye –products, use of solid waste as raw materials in industry, Concept of incineration, types of incineration, recycling of solid waste. plastic waste environmental significance and reuse. Reuse and Recycling possibilities	07Hrs


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Unit 5	Concept of Composting and Solid waste management rules Types, factors governing, processing, mechanical composting plant, Facility Development and operation, Site Remediation: Quantitative risk assessment, site. Solid waste management rules, Status of solid waste management in India	07Hrs
Unit 6	Land Filling: Types , site selection, construction techniques, design of landfill site, maintenance and precautions, leachate and its control, control of contamination of ground water, Operation monitoring ,Closure & end-use.	07Hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Sewage disposal and air pollution engineering	S.K.Garg	Khanna publishers	33 rd	2015
02	Air Pollution	M.N. Rao and H.V.N. Rao	Tata McGraw-Hill Education Pvt. Ltd., New Delhi	19 th	2010
03	Introduction to Environmental Engineering	P. Aarne Vesilind, Susan, M. Morgan, Thompson	Tata McGraw-Hill Education Pvt. Ltd., New Delhi	2 nd	2008
04	Solid Waste Management	George Tchobanoglous	McGraw-Hill Book Company	2 nd	2002
05	Integrated Solid Waste Management	Tchobanoglous, Theissen & Vigil.	McGraw Hill Publication	1 st	2001

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Geoenvironmental Engineering: Site Remediation, Waste Containment and Emerging Waste Management Technologies	Sharma H.D., and Reddy K.R.	John Wiley & Sons,	1 st	2004
2	Geoenvironmental Engineering: Site Remediation, Waste Containment and Emerging Waste Management Technologies	Sharma H.D., and Reddy K.R.	John Wiley & Sons, Inc. Hoboken, New Jersey	2 nd	2004
3	Wastewater Engineering	Metcalf and Eddy	TMH Publication	4 th	2003
4	Geotechnical aspects of landfill design and construction	Qian X., Koerner R. and Gray D.H.	Prentice Hall	2 nd	2002

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Course Details:

Class	B. Tech, Sem.-VI
Course Code and Course Title	0CVPC357, Waste Treatment and Pollution Control Laboratory
Prerequisite/s	Basics of chemistry
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives:


1	To understand various physical, chemical and biological wastewater quality parameters
2	To provide basic concepts of waste water treatment methods.
3	To understand the practical aspect of wastewater engineering.

Course Outcomes (COs):


Upon successful completion of this course, the student will be able to:


0CVPC357_1	Calculate the level of pollution in wastewater. (K ²)
0CVPC357_2	Observe various units of wastewater treatment plant (K ²)
0CVPC357_3	Compute the of various units of wastewater treatment Plant (K ³)
0CVPC357_4	Use of software for designing of sewer network (S ²)
0CVPC357_5	Practice education of water supply system in environmental and societal context. (A ³)

Exp. No.	Title of Experiments
1	Determination of various of wastewater quality parameters (Physical chemical parameters)
2	To determine Solids in Sewage: Total Solids, Suspended Solids and Volatile
3	Determination of DO of wastewater
4	Determination of BOD of wastewater
5	Determination of COD of wastewater
6	To determine the Sodium and Potassium using Flame Photometer.
7	Demonstration of HVS and Auto exhaust analyser.
8	Applications of software's in sewer network design.
9	Visit to sewage treatment plant.
10	Design of complete Wastewater Treatment Plant for small community.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Sewage disposal and air pollution engineering	S.K.Garg	Khanna publishers	33 rd	2015
02	Water Supply & Sanitary Engineering	G. S. Birdie	Dhanpat Rai & Sons, New Delhi	18 th	2007
03	Waste Water Treatment, Disposal and Reuse	Metcalf and Eddy	Tata McGraw Hill Publications	2 nd	2000
04	Wastewater Engineering	B.C. Punmia, Jain	Laxmi Publications (P) Ltd	2 nd	1998
05	Air pollution	Rao M. N. and Rao H.V.	Tata McGraw Hill	2 nd	1990

Reference Books/manuals:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Manual of Water & Wastewater Analysis	-	NEERI Publication.	2 nd	2002
02	Standard Methods for Examination of Water and Wastewater	Water Pollution Control Federation, American Water Works Association, Washington DC.	American Publication	1 st	1995
03	Environmental Engineering	H.S. Peavy, D.R. Rowe	McGraw Hill	2 nd	1985
04	Chemistry for Environment Engineering	Sawyor and McCarthy	Tata McGraw Hill Publishing Company Ltd.	9 th	1967


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Course Details:

Class	B. Tech, Sem.- VI (Elective)
Course Code and Course Title	0CVPE361 Open Channel Flow Laboratory
Prerequisite/s	0CVPC203, 0CVPC251, 0CVPE311
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives:

1	To understand the unsteady, non-uniform flow for depth energy relationship in open channels
2	To professionally communicate in both technical and non technical terms.
3	To develop effective communication techniques

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE361_1	Report on components of canal or weir (K^2)
0CVPE361_2	Compute the various design parameters of open channels (K^3)
0CVPE61_3	Illustrate depth energy relationship for unsteady, non-uniform open channel flow (K^3)
0CVPE61_4	Professionally communicate in both technical and non technical terms. (S^3)
0CVPE61_5	Exhibit effective communication techniques (A^5)

Exp. No.	Title of Experiments
1	Prepare and deliver presentations on each unit
2	Solve open book assignment on non uniform flow in open channel
3	Solve open book assignments on unsteady flow in open channels
4	Solve open book assignments on dispersion in open channels
5	Design hydraulic models of canals
6	Design hydraulic models of weirs
7	Design hydraulic models of dams, spillways
8	Report on visit to a canal or weir.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A text book of Fluid Mechanics	R.K. Rajput	Chand Pub.	9 th	2013
02	Engineering Fluid Mechanics	K.L.Kumar	Eurasia Pub.	7 th	2001
03	Fluid Mechanics	S.Ranmamurtham	Dhanpat Rai & sons	5 th	2009
04	Fluid Mechanics	R.K.Bansal	Khanna Pub.	10 th	2013

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Open Channel Hydraulics	Ven Te Chow	McGraw-Hill International Editions	9 th	2013
02	Open Channel Hydraulics	Richard H. French	McGraw-Hill International Editions	7 th	2001
03	Flow Through Open Channels	K. G. RangaRaju	Tata McGraw Hill Pubsh. Co. Ltd.	5 th	2009
04	Flow in Open Channels	K. Subramanyam	Tata McGraw Hill Pubsh. Co. Ltd.	10 th	2013



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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE362, Pavement Design & Analysis Laboratory
Prerequisite/s	0BSES104, 0CVPC251, 0CVPC305
Teaching Scheme: Practical	2
Credits	01
Evaluation Scheme: ISE/ESE	50/25

Course Objectives:

01	To study the various parameters for design of rigid and flexible pavement
02	To understand the use of IIT Pave software for design of pavement

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE362_1	Calculate various parameters for design of flexible pavement. (K ³)
0CVPE362_2	Calculate various parameters for design of rigid pavement. (K ³)
0CVPE362_3	Use IIT Pave software for design of pavement. (K ³)
0CVPE362_4	Function effectively as a individual and team member during pavement design. (S ²)
0CVPE362_5	Practice professional and ethical behavior to carry forward in their life. (A ²)

Exp. No.	Title of Experiment
1	Design of flexible pavement
2	Design of rigid pavement
3	Introduction to IIT Pave
4	Design of pavement using IIT Pave
5	Creating design charts using IIT Pave
6	Project on detailed design of flexible pavement using IIT Pave and IRC 37:2012
7	Data collection and soil test for exp.no. 6
8	Manual design of flexible pavement and comparison with IIT Pave


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Principles and Practice of Highway Engineering (Including Expressways and Airport Engineering)	Kadiyali L.R. and N.B. Lal	Khanna Publishers, New Delhi	8 th	2004
02	Pavement Design	Yoder and Witzech	McGraw-Hill	2 nd	1982
03	Functional Designing of Pavements	Teng	Mc Graw - Hill	1 st	1980
04	Pavement Analysis and Design	Yang H. Huang	Pearson Prentice Hall	7 th	2004
05	Highway Engineering	Khanna and Justo	Nemchand Bros, Roorkee	8 th	2015
06	Principles of Pavement Design	Yoder E.J. and Witczak M.W	John Wiley & Sons, Inc., New York	1 st	1975

References: IRC Codes:			
Sr. No	IRC No.	Title	Year
01	IRC-58	Guidelines for the Design of Rigid Pavements for Highways	2002
02	IRC-15	Guidelines for the Design of Rigid Pavements for Highways	2002
03	IRC-37	Guidelines for the Design of Flexible Pavements for Highways	2012
04	IRC-82	Code of Practice for Accelerated Strength Testing and Evaluation of Concrete Road and Air field Constructions	1983
05	IRC-76	Tentative Guidelines for Structural Strength Evaluation of Rigid Airfield Pavement	1979


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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE363, Remote Sensing & GIS Applications in Civil Engineering Laboratory
Prerequisite/s	00CVPC258
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE/ ESE	50/25

Course Objectives: Laboratory practice aims to

01	To identify various elements of aerial photographs .
02	To know basic practical knowledge of GIS software.
03	To introduce applications of web portals like INDIA-WRIS & Bhuvan Map in Civil engineering.

Course Outcomes (CO):

On successful completion of laboratory practice, student will be able to,

0CVPE363_1	Identify various photo recognition elements in aerial photograph (K ²)
0CVPE363_2	Describe various rock types in aerial photograph (K ²)
0CVPE363_3	Practice georeferencing, shape file, DEM with the help of QGIS (K ³)
0CVPE363_4	Communicate effectively about laboratory work orally while performing experiments. (S ²)
0CVPE363_5	Practice professional and ethical behavior to carry forward in their life. (A ²)

Exp. No.	Title of Experiment
1	Preliminary study of aerial photographs and satellite pictures
2	Delineation of igneous, sedimentary and metamorphic rock formations in aerial photographs
3	Study of geological structures with aerial photographs
4	Applications of Bhuvan Map & INDIA-WRIS web portal in Civil Engineering
5	Georeferencing of toposheet
6	Preparation of shape file from Google Map
7	Preparation of DEM in QGIS
8	Morphometric analysis of stream basin (Manually & with GIS)
9	Compulsory mini project with Remote Sensing, QGIS techniques in fields any one from i) Geology ii) Water Resource iii) Environment iv) Landslide v) Transportation vi) Any other civil engineering field


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Textbook on remote sensing in natural resources monitoring and management	C. S. Agrawal and P.K.Garg	Wheeler Publishing, New-Delhi.	1 st	2000
02	Basics of Remote Sensing and GIS	Dr. S. Kumar	Laxmi publications (P) Ltd. New- Delhi	1 st	2005
03	Fundamental of Remote Sensing	Gorge Goseph	University Press (India) Pvt. Ltd.	1 st	2005
04	Remote Sensing Principles and Applications	Dr. B. C. Panda	Viva Books Pvt. Ltd	1 st	2005
05	Remote Sensing And Geographic Information System	Chandra	Narosa Publication	2 nd	2015

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	American Society of Photogrammetry	-	Washington D. C. Manual of Photographic Interpretation	1 st	1960
02	Introduction to Remote Sensing	James B. Campbell	Guilford Publication America	5 th	2011
03	Aerial Photography, Photogeology, GIS, R.S. and Image Processing	Saif Saiful-Islam	LAP Lambert Academic Publishing	1 st	2014
04	Learning QGIS	Anita Graser	Packt Publishing Limited	3 rd	2016
05	Mastering QGIS	Kurt Menke GISP	Packt Publishing Limited	2 nd	2016


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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE364, Design of Concrete Bridges Laboratory
Prerequisite/s	0CVPC304 , 0CVPC305
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives:


01	Discuss various construction techniques of bridges
02	Study types of bridges and its design considerations of bridges
03	Study type of bridge bearings and pre-stress bridges

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE364_1	Explain various construction techniques of bridges (K ²)
0CVPE364_2	Explain types of bridges and its design consideration of bridges (K ²)
0CVPE364_3	Discuss bridge bearings and pre-stress bridge (K ²)
0CVPE364_4	Report on site visit of bridge construction site (K ²)
0CVPE364_5	Communicate effectively about laboratory work both orally and in writing journals. (S ²)
0CVPE364_6	Practice professional and ethical behavior to carry forward in their life. (A ²)

Assignment No.	List of Assignment
1	Components parts of bridges
2	Standard specification of bridges
3	General design considerations of bridges
4	Construction techniques for the construction of substructures of footings
5	Different types of bridge Bearing and expansion joints
6	Pre-stress bridge
7	Visit to bridge construction sites and preparation of the report
8	Indian Road Congress bridge codes




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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Reinforced Concrete Structures – Vol. II	Dr.B.C.Punmia and Jain	Laxmi Publications New Delhi	4 th	1992
02	Concrete Bridge Practice, Analysis, Design and Economics	Dr. V.K. Raina	Tata McGraw- Hills Publishing Company Limited.	2 nd	2004
03	Bridge Engineering	S. Ponnuswamy	Tata McGraw-Hills Publishing	2 nd	2007
04	Design of Bridges	N. Krishna Raju	Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi	4 th	2009

Reference Books :					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of bridge structures	T. R. Jagadeesh	PHI Learning Pvt. Ltd.	2 nd	2010
02	Essential of Bridge engineering	D. Johnson Victor	Oxford & IBH Publishing Co. Pvt. Ltd.	6 th	2007
03	Design of concrete bridges	M. G. Aswani	Khanna	3 rd	2001
04	Design & construction of highway bridges	K. S. Rakshit	NCB Pvt. Ltd	2 nd	1992
05	Handbook on Repair and Rehabilitation of R. C. C. Buildings	Director General Works	CPWD, New Delhi, India	2 nd	1992


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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE365, Advanced Foundation Engineering Laboratory
Prerequisite/s	0BSES104, 0CVPC205
Teaching Scheme: Lecture/Tutorial/Practical	0/0/02
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives:

01	To know different types of shallow foundation and their design criteria.
02	To classify the piles and calculate their capacities in single and group action.
03	To Know soil stabilization and different types of soil stabilization.

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE365_1	Discuss soil stabilization and their different types (K ²)
0CVPE365_2	Calculate various dimensions of shallow foundation. (K ³)
0CVPE365_3	Compute various dimensions of machine foundation for static and dynamic loading condition. (K ³)
0CVPE365_4	Communicate effectively about laboratory work both orally and in writing journals. (S ²)
0CVPE365_5	Practice professional and ethical behavior to carry forward in their life. (A ²)

Assignment No.	List of Assignment
1	Calculation of C- ϕ value of various soil samples by direct shear test
2	Determine safe bearing capacity of soil by using terzaghis analysis
3	Determine safe bearing capacity of soil by IS Code method
4	Design of shallow foundation – Isolated, Combined, Strap, Raft foundation
5	Design of pile foundation – individual and group action
6	Design of machine foundation with static and dynamic loading
7	Determination of settlement of pile group
8	Assignment based on soil stabilization and their different methods
9	Prepare a report based on visit to deep foundation in construction site



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Text Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Soil Mechanics and Foundation Engineering	Dr. K. R. Arora	Standard Publishers and Distributors	2 nd	2009
02	Soil Mechanics and Foundations	BC Punmia	Laxmi publications Pvt Ltd	16 th	2005
03	Soil Mechanics and Foundation Engineering	VNS Murthy	Saikripa Technical Consultants Bangalore	9 th	1991
04	Geotechnical Engineering	SK Gulhati	Tata McGraw Hill Delhi	1 st	2005
05	Soil Mechanics and Foundations	Muni Budhu	Wiley India Pvt Ltd	2 nd	2008
06	Geotechnical Engineering	P. Purushottam Raj	Tata McGraw Hill Company Ltd. New Delhi	1 st	2005


Reference Book:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Foundation Analysis and Design	JE Bowles	McGraw Hill International Edition	5 th	1996
02	Foundation Design and Construction	MJ Tomlinson	ELBS	7 th	2001
03	Design Aids in Soil Mechanics and Foundation Engineering	S.R. Kaniraj	TMH New Delhi	7 th	2004
04	Soil Mechanics and Foundations	Muniram Budhu	John Wiley & Sons Publishers	2 nd	2007



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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE366, Town Planning & Transportation Engineering Laboratory
Prerequisite/s	0BSES104, 0CVPC251, 0CVPC305
Teaching Scheme: Practical	2
Credits	01
Evaluation Scheme: ISE	50/25

Course Objectives:


01	To make a report on existing planned city
02	To use PTV VISSIM for design of signalize and rotary intersection
03	To study traffic volume and its behavior

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:


0CVPE366_1	Report on existing planned city (K ²)
0CVPE366_2	Use of PTV VISSIM for signalize and rotary intersection. (K ³)
0CVPE366_3	Examine traffic volume and its behavior (K ⁴)
0CVPE366_4	Function effectively as a individual and team member during traffic studies (S ²)
0CVPE366_5	Use knowledge of contemporary issues relevant to traffic engineering for society (A ³)

Sr. No.	Title of Experiment
1	Traffic Studies: Traffic volume count I (along state highway)
2	Traffic Studies: Traffic volume count II (At intersection)
3	Traffic studies : Parking study
4	Traffic Studies: origin and destination study
5	Traffic Studies: Speed study : Manual method
6	Introduction to PTV VISSIM 7 (Student version)
7	Simulation of un-signalized intersection using PTV VISSIM 7 (Student version)
8	Design of signalized intersection
9	Simulation of signalized intersection using PTV VISSIM 7 (Student version)
10	Design of rotary intersection
11	Simulation of rotary intersection using PTV VISSIM 7 (Student version)
12	Case study of planned city


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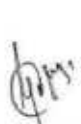
Department of Civil Engineering

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Town and country Planning	G.K. Hiraskar & K. G. Hiraskar	Dhanpat Rai Publication (p) Ltd., New Delhi.	19 th	2018
2	Town Planning	S.C. Rangawala	Charotar Publications, Pune	13 th	2015
3	Traffic Engineering and Transportation Planning	L. R. Kadiyali,	Khanna Publishers	9 th	2017
4	Principles of Highway Engineering And Traffic Analysis	Fred Mannering, Walter Kileraski and Scott Washburn	Wiley India	3 rd	2007
5	Urban Transportation Planning	Michael Meyer and Eric J. Miller	McGraw-Hill Publications	2 nd	2000
6	Public Transportation	Gray G. E., and Hoel L. A.,	Prentice Hall	2 nd	1992
7	Urban Transit: Operations, Planning and Economics	Vuchic Vukan R.	Prentice Hall	8 th	2005

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	MRTP Act 1966	-	-	-	-
2	Land Acquisition Act – 1894	-	-	-	-
3	Highway Capacity Manual 2000, MORTH Codes, All relevant IRC codes	-	-	-	-
4	Urban Pattern	Gallion, Eisner	-	-	-
5	Rural development Planning – Design and method	Misra S.N.	Satvahan Publications New Delhi	8 th	2009


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6	Economic development in Third world	Todaro Michael	Orient Longman Publication, New- Delhi	13 th	2013
7	Modeling Transport	Juan De Dios Ort, Luis G Willumsen, and Juan De Dios Ortuzar	John Wiley and Sons	5 th	2011
8	Transportation Engineering and Planning	C. S. Papacostas and P. D. Prevedouros	Prentice-Hall	3 rd	2000
9	Traffic Flow Fundamentals	Adolf May	McGraw-Hill Publications	9 th	2014
10	Accessibility and the Bus System – Concepts and Practice	Tyler N	Thomas Telford	8 th	2002
11	Urban Transport for Growing Cities – High Capacity Bus System	Tiwari G.	MacMillan India Ltd	6 th	2002

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Course Details:

Class	B. Tech, Sem.-VI (Elective)
Course Code and Course Title	0CVPE367, Solid Waste Management Laboratory
Prerequisite/s	Basics of chemistry
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE / ESE	50/25

Course Objectives:

01	To study the various physico-chemical parameters of solid waste parameters
02	To understand basic concepts of solid waste treatment methods.
03	To understand the characteristics of leachate

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE367_1	Calculate the level of pollution in solid waste. (K ²).
0CVPE367_2	Observe various units of solid waste treatment plant (K ²)
0CVPE367_3	Compute various units of land filling site. (K ³)
0CVPE367_4	Function effectively as an individual and as a team member while checking various water quality parameters (S ¹)
0CVPE367_5	Practice professional and ethical behavior to carry forward in their life. (A ²)

Exp. No.	Title of Experiment
1	Determination of pH - Solid waste sample
2	Determination of moisture content in Solid waste
3	Elemental analysis on solid waste content
4	Determination of ash content in Solid waste
5	Determination of chloride content of Leachate
6	Determination of DO of Leachate
7	Design of complete solid waste plant for small community.
8	Design of Landfill for small community.
9	Visit to Solid waste treatment plant.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Sewage disposal and air pollution engineering	S.K.Garg	Khanna publishers	33 rd	2015
02	Air Pollution	M.N. Rao and H.V.N. Rao	Tata McGraw-Hill Education Pvt. Ltd., New Delhi	19 th	2010
03	Introduction to Environmental Engineering	P. Aarne Vesilind, Susan M. Morgan, Thompson	Tata McGraw-Hill Education Pvt. Ltd., New Delhi	2 nd	2008
04	Solid Waste Management	George Tchobanoglous, Frank Kreith	McGraw-Hill Book Company	2 nd	2002
05	Integrated Solid Waste Management	Tchobanoglous, Theissen & Vigil	McGraw Hill Publication	1 st	2001

Reference Books/manuals:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Manual of Water & Wastewater Analysis		NEERI Publication.	2 nd	2002
02	Environmental Engineering	H.S. Peavy, D.R. Rowe	McGraw Hill	2 nd	1985
03	Chemistry for Environment Engineering	Sawyor and McCarthy	Tata McGraw Hill Publishing Company Ltd.	3 rd	1967


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Course Details:

Class	B. Tech, Sem.-VI
Course Code and Course Title	0CVPC358, Mini Project I (SDD I)
Prerequisite's	0CVPC303
Teaching Scheme: Practical	04
Credits	02
Evaluation Scheme: ISE	50

Course Objectives:

01	To study the detailed structural design and drawing of the industrial shed with roof truss, gantry girder, roof and gantry columns, bracing system, column bases
02	To study the detailed structural design and drawing of building frames/ footbridge / welded plate girder
03	To provide training on application software for analysis and design of steel structures

Course Outcomes (COs):

Upon successful completion of the course, the students should be able to analyze and design the following steel structures as per BIS 800: 2007 (General Construction in Steel):

0CVPC358_1	Explain different types of methods used for steel design. (K ²)
0CVPC358_2	Solve and draw the various components of the industrial shed with roof truss or portal frame or gable frames (K ⁴)
0CVPC358_3	Calculate and draw the various components of building frames/ footbridge / welded plate girder. (K ⁴)
0CVPC358_4	Function effectively as an individual and as a team member while steel structural design. (S ²)
0CVPC358_5	Engage in lifelong learning structural drawing and design. (A ²)

Course Contents:

The term work shall consist of detailed structural design and drawing of the following steel structure along with necessary drawings.

1	INDUSTRIAL SHED Design of industrial shed including roof truss (Roof truss: assessment of dead load, live load and wind load, design of purlin, design of members of a truss, detailing of typical joints and supports), purlin, gantry girder (Design of gantry girder: Selection of gantry girder, design of cross section, check for moment capacity, buckling resistance, bi-axial bending, deflection at working load and fatigue strength.), roof and gantry columns, bracing system, column bases and connections.
2	ANY TWO OF THE FOLLOWING: a) WELDED PLATE GIRDER: Design of welded plate girder, the design of cross section, curtailment of flange

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	<p>plates, stiffeners and their connections.</p> <p>b) FOOTBRIDGE Influence lines, cross beam, main truss, Raker, joint Details, support details</p> <p>c) BUILDING FRAMES Building with Secondary and main beams, column and column bases, beam-to-beam connection, column-beam-connection, the design of typical members. Secondary and main beam arrangement for the floor of a building, design of beam to beam and beam to column connections using bolt / weld.</p> <p>d) HOARDING STRUCTURE Analysis and design of hoarding structures under dead, live and wind load conditions as per codal provisions by limit state method, introduction to fatigue failure.</p>
<p>Term work will consist of the following. Four full imperial size drawing sheet showing structural detailing of sketches based on the syllabus. (Hand drawn).</p>	
A.	<p>Design of industrial building including roof truss, purlin, bracings, gantry girder, column, column base, and connections. Three full imperial size drawing sheets. (Drawn by hand).</p>
B.	<p>Design of welded plate girder the design of cross section, curtailment of flange plates, stiffeners and connections. One full imperial size drawing sheets. (Drawn by hand)</p>
OR	
B.	<p>Design of foot Bridge including Influence lines, cross beam, main truss, Raker, joint Details, support details. One full imperial size drawing sheets. (Drawn by hand)</p>
OR	
B.	<p>Design of Building Frame including Secondary and main beams, column and column bases, beam-to-beam connection, column-beam-connection, the design of typical members. Secondary and main beam arrangement for the floor of a building, design of beam to beam and beam to column connections using bolt / weld. One full imperial size drawing sheets. (Drawn by hand)</p>
OR	
B	<p>Analysis and design of hoarding structures under dead, live and wind load conditions as per codal provisions by LSM, introduction to fatigue failure. One full imperial size drawing sheets. (Drawn by hand)</p>
<p>Note:</p> <ol style="list-style-type: none"> 1. Sample verification of analysis results shall be made by using software for any one problem. 2. A maximum number of students in a group not more than four (04) for design. 3. Two site visits on selected design: Report should contain structural details with the sketch. 	

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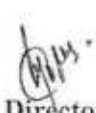
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Steel Structure	N. Subramanian	Oxford University Press, New Delhi	1 st	2011
02	Limit state design in Structural Steel	M. R. Shiyekar	PHI, Delhi	2 nd	2013
03	Limit state design of steel structures	S. K. Duggal	Tata McGraw Hill Education, New Delhi	3 rd	2014

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Steel Structure	N Subramanian	Oxford University Press, New Delhi	-	2011
02	Indian Standard Codes: IS 800-2007	-	Bureau of Indian Standards	-	2007
03	Indian Standard Codes: IS 875-1987 (Part I, II, III)	-	Bureau of Indian Standards	-	1987
04	Limit State Design of Steel Structures	D. Ramchandra & Virendra Gehlot	Scientific Publishers	-	2011
05	Limit state design of Steel Structure	V. L. Shah & Gore	Structures Publication, Pune	3 rd	2012
06	Limit state design in Structural Steel	M. R. Shiyekar	PHI, Delhi	2 nd	2013
07	Limit state design of steel structures	S K Duggal	Tata McGraw Hill Education, New Delhi	2 nd	2014


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Course Details:

Class	B. Tech, Sem. - VI
Course Code and Course Title	0CVPR359, Self Study
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	01
Evaluation Scheme: ISE	50

Course Objectives:

01	To develop habit of self learning.
02	To get deep knowledge of interested topic

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPR359_1	Describe recent trends in Civil Engineering. (K ²)
0CVPE359_2	Research technical knowledge in the field of Civil Engineering (K ²)
0CVPE359_3	Explain acquired knowledge in the field of Civil Engineering. (K ²)
0CVPE359_4	Communicate effectively orally. (S ³)
0CVPE359_5	Habituate for self-learning. (A ³)

Course Contents:

Hrs.

The lab work shall consist of distinct units from various fields of Civil Engineering. Each student is allotted with one unit based on his/her choice of interest. Two faculties will be allotted as guide for each unit. The guide will assess their knowledge by any assessment tools at the end of semester.

Distinct Units are: (NPTEL Courses of 8 weeks)

- 1) Energy efficiency, acoustics & day lighting in building.
- 2) Digital Land Surveying and Mapping (DLS&M).
- 3) Plastic Waste Management.
- 4) Geosynthetics & Reinforced soil structures.
- 5) Infrastructure planning and management.

Note: If these courses not available, then similar courses can be allowed.

Unit 1 Energy Efficiency, acoustics & day lighting in Building

Topic 1	Environmental Factors: Factors and their representation, tropical environments and site environments, etc. Human response to environment: Factors affecting human comfort, Human response to thermal environment, noise, visual environment etc., Comfort indices	06
Topic 2	Response of building to thermal environment: Processes of heat exchange of building with environment; Effect of solar radiation; Thermal properties of material and sections and their influence. Steady and periodic heat transfer in buildings	04

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Topic 3	Heat flow computations: Transmission matrix, Admittance method, etc. Structural control and design for energy efficiency: Selection of envelope elements, Orientations, shape, Glasses and shading devices	04
Topic 4	Natural ventilation: Purpose of ventilation, Mechanisms, Fenestration Design for natural ventilation	04
Topic 5	Noise and Building: Basic acoustics and noise, Planning, Sound in free field, protection against external noise. Internal noise sources and protection against air borne & structure borne noise.	06
Topic 6	Day lighting: Lighting principles and fundamentals Sky, Indian sky, daylight prediction and design of fenestration.	04
Unit 2 Digital Land Surveying and Mapping (DLS&M)		
Topic 1	Fundamentals of Land Surveying & GPS	06
Topic 2	Global Positioning System (GPS)	04
Topic 3	Total Station (TS)	04
Topic 4	Digital Land Surveying (DLS)	04
Topic 5	Digital Mapping (DM)	06
Topic 6	Digital Data Manipulation (DLM)	04
Unit 3 Plastic waste management		
Topic 1	Plastics – What it is? Types, Uses and Global Statistics Plastic Waste – Sources, Production, Global and Indian	04
Topic 2	Plastic Waste Management Rules 2016 (India) and Global Rules and Regulations	06
Topic 3	Plastic Bans including China Sword Policy implication on global plastic waste management	04
Topic 4	Impact of Plastics on Marine Life, Effect on Wildlife, Human Health and Environment	04
Topic 5	Plastic Waste Management Practices – Use of Plastic waste in roads, issues and challenges	06
Topic 6	Possible Alternate Materials to Plastics –Greener Alternatives. Plastics Resource Recovery and Circular Economy.	04
Unit 4 Geosynthetics & Reinforced soil structures		
Topic 1	Introduction to Geosynthetics. Types of geosynthetics and their applications & Manufacture of geosynthetics.	04
Topic 2	Strength of reinforced soils. Testing of Geosynthetics	04
Topic 3	Different Types of Soil Retaining Structures. Construction Aspects of Geosynthetic Reinforced Soil Retaining Walls Design Codes for Reinforced Soil Retaining Walls	06

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Topic 4	External Stability Analysis of Reinforced Soil Retaining Walls. Seismic Loads and Internal Stability Analysis of Reinforced Soil Walls. Testing Requirements for Reinforced Soil Retaining Walls.	04
Topic 5	Design of Reinforced Soil Retaining Walls – simple geometry. Design of reinforced soil retaining walls – sloped backfill soil. Design of reinforced soil retaining walls supporting a bridge abutment.	04
Topic 6	Stability analysis of soil slopes – infinite and finite slopes Stability analysis of reinforced soil slopes resting on soft foundation soils Stability analysis of reinforced soil slopes resting on strong foundation soil	06
Unit 5 Infrastructure planning and management		
Topic 1	Class Introduction, Introduction to Infrastructure and to the Transportation, power and telecom sectors	04
Topic 2	Rural and Urban Infrastructure Sectors, Players and Phases in an Infrastructure Project. Project Finance and Public Private Partnerships	06
Topic 3	Construction and Economic Risks Political and Social Risks	04
Topic 4	Stakeholder Management, Design Thinking and Negotiations	06
Topic 5	Socio-Economic Analysis and Good Governance for Infrastructure	04
Topic 6	Modeling Flexible Project Arrangements	04

Text Books :

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Air conditioning and ventilation of building	J.D. Croome B.M. Roberts	Pergamon press	1 st	1981
02	Infrastructure Planning Handbook	Prof Makarand Hastak	ASCE Press	1 st	2006
03	Strategic Management of Large Engineering Projects	Miller and Lessard	MIT Press	1 st	2001
04	GPS for land surveyors	Jan Van Sickle	CRC Press	3 rd	2008
05	Plastic waste management	Aishwarya Bhosale and Jayashree Awati	Lambart Academic Press	1 st	2015
06	An Introduction to soil reinforcement and geosynthetics	G. L. Shivakumar Babu	Universities Press	1 st	2005

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Reference Books					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Hand book of Functional requirements of building (SP-41)	BIS	BIS	1 st	1987
02	Hand book of Functional requirements of building (SP-32)	BIS	BIS	2 nd	1989
03	Manual Of Tropical Housing And Building Part-I Climatic Design	O.H. Koenighsberger	Orient Longman	1 st	1973
04	Noise Building And People	J.D. Croome	Pergamon press	1 st	1977


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Course Details:

Class	B. Tech, Sem.-VI
Course Code and Course Title	0CVES360, Soft Computing Skills in Civil Engineering – I
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Credits	02
Evaluation Scheme: ISE	50

Course Objectives:

01	To learn the software developing skills.
02	To study software computing techniques in the field of civil engineering

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVES360_1	Adopt software skills in the field of Civil Engineering. (K ³)
0CVES360_2	List various commands for implementation of software. (K ³)
0CVES360_3	Compute various technical parameters with the help of software. (K ³)
0CVES360_4	Communicate effectively about laboratory work both orally and in writing journals. (S ²)
0CVES360_5	Practice professional and carry forward in their life as lifelong learning. (A ³)

Course Contents:

The lab work shall consist of **Software training**.

List of Software training floated by Department will be in the field of:

1. Structural Design
2. Construction Planning and Management
3. Transportation Engineering
4. Environmental Engineering
5. Quantity Estimation

1. Structural Design

Analysis & design of structural members and System by any design software.

2. Construction Planning and Management

Planning of all construction activity and management of them by any software.

3. Transportation Engineering

Analysis and Design of pavement by any Software.

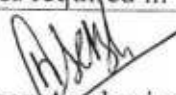
4. Environmental Engineering


Pipe network analysis.

5. Quantity Estimation

Estimate the various quantities required in the construction field.


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Teaching and Evaluation Scheme
B. Tech Civil Engineering: VII Semester

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max	Min. for Passing	Max	Min. for Passing
0CVPC401	Estimating & Costing	4	--	--	4	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC402	Design of Concrete Structures I	3	1	--	4	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC403	Earthquake Resistant Structures	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPE4**	Program Elective II	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVOE4**	Open Elective	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC451	Estimating & Costing Laboratory	--	--	2	1	ISE	--	--	50	20
						ESE	--	OE	25	10
0CVHS452	General Proficiency Laboratory II	--	--	2	1	ISE*	--	--	50	20
0CVES453	Soft Computing Skills in Civil Engineering- II	--	--	2	1	ISE	--	--	25	10
0CVPR455	Project Phase - I	--	--	6	6	ISE	--	--	100	40
						ESE	--	OE	50	20
Total		16	01	12	26	--	500	--	300	--
Total Contact Hours/Week: 29 hrs						Total-500+300=800				

* Industrial Training Presentation will be included as a part of the course and assessed.

Course Category	HS	BS	ES	PC	PE	OE	PR
Credits	01	00	01	12	03	03	06
Cumulative Sum	05	20	40	82	07	03	08

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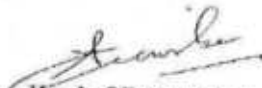
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Program Elective II		Course Code
Sr. No.	Course Name	
1	Advanced Structural Analysis	0CVPE404
2	Repairs & Rehabilitation of Structures	0CVPE405
3	Advanced Construction Techniques	0CVPE406
4	Legal Aspects in Civil Engineering	0CVPE407
5	Ground Improvement Techniques	0CVPE408
6	Hydraulic Structures	0CVPE409
7.	Green building	0CVPE410

Open Elective		Course Code
Sr. No.	Course Name	
1	Operations Research	0CVOE411
2	Human Resources Development	0CVOE412
3	Air Pollution & Control	0CVOE413
4	Research Methodology	0CVOE414
5	Economics & Management	0CVOE415
6	Finite Element Method	0CVOE416
7	Disaster Management	0CVOE417


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Teaching and Evaluation Scheme
B. Tech Civil Engineering: VIII Semester

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max	Min. for Passing	Max	Min. for Passing
0CVPC421	Design of Concrete Structures II	3	1	--	4	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC422	Project Management	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC423	Entrepreneurship	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPE4**	Program Elective III	3	--	--	3	ISE I	10	40	--	--
					MSE	30	--		--	
					ISE II	10	--		--	
					ESE	50	--		--	
0CVPC457	Entrepreneurship Laboratory	--	--	2	1	ISE	--	--	50	20
0CVPE4**	Program Elective III Laboratory	--	--	2	1	ISE	--	--	50	20
0CVPC458	Mini Project II (SDD II)	--	--	4	2	ISE	--	--	50	20
						ESE	--	OE	50	20
0CVPR459	Project Phase II	--	--	6	10	ISE	--	--	100	40
						ESE	--	OE	100	40
0CVAC460	Stress Management	1	--	--	--	--	--	ISE* (Grade)	--	--
Total		13	01	14	27	--	400	--	400	--
Total Contact Hours/Week: 28 hrs						Total-400+400=800				

* Grade will be assigned based on internal assessment.

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Sr. No.	Program Elective III	Course Code	Sr. No.	Program Elective III Laboratory Name	Laboratory Course Code
1	Management Information Systems	0CVPE424	1	Management Information Systems	0CVPE461
2	Structural Dynamics	0CVPE425	2	Structural Dynamics	0CVPE462
3	Site Investigations Methods & Practices	0CVPE426	3	Site Investigations Methods and Practices	0CVPE463
4	Advanced Engineering Geology and Rock Mechanics	0CVPE427	4	Advanced Engineering Geology and Rock Mechanics	0CVPE464
5	Structural Audit	0CVPE428	5	Structural Audit	0CVPE465
6	Environmental Impact Assessment	0CVPE429	6	Environmental Impact Assessment	0CVPE466
7	Safety Aspect in Construction	0CVPE430	7	Safety Aspect in Construction	0CVPE467
8	Industrial Waste Water Treatment	0CVPE431	8	Industrial Waste Water Treatment	0CVPE468


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Course Details:

Class	B. Tech. Sem.-VII
Course Code and Course Title	0CVPC401, Estimating & Costing
Prerequisite/s	0CVPC205, 0CVPC209, 0CVPC210
Teaching Scheme: Lecture/Tutorial	04/00
Credits	04
Evaluation Scheme: ISE I/MSE/ ISE II /ESE	10/30/10/50
ESE Exam Duration	4 Hrs.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPC401_1	Describe estimate, specifications and their types (K ²)
0CVPC401_2	Explain different terms related to valuation (K ²)
0CVPC401_3	Calculate value of existing properties by various methods (K ³)
0CVPC401_4	Compute quantities and rates for various items of construction (K ³)
0CVPC401_5	Classify different types of contract and essential study of legally valid contract (K ⁴)

Course Contents:

Unit 1	<p>Elements of Estimating: Purpose and types of estimate, Units and mode of measurement, IS 1200, Schedule of rates (SSR), Administrative approval and technical sanction, Various items to be included in estimates, Measurement sheet and abstract sheet, Use of excel spread sheets for estimating.</p> <p>Specifications: Purpose and basic principle of general and detailed specifications</p>	08 hrs
Unit 2	<p>Quantity Surveying: Prime cost, Provisional sum, Provisional quantities, Taking out quantities by long wall – short wall method and centre line method, Preparation of schedule for steel as reinforcement.</p> <p>Rate Analysis: Factors affecting, Material required, Task work, Labour required, Plant and equipment cost, Overhead charges, Rates for various items of work, Price escalation</p>	10 hrs
Unit 3	<p>Detailed Estimate: Detailed estimate of residential building, Road, Earthwork for canal etc.</p> <p>Approximate Estimate: Purpose, Various methods used for buildings and other civil engineering works such as bridge, water supply, drainage, road project, school buildings,</p>	10 hrs

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	industrial sheds.	
Unit 4	<p>Contracts: Necessity, Types of contracts, Various conditions of contract, Earnest money, Security deposit, PWD procedure of execution of civil engineering work, Rights of parties and responsibilities of contracts, PPP Models: BOT, BOOT, BOLT.</p> <p>Tender: Tender, Types of tenders, Invitation of tender notice, concept of e-tendering.</p>	08 hrs
Unit 5	<p>Elements of Valuation: Definition of value, price and cost, Different types of values, valuation, Necessity of valuation, factors affecting valuation, Landed properties- free hold and leasehold properties, different types of lease, Valuation from yield and from life, gross yield and net yield, outgoing, capitalized value, Year's purchases, Sinking fund.</p>	10 hrs
Unit 6	<p>Valuation Methods: Rental method of valuation- Form of rent, different types of rent, standard rent, Belting method of valuation, Development method of valuation for building estate, Valuation on profit base, Depreciation, different methods of calculating depreciation – straight line method, declining balance method, sinking fund method, quantity survey method, Obsolescence.</p>	10 hrs

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Estimating, Costing and Specification in civil engineering	M. Chakraborti	MonojitChakraborti Pvt. Ltd.	27 th	2016
02	A textbook of estimating and costing.	G.S. Birde	DhanpatRai& Sons	7 th	2008
03	Estimating and Costing	B.N.Dutta	UBS Publisher	25 th	2002
04	Elements of Estimating and Costing	S. C. Rangwala.	Charotar Publishing house	4 th	1998
05	Civil Engineering Contracts & Estimates	B. S. Patil,	Orient Langman Ltd	7 th	2015

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Professional Practices (Estimating & Valuation)	RoshanNam avati	LBD Publishers	4 th	1984
02	Estimating and Costing for Building and Civil Engineering Works Based on Indian Standard	P. L. Bhasin	Chand Publisher	5 th	2002

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	Method of Measurement (I.S.1200)				
03	Standard Specification Vol. I & II	---	PWD, Maharashtra	---	---
04	Standard Schedule of Rates- Recent SSR	---	PWD, Maharashtra	---	---
05	Indian Standard 1200 (Part 1 To 10)	---	---	---	---



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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVPC402, Design of Concrete Structures I
Prerequisite/s	0CVBS201, 0CVPC204, 0CVPC207
Teaching Scheme: Lecture/Tutorial	03/01
Credits	04
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of the course, the student should be able to:

0CVPC402_1	Summarize the general stress strain behaviour of reinforced concrete with different design philosophies. (K ²)
0CVPC402_2	Calculate various design parameters of members in shear by limit state method. (K ⁴)
0CVPC402_3	Examine various design parameters of Slab & Stair case. (K ⁴)
0CVPC402_4	Calculate various design parameters of beam & column by limit state method. (K ⁴)
0CVPC402_5	Examine various design parameters of footing by limit state method. (K ⁴)

Course Contents:

Unit 1	Limit State Method: Introduction- Stress strain behaviour of concrete and steel, Behaviour of RCC, Permissible stresses in steel and concrete, Different design philosophies, various limits states, Characteristic strength and Characteristic load, Load factor, Partial safety factors.	06 hrs
Unit 2	Limit State collapse & Serviceability: a) Limit state of collapse (shear and bond): Shear failure, Types of Shear reinforcement, Design of Shear reinforcement, Bond-types, Factors affecting bond Resistance, Check for development length. b) Limit state of serviceability: Significance of deflection, IS recommendations, Cracking-classification and Types of Cracks, Cause, IS recommendations.	07 hrs
Unit 3	Slab & Staircase: a) Design of slabs: Cantilever Slab, Simply supported One way slab, Two way slab with different support conditions as per IS:456-2000 b) Design of Simply Supported single flight and Dog legged staircase.	08 hrs

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Unit 4	Beam: Limit state of collapse (flexure): Analysis and Design of Singly and Doubly Reinforced rectangular sections, Cantilever beam, Design of Continuous beam by IS coefficient method	09 hrs
Unit 5	T & L Beam: Analysis of singly reinforced T and L beams, Design of singly reinforced T and L beams	06 hrs
Unit 6	Column & Footing: Analysis and Design of axially loaded circular and rectangular columns, Circular column with helical reinforcement, Interaction diagram, Introduction to Un-axial loading Column Design of isolated rectangular & Square column footing with constant depth subjected to axial load	06 hrs

List of Tutorials :

Sr. No	Title of Tutorial	Contact Hrs
01.	Explain the basic terms used in limit state method	01
02.	Design shear reinforcement for beam	01
03.	Analysis and design of slab	02
04.	Analysis and design of dog legged staircase	01
05.	Analysis and design of Beam	03
06.	Analysis and design of T & L beam	02
07.	Analysis and design of column	02
08.	Analysis and design of footing	02

Text Books :

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Reinforced Concrete Structural element	Purushotama n.P	McGraw Hill Publication Co. Ltd.	4 th	2010
02	Reinforced Concrete VOL.II (Advanced Reinforced Concrete)	H.J Shah	Charotar Publishing House Pvt. Ltd	7 th	2014
03	R.C.C Design & Drawing	NeelamSharma	S.K.Kataria	3 rd	2013
04	Reinforced Concrete VOL.I	H.J Shah	Charotar Publishing House Pvt. Ltd	7 th	2014

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Reinforced Concrete Structures	S.Ramamrutham	Dhanpat Rai Publishing Company	16 th	2010
02	Limit State Design	B.C.Punmia, A.K.Jain	Laxmi Publications Ltd.	1 st	2017
03	R.C.C Designs	B.C.Punmia, A.K.Jain, Arun K Jain	Charotar Publishing House Pvt. Ltd	7 th	2015
04	Illustrated Design of R.C. Buildings	V.L Shah, S.R.Karve	Structures Publisher	8 th	2015
05	IS 456-2000	Indian Standard Code	B.I.S, New Delhi	4 th	2000
06	SP16	Design Aids For Reinforced Concrete	B.I.S, New Delhi	2 nd	1998

Note : It is necessary to have knowledge of IS code, Use of IS 456:2000 codes.


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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVPC403, Earthquake Resistant Structures
Prerequisite/s	0CVPC204, 0CVPC207
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPC403_1	Explain various elements of seismology (K^2)
0CVPC403_2	Summarize earthquake resistant modern techniques(K^2)
0CVPC403_3	Discuss earthquake resistant design of masonry structure (K^2)
0CVPC403_4	Adapt the earthquake resistant design principles (K^3)
0CVPC403_5	Apply theory of vibration and prepare mathematical modelling of structure(K^3)
0CVPC403_6	Calculate lateral force acting on earthquake resistant structure. (K^4)

Course Contents:

Unit 1	Elements of seismology – terminology, structure of earth, causes of an earthquake, plate tectonic theory, continental drift theory, elastic rebound theory, seismic waves, magnitude and intensity, methods of measurement, energy released, seismograph, strong motion earthquakes, accelogram, prominent earthquakes of India	04 hrs
Unit 2	Fundamentals of theory of vibration Earthquake response of SD of system, Spring parallel and series theory, free and forced vibrations (harmonic loading) of single degree of freedom systems. Undamped and viscously damped vibrations, equations of motion and solution	10 hrs
Unit 3	Masonry Structures: Behavior of unreinforced masonry and reinforced masonry, RC bands, vertical reinforcement, openings, Provisions of I.S. 4326, Repairs and strengthening of masonry and RC members.	05 hrs
Unit 4	Earthquake resistant modern techniques: Types of Damper, Base Isolation-Elastomeric, Sliding, Combined, Seismic Dampers - Friction Dampers, TMD, Visco - elastic dampers.	05 hrs
Unit 5	Response spectrum theory: Earthquake response spectrum, seismic coefficient method or equivalent static load method, tripartite spectrum, construction of design response spectrum, effect of foundation soil and structural damping on design spectrum,	07 hrs

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	evaluation of lateral loads due to earthquake on multi story buildings as per IS 1893 Part I – 2016, Introduction to response spectra, Time history analysis, P-Delta analysis, Push Over analysis	
Unit 6	<p>Conceptual: Planning aspects, Load path, Stiffness and strength Distribution, different structural system, liquefaction and settlement.</p> <p>Earthquake Resistance Design Principles: Design philosophy, Behavior of RC building, ductility and ductile detailing of beam and columns using IS 13920-2016.</p>	09 hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Dynamics of Structures	A.K. Chopra	Prentice Hall Publications	3 rd	2007
02	Earthquake Resistance Design of Structure	S. K. Duggal	Oxford Uni. Press	---	2007
03	Earthquake Resistance Design of Structure	Manish Shrikhande and Pankaj Agarwal,	Prentice Hall of India Pvt Ltd, New Delhi	---	2006
04	Structural Dynamics	Mario Paz	CBS Publication	4 th	2003

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Earthquake Resistant Structures	D.J. Dowrick John	Wiley Publication	2 nd	2009
02	Dynamics of Structures	R. M. Clough and Ponian	McGraw Hill co. New Delhi	2 nd	2015
03	Elements of Earthquake Engineering	Jai Krishna,	South Asian Pub. New Delhi	2 nd	2000
04	Earthquake Resistance Design of Structure	Vinod Hosur	Wiley Publication	---	2012

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Indian Standards:				
Sr. No	Title	Publisher	Edition	Year
01	Indian Standards IS 1893-Part I	Bureau of Indian Standards	1 st	2016
02	Indian Standards IS 13920	Bureau of Indian Standards	1 st	2016
03	Indian Standards IS 4326	Bureau of Indian Standards	3 rd	2013



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B-Tech - CV - 09 / 89

Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVPE404, Advance Structural Analysis
Prerequisite/s	0CVBS201,0CVPC204,0CVPC207
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of the course, the student should be able to:

0CVPE404_1	Draw SFD, BMD and TMD for beams curved in plan for various loading and support condition.(K ³)
0CVPE404_2	Produce ILD for reactions, S.F. and B.M. for propped cantilever beam. Fixed beam Portal frames and arches. (K ³)
0CVPE404_3	Illustrate the expressions for max. B.M., slope, deflection for beam –column and beams in elastic foundation subjected to different loading with different support condition.(K ³)
0CVPE404_4	Examine structures for various loading by using stiffness and flexibility matrix method.(K ⁴)
0CVPE404_5	Evaluate element and global stiffness matrix(K ⁵)

Course Contents:

Unit 1	Influence line diagrams: Muller Breslau's Principle, ILD for Continuous beams, Fixed beams, Two hinged arches.	08 hrs
Unit 2	Beams curved in plan: Determinate and Indeterminate beams curved in plan.	07 hrs
Unit 3	Beam columns: Governing differential equation, Analysis of beam columns subjected to different loadings and support conditions. Stiffness and carryover factors for beam columns.	06hrs
Unit 4	Beams on elastic foundation Assumptions, Types of beams on elastic foundation, Analysis of beams on elastic foundation subjected to various loads and boundary conditions, deflection curve, pressure distribution, shear force and bending moment diagrams.	08 hrs
Unit 5	Beams on elastic foundation Assumptions, Types of beams on elastic foundation, Analysis of beams on elastic foundation subjected to various loads and boundary conditions,	06 hrs

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	deflection curve, pressure distribution, shear force and bending moment diagrams.	
Unit 6	Analysis using stiffness method: Analysis of continuous beams, plane trusses and rigid plane frames by stiffness method (having not more than 3 coordinates – 3x3 stiffness matrix)	07 hrs

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Analysis of Structures Vol. I	Vazirani and Ratwani	Khanna Publisher, Delhi.	---	2015
02	Advanced Theory of Structures	Vazirani and Ratwani	Khanna Publisher, Delhi.	---	2015
03	Theory of Elastic Stability	Timoshenko and Gere	East West Press Ltd.	2 nd	1985
04	Mechanics of Structures Vol. II & III	Junnarkar and Shah	Charotor Publ. House, Delhi.	24 th	2015

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Basic Structural Analysis	C. S. Reddy	Tata McGraw Hill, Delhi.	3rd	2010
02	Structural Analysis	Negi and Jangid	Tata McGraw Hill, Delhi.	-	2004
03	Matrix Analysis of Framed Structures	Gere and Weaver	CBS Publishing, Delhi.	2nd	2004
04	Structural Analysis A matrix approach	Pandit and Gupta	Tata McGraw Hill, Delhi.	2nd	2015

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Course Details:

Class	B. Tech, Sem.- VII
Course Code and Course Title	0CVPE405, Repair & Rehabilitation of Structures
Prerequisite/s	0CVPC210
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE405_1	Describe causes of deterioration of structures. (K ²)
0CVPE405_2	Explain methods of assessment of structures. (K ²)
0CVPE405_3	Discuss methods and techniques of repairing of structures (K ²)
0CVPE405_4	Illustrate different retrofitting methods (K ³)
0CVPE405_5	Relate methods for repair of structures. (K ⁴)

Course Contents:

Unit 1	Introduction: Aging of structures, assessment procedure, causes of deterioration, need for repair and rehabilitation, performance of structures, Inspection, Maintenance	6 hrs
Unit 2	Distress in load bearing, RCC, steel structures: Damage, source, cause, effects of damage, case studies. Effects of climate, temperature, Corrosion, Strength, Durability and Thermal properties of building materials.	8 hrs
Unit 3	Damage assessment and Evaluation methods: Damage testing methods, Non-destructive Testing Techniques (NDT), destructive testing method, Core samples	7 hrs
Unit 4	Repairing methods and techniques: Guniting and Shotcreting, grouting, Crack ceiling, Polymer concrete, Fiber wrapping techniques, steel plate flitching, Case studies.	8 hrs
Unit 5	Retrofitting methods: Seismic Retrofitting of reinforced concrete buildings, Considerations in retrofitting of structures; Source of weakness in RC frame building, Structural damage due to discontinuous load path, Quality of workmanship and materials, Jacketing	7 hrs


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Unit 6	Repair and maintenance of buildings: IS standards, Bridge repairs, Seismic strengthening, Estimation and costing of repairing techniques such as jacketing, grouting, polymer mortar etc.	6 hrs
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	M.L.Gambhir	Tata McGraw-Hill Education,	3 rd	2013
02	Reinforced Concrete Structures – Vol. II	Dr B. C. Punmia, Ashok Kumar Jain & Arun Kumar Jain	Laxmi Publications	2 nd	2005
03	Maintenance and Repairs of Buildings	P.K. Guha	New Central book Agencies	2 nd	2003
04	Maintenance Engineering For Civil Engineers	Nayak B. S.	Khanna Publication	3 rd	2009
05	Diagnosis and treatment of structures in distress	R.N.Raikar	R&D Centre of Structural Designers & Consultants Pvt.Ltd., Mumbai	---	1994
06	Structural Health Monitoring, Repair and Rehabilitation of Concrete Structures	Ravishankar.K., Krishnamoorthy	Allied Publishers	1 st	2004
07	Repairs and rehabilitation of concrete structures	P. I. Modi & C. N. Patel	PHI Publication.	---	---

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Deterioration, Maintenance and Repair of Structures	Johnson	Tata McGraw-Hill publishing Company Ltd, New Delhi	2 nd	2011
02	Concrete Structures: Repairs, water proofing and protection	Philip H. perkins	Applied sciences publications Ltd., London,	1st	2007

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03	Durability of concrete structure: Investigation, Repair, Protection	Geoffmang., E. & FN SPON	An imprint of Chapman & Hall,	---	2006
04	Building Failures – Diagnosis and Avoidance	W H Ransom.	E and F. N. Span.	---	2004
05	Repairs and rehabilitation of concrete structures	P. I. Modi & C. N. Patel	PHI Publication.	---	---
06	Handbook on Repair and Rehabilitation of RCC buildings	---	CPWD, Delhi	---	2002



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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVPE406, Advanced Construction Techniques
Prerequisite/s	0CVPC305,0CVPC210
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE /ISE II /ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE406_1	Discuss various construction techniques (K ²)
0CVPE406_2	Summarize construction technique for different underground constructions (K ²)
0CVPE406_3	Explain prefabricated construction techniques. (K ²)
0CVPE406_4	Discuss rehabilitations of bridges and construction methods of retaining structures (K ²)
0CVPE406_5	Illustrate the different types of formwork systems(K ³)
0CVPE406_6	Apply various grouting method for different site condition. (K ³)

Course Contents:

Unit 1	Formwork: Material for formwork, special types of formwork, designs of formwork, failure of formwork, safety, formwork economy.	09 hrs
Unit 2	Construction Techniques: Re-vibrated concrete, roller –compacted concrete, slip form in pavement construction, wet- mix macadam in road, vacuum dewatering in concrete slab construction, reinforced earth construction.	06 hrs
Unit 3	Grouting Methods: Cement grouting, colgrout, colcrete process, pre-packed concrete, intrusion grout alluvial grouting, various types of clay grouting chemical grouting – grouts for injection of fine sands, resin grouting polymerisation technique, field procedure, applications and limitations.	06 hrs
Unit 4	Underground Construction: Tunnels- Shaft sinking, Tunnel ventilation in hard and soft strata, Surge chambers - Design criteria, Loads, Assumptions, Types of surge chambers. Underground power stations principal and types. Underwater Construction Problems Encountered, Underwater drilling, blasting, concreting and welding, Underwater structural concrete walls. Protection of structures against attack by ground water.	08 hrs.
Unit 5	Pre-fabricated Construction: Types, Sizes and Economy, Fabrication techniques, Transportation, Erection, Jointing of Components, Light Weight Panels, Standardization of Components,	07 hrs.

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Unit 6	Composite Construction: Composite v/s Non Composite Action; Composite Steel-Concrete Construction. Retaining structures diaphragm walls, advanced methods of their construction	06 hrs
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Bridge Engineering	S. K. Pounuswamy	Tata, Mcgraw Hill Co. Ltd	2 nd	2015
02	Wells and Caissons	Vijaya Singh,	New Chand & Bros, Roorkee	2 nd	1981
03	Bridge engineering	Raina	Shroff Publishers and Distributors Pvt. Ltd	3 rd	2007
04	Concrete Technology	M. S. Shetty	S. Chand	1 st	2005

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Grouts and Drilling Mud in Engineering Practice.	Symposium by Inst. of Engineers	Butter Worth's	1 st	1963.
02	Formwork design and construction	Wynn	Concrete Publications	6 th	1974
03	Modem Foundations.	N.P. Kurion	Tata McGraw, Hill pub, co. Ltd	1 st	2006
04	Prefab Architecture: A Guide to Modular Design and Construction	Ryan E. Smith	Wiley Publication	1 st	2010


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Course Details:

Class	B Tech, Sem.-VII
Course Code and Course Title	0CVPE407, Legal aspects in Civil Engineering
Prerequisite	---
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE /ISE II /ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE407_1	Discuss various types of land documents required for land purchasing (K ²)
0CVPE407_2	Summarise administrative procedure and various types of injunctions (K ²)
0CVPE407_3	Explain various types of industrial act and contract and labour laws (K ²)
0CVPE407_4	Discuss phenomenon of arbitration, Indemnity and guarantee in legal aspects (K ²)
0CVPE407_5	Describe the concepts of bailment and legal aspects of various factors. (K ²)

Course Contents:

Unit 1	Land documents: Role of Plan sanctioning authority, 7/12 abstract, meaning of different terms of 7/12 abstract, Form 6 and its types, Concept of TDR, List of documents to be submitted to local authority, Procedure for seeking Commencement and Occupancy Certificate, Various NOCs required.	07 hrs
Unit 2	Administration and Injunctions: Standard forms of building contract, rights of building owner, adjoining owners and third party, The Indian contract act, Sales of goods act, professional ethics. Injunction: types, temporary, perpetual, and mandatory.	07 hrs
Unit 3	Introduction to Contract Law: The nature of contractual obligations, Introduction to certain types of contracts and discussion about their parties, parties' relative position, terms, Tender: Concept of E- Tendering, Applications of E-Tendering, Methods of Preparation and submission of tenders by two envelope method	08 hrs
Unit 4	Industrial acts and taxation: Industrial Dispute Act, Payment of Wages Act, Indian Trade Union Act, Land Acquisition Act, Industrial Employment (Standing Orders) Act, 1946, Rehabilitation and Resettlement Act, 2013, Goods and Services Tax Act,	07 hrs

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	Payment and Settlement Systems Act, 2007, Land Ports Authority of India Act, 2010, Real Estate Regulatory Authority (RERA) act.	
Unit 5	Arbitration, Indemnity and Guarantee: Arbitration- Awards and dispute resolving boards, Indian arbitration Act, arbitration agreement, conduct of arbitration, power and duties of arbitrator. Indemnity and Guarantee- Difference between two contracts, consideration for guarantee, surety's liability, discharge of surety.	07 hrs
Unit 6	Bailment & Town planning Act: Nature of transaction, delivery of bailee, bailee's responsibility, Termination, bailment of pledges. The Maharashtra regional and town planning Act, 1966, FIDIC.	06 hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Legal Aspects of Building and Engineering Contracts	B.S. Patil	B.S. Patil	3 rd	1986.
02	Fundamental concepts in Law of Contract	MeenaRao	Professional Offset	3 rd	2006
03	Indian Contract Act,	Dutt	Eastern Law House	4 th	1994
04	The Law of Contract: An Outline	Chandiramani, Neelima	Avinash Publications Mumbai	2 nd	2000

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Construction Contracting	Clough R. H.	London : Construction Industry Research and Information Association	2 nd	1995
02	Laws for Engineers	Dr. VandanaBhat and PriyankaVyas	PROCARE, Juhu, Santacruz(W), Mumbai-400049	1 st	2015
03	Introduction to the Law of Industrial Disputes	Rustamji R.F.	Asia Publishing House, London	1 st	1967
04	The Law of Contract: An Outline	NeelimaChandiramani	Avinash Publications, Mumbai	2 nd	2000

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Course Details:

Class	B. Tech. Sem.-VII
Course Code and Course Title	0CVPE408, Ground Improvement Techniques
Prerequisite/s	0CVPC302, 0CVPC308
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I/MSE/ ISE II /ESE	10/30/10/50

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPE408_1	Explain concept of ground improvement techniques (K ²)
0CVPE408_2	Describe earth reinforcement and their stability analysis (K ²)
0CVPE408_3	Apply geo-synthetics techniques to different civil engineering structures (K ³)
0CVPE408_4	Illustrate phenomenon of stone column (K ³)
0CVPE408_5	Classify different ground techniques with their suitability (K ⁴)

Course Contents:

Unit 1	Introduction to ground improvement techniques: Definition of ground improvement, objectives, classification of ground improvement techniques, suitability of different techniques, preloading: need, preloading without vertical drain, preloading with vertical drain, dynamic consolidation	07 hrs
Unit 2	Stone Column: Stone column, Design of stone column: unit cell concept, area replacement ratio, spacing and diameter, depth, stress ratio, Load bearing capacity of individual stone column, settlement of stone column, Failure mechanism	07 hrs
Unit 3	Ground Anchors: Ground anchors, components, load transfer mechanism, rock anchors, anchors in granular soil, anchors in cohesive soil, Rock bolt, types, action of rock bolt, Soil nailing, analysis of nailed soil	07 hrs
Unit 4	Soil Stabilization: Soil stabilization: cement, lime, fly ash, factors affecting. Grouting: classification, types of grouts, equipments, grouting design and layout, applications, case histories Landslide: Landslide, various causes of landslide, prevention by advanced techniques	07 hrs
Unit 5	Earth Reinforcement: Earth reinforcement, mechanism and concept, stress strain relationship of reinforced soil, design theories, stability analysis of retaining wall: tie back analysis, coherent gravity analysis, application areas of earth reinforcement	07 hrs


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Unit 6	Geo-synthetics: Geo-synthetics – Types, functions, Application of geo-synthetics: reinforcement, separator, filter, drainage, Selection of geo-synthetics; damage and durability of geo-synthetics.	07 hrs
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Ground Improvement Techniques	Dr. P Purushothma Raj	Tata McGraw Hill Company Ltd. NewDelhi	1 st	2005
02	Ground Improvement	Klaus Kirsch	---	5 th	2004
03	An Introduction to Ground Improvement	Satyendra Mittal	---	6 th	2011
04	Geotechnical Engineering	SK Gulhati	Tata McGraw Hill Delhi	1 st	2005

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Soil Mechanics and Foundation Engineering	Dr. K. R. Arora	Standard Publishers and Distributors	2 nd	2009
02	Soil Mechanics and Foundations	BC Punmia	Laxmipublications Pvt Ltd	16 th	2005
03	Soil Mechanics and Foundation Engineering	VNS Murthy	Saikripa Technical Consultants Bangalore	8 th	1991
04	Soil Mechanics and Foundation	Muni Budhu	Wiley India Pvt Ltd	2 nd	2008

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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVPE409, Hydraulic Structures
Prerequisite/s	0CVPC310
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of the course, the student should be able to:

0CVPE409_1	Identify suitable type of dam depending on the site conditions. (K ²)
0CVPE409_2	Explain the concept and types of spillway. (K ²)
0CVPE409_3	Describe various theories for canal silting and diversion head work stability. (K ²)
0CVPE409_4	Illustrate the function of different parts and components of hydraulic structures (K ³)
0CVPE409_5	Investigate the ability of gravity and earthen dam. (K ⁴)

Course Contents:

Unit 1	Introduction to dams: Types of dams, selection of site for dams, selection of type of dam, Storage Calculations using mass curves, Area elevation curve & Elevation capacity curve, Control levels, silting of reservoirs, control of Losses in reservoirs	06 hrs
Unit 2	Gravity Dams: Forces acting on dam, Design Criterion-theoretical and practical profile, high and low dam, fixing section of dam, stability analysis, and methods of construction, galleries and joints in dams. Arch dams-Introduction & types only. Introduction to instrumentation in dams.	08 hrs
Unit 3	Earthen dam: Types of earthen dams, Components and their functions, methods of construction of earthen dam, Design criterion, plotting of phreatic line, Modes of failure, seepage control measures-Drainage & filters, stability of slopes for sudden drawdown & steady seepage.	07 hrs
Unit 4	Spillway: Necessity and function components of spillway, different types, factors affecting choice of type of spillway. Elementary hydraulic design, types of energy dissipation arrangements, gates for spillway.	07 hrs


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Unit 5	Diversion Head Works: component parts & their functions, types of weir and barrages, Causes of failure and remedies, Introduction to Theory of seepage-Bligh's creep theory, critical exit gradient, Khosla's theory	07 hrs
Unit 6	Canals: Types, alignment, typical sections of canals, balancing depth Kennedy's and Lacey's silt theories, canal lining-purpose, types, selection and economics. C.D.Works: Necessity, Types. Canal Regulatory Works: Head regulator, cross regulator, canal fall, canal escape, standing wave flume.	07hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Irrigation and water power	Priyani	Charotar Publication	3 rd	2007
02	Irrigation and water power engineering	B. C.Punmia	Standard Publications, New Delhi.	1 st	1962
03	Design of small dams manual	--	U.S.B.R, Oxford and IBH Publ. Co	--	--
04	Hydraulic Structures	A.I.B Moffat, C. Nalluri, P. Novak, R. Narayanan	CRC Press	2 nd	2004
05	Irrigation Engineering and Hydraulic Structures	Santosh Kumar Garg	Khanna publisher	1 st	2006

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Hydrology and water resources	R.K.Sharma	Dhanpatrai and sons, New Delhi	4 th	2018
02	Irrigation Theory and practice	A. M.Michael.	Vikas Publications House	2 nd	2012
03	Theory and design of irrigation structures vol. I and II and II	Varshney, Gupta and Gupta	Newchand and Brothers	2 nd	2015
04	Hydraulic structures	Sheng-Hong Chen	Springer	3 rd	2005


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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVPE410, Green Building
Prerequisite/s	1CVPC205,1CVPC209
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE410_1	Discuss orientation and lighting provision in building (K ²)
0CVPE410_2	Explain passive, active architecture and energy audit of building (K ²)
0CVPE410_3	Explain recycling and embodied energy of different building materials. (K ²)
0CVPE410_4	Illustrate various methods of improving efficiency of water uses in green building (K ³)
0CVPE410_5	Apply the different green building rating systems. (K ³)

Course Contents:

Unit 1	Orientation and lighting of green building : Sustainable site selection orientation, building envelop, building plan layout, design of doors and windows, natural ventilation, solar energy - use of solar energy for water heating, solar photovoltaic panels, direct and indirect lighting, comparison of various lighting devices-electric tubes, incandescent lamps, CFL and LED lamps, Indirect lighting devices- fibre optic, Fresnel lens.	10 hrs
Unit 2	Passive and active architecture: Introduction to Passive and active architecture, Natural ventilation and air conditioning, Hybrid system of active and passive refrigeration and air-conditioning. Energy audit of building.	06 hrs.
Unit 3	Water efficiency: Rain water harvesting, potable water and bore well recharging, minimization of water use, dual flush, Waterless urinals, Smart controlled water tabs, Recycling of treated waste water for different non potable use, Domestic solid waste –segregation, green materials, water audit of building.	06 hrs.
Unit 4	Recycling of building materials: Existing walls, roofs and floors, Materials use, Recycled content, Use of fly ash, foundry sand and other inert solid wastes in building, life cycle analysis. Concept of Embodied energy of various common building materials.	06 hrs
Unit 5	GRIHA and SVAGRIH: Introduction to GRIHA and SVAGRIHA. GRIHA and SVAGRIHA criteria.	07 hrs
Unit 6	LEED: Introduction to LEED. LEED Criteria	07 hrs.

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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	National Building Code 2017.	Bureau of Indian Standards	Bureau of Indian Standards	1 st	2016
02	Green Building: Principles and Practices in Residential Construction	Abe Kruger, Carl Seville	Delmar Learning	2 nd	2012
03	Green Building Guidance	Karthik Karuppu	Notion Press	1 st	2019
04	GRIHA Manuals	The Energy and Resources Institute	TERI Press	1 st	2007
05	SVAGRIHA	The Energy and Resources Institute	TERI Press	1 st	2007

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Green Building – Guidebook for Sustainable Architecture	Michael Bauer, Peter Mosle and Michael Schwarz	Springer Publication	2 nd	2014
02	Handbook of Green Building Design and Construction: LEED, BREEAM, and Green Globes	Sam Kubba	Elsevier	2 nd	2012
03	Green Building with Concrete: Sustainable Design and Construction	Gajanan M. Sabnis	CRC Press	2 nd	2015
04	Passive House Details	Donald B. Corner, Jan C. Fillinger, Alison G. Kwok	Routledge Press	1 st	2017


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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVOE411, Operation Research
Prerequisite	---
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVOE411_1	Discuss the decision theory and game theory (K^2)
0CVOE411_2	Use Assignment model and transportation model for mathematic formulation (K^3)
0CVOE411_3	Apply OR and LP technique for solving Engineering Problems (K^3)
0CVOE411_4	Illustrate various inventory models for cost optimization (K^3)
0CVOE411_5	Adopt non linear and dynamic programming for operational research (K^3)

Course Contents:

Unit 1	Introduction to Operation Research and Linear Programming Problems: Introduction, History and development of OR, Applications, modelling in OR, OR models and their applications. Linear Programming Problems: Formulation of problem, Graphical solution, Simplex Procedure for maximization and minimization	07 hrs
Unit 2	Assignment Model and Transportation Model: Assignment Model: Mathematical statement, Methods to solve balanced and unbalanced Assignment problems, Maximization problems, Travelling salesman problem. Transportation Model: Mathematical formulation, methods to obtain initial basic feasible Solution (IBFS), NWCR, Least Cost and VAM, Conditions for testing optimality	08 hrs
Unit 3	Decision Theory Decision Theory, Decision Tree, Game Theory. Introduction, Pay off table, Opportunity loss or regret table, Decisions under uncertainty, Laplace criterion, Maximin or Minmax principle, Maximax or Minimin principle, Hurcuilicz principle, Decisions under risk–maximum likelihood criteria.	06 hrs
Unit 4	Inventory Management: Deterministic models, probabilistic models, Queuing Theory, simulation	07 hrs


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	applications, EOQ method, ABC analysis. Sequencing: Sequencing of n jobs and 2 and 3 machines, 2 jobs and m machines.	
Unit 5	Introduction to non linear programming: Single variable unconstrained optimization –Local & Global optima, Uni-modal Function- Sequential Search Techniques: Dichotomous, Fibonacci, Golden Section methods.	07 hrs
Unit 6	Dynamic programming(D.P.) and Integer programming, forecasting techniques Multi stage decision processes of D. P., Principle of optimality, Recursive Equations of D. P., Application of D.P.	07 hrs

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Industrial Management & Operation Research	Nandkumar Huukkeri	Electrotech publication	7 th	2016
02	Introduction to Operation Research	Hamdy A. Taha	Prentice Hall India Publication	8 th	2011
03	Operations Research	SwaroopKanti Gupta P.K. , Mohan Man	Sultan Chand & Sons	3 rd	2017
04	Operations Research: An Introduction	Taha	Pearson Publications	9 th	2014

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Operations Research	J.K. Sharma	McMillan India Publi. New Delhi	8 th	2011
02	Operations Research	Hira& Gupta	S.Chand& Co. New Delhi	5 th	2011
03	Operations Research	ManoharMahajan	DhanapatRai And Sons	8 th	2009
04	Operations Research	Nita H. Gor, Ravi M. Soni, Hardik Shah	Eastern Economy Editions	3 rd	2010


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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVOE412, Human Resources Development
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of the course, the student should be able to

0CVOE412_1	Discuss the significance of human resource development. (K ²)
0CVOE412_2	Explain the process of human resource planning.(K ²)
0CVOE412_3	Describe employee management relation and various schemes of employee benefit. (K ²)
0CVOE412_4	Illustrate different trainings and performance appraisal systems. (K ³)
0CVOE412_5	Apply different recruitment and selection procedure. (K ³)

Course Contents:

Unit 1	Introduction What is Human resource? Significance, history, objectives and functions of HRM, Organization design, organizational and human resource strategies.	07 hrs
Unit 2	Human Resource Planning: Formulating human resource plans, various methods, job analysis, job specifications and job design in construction projects, forecasting personal needs and supply in construction sector.	07 hrs
Unit 3	Recruitment & selection: Selecting project manager & project team, external & internal recruitment. Data gathering methods, skill requirement of construction personnel.	07 hrs
Unit 4	Training & Development: The training Process, Individual and organizational development, change management, performance appraisal, use of performance appraisal information establishing the evaluation system, Performance Management / Encouragement, Rewarding Employees	07 hrs
Unit 5	Employee Benefits: Employee health and safety, wage and salary administration, incentive system, wages of construction industry, retirement and pensions.	07 hrs

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Unit 6	Employee Management Relations: Collective Bargaining, Effective ways of working, trade unions act, labour welfare act, payment of wages act, workers compensation act, contract labour act, management of conflicts.	07 hrs
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Human Resource Development and Management	Biswanath Ghosh	Vikas Publishing House Pvt. Ltd.	3 rd	2007
02	Human Resource Management	S.C. Agarwal	Dhanpat Rai Publications	2 nd	2006
03	Personnel & Human resource Management	C.B. Mamoria	Himalaya Publishing House	4 th	2015
04	Human Resource and Personnel Management	Aswathappa K.	Tata McGraw Hill Publishing Co. Ltd	4 th	2005

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Human Resource Management,	Durai, P.	Pearson Education	4 th	2010
02	Human resource Management,	Snell/ Bohlander	Cengage Learning	---	---
03	Human Resource Management	Dessler, G.&Varkkey B.	Pearson Education	12 th	2011
04	Essentials of HRM and Industrial relation	SubbaRao	Himalaya Publishing house	4 th	2010


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Course Details:

Class	B. Tech, Sem. - VII
Course Code and Course Title	0CVOE413, Air Pollution and Control
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I/MSE/ ISE II / ESE	10/30/10/50

Course Outcomes(COs):

Upon successful completion of the course, the student should be able to

0CVOE413_1	Discuss physics of atmosphere (K^2)
0CVOE413_2	Describe concept of dispersion of pollutant in the atmosphere (K^2)
0CVOE413_3	Illustrate concept of particulate matters and various controlling equipment for particulate matter (K^3)
0CVOE413_4	Discuss various control measures for gaseous pollutant (K^2)
0CVOE413_5	Summarize various automobile source of pollution (K^2)

Course Contents:

Unit 1	Physics of atmosphere: Solar radiation, Wind circulation, Lapse rate, Inversion, Stability conditions, Pasquil stability model, maximum mixing depth, Wind rose, Plume behavior, Heat island effect, Green house effect, Rain drop formation, Visibility, Photochemical reaction	08 hrs
Unit 2	Dispersion of pollutants in the atmosphere: Eddy diffusion model, the Gaussian dispersion model, point source, Line source, maximum ground level concentration, Determination of stack height, sampling time corrections, Effects of inversion trap.	07 hrs
Unit 3	Particulate matter: Definitions of different particulate matter, Distribution and source of SPM, Terminal settling velocity, Hood and duct design, Particulate collection design.	07 hrs
Unit 4	Control equipment for particulate matter: Settling chamber, Cyclone, Wet collectors, Fabric filter, Electrostatic precipitator, Problems on design of equipment, Component detailing collection efficiency	06 hrs
Unit 5	General control of Gaseous pollutants: Principles of absorption, Adsorption, Basic design of absorption and adsorption units, Incineration and after burner, Control of sulphuric dioxide, NOx.	07 hrs

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Unit 6	Automobile source: Emission of pollutants from automobiles, Reduction of emissions by different methods, Alternative fuels and their utilizations. Strategy for effective control of air pollution in India.	07hrs
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Sewage disposal and air pollution engineering	S.K.Garg	Khanna publishers	33 rd	2015
02	Environmental pollution and control	Dr. H.S. Bhatia	Galgotia Publications Pvt. Ltd.	2 nd	2018
03	Air pollution and control	Keshav kant	Khanna publishing	1 st	2018
04	Air pollution	Rao M. N. and Rao H.V.	Tata McGraw Hill	2 nd	1990

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Engineering	H.S. Peavy, D.R.Rowe	McGraw Hill	2 nd	1985
02	Chemistry for Environment Engineering	Sawyorand McCarthy	Tata McGraw Hill Publishing Company Ltd.	9 th	1967
03	Air Pollution and Control	K.V.S.G. Murali Krishna	USP	1 st	2017
04	Air Pollution Control :A Design Approach.	C David Cooper	Medtech	4 th	2015


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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVOE414, Research Methodology
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I/MSE/ISE II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVOE414_1	Discuss the basic concepts of research. (K ²)
0CVOE414_2	Summarize data collection methods. (K ²)
0CVOE414_3	Identify various methods for analysis of research problem (K ²)
0CVOE414_4	Explain parameters for writing a research report and thesis. (K ²)
0CVOE414_5	Describe different methods of presentation of research. (K ²)

Course Contents:

Unit 1	Introduction to Research: Meaning of research, types of research, process of research, Sources of research problem, Errors in selecting a research problem, Scope and objectives of research problem, formulation of research hypotheses. Search for causation.	06 hrs.
Unit 2	Literature survey: Definition of literature and literature survey, need of literature survey, sources of literature, elements and objectives of literature survey, styles of literature survey, and strategies of literature survey.	07 hrs.
Unit 3	Data collection: Classification of data, benefits and drawbacks of data, evaluation of data, qualitative methods of data collection.	08 hrs.
Unit 4	Introduction of data analysis: Testing of hypothesis- concepts and testing, analysis of variance techniques, introduction to nonparametric tests. Validity and reliability, Approaches to qualitative and quantitative data analysis.	07 hrs.
Unit 5	Report writing: Need of effective documentation, importance of report writing, types of reports, report structure, report formulation, Plagiarism.	07 hrs.
Unit 6	Presentation of research: Research briefing, presentation styles, impact of presentation, elements of effective presentation, Writing of research paper, presenting and publishing paper, patent procedure.	07 hrs.

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year
1.	Research Methodology: concepts and cases	Deepak Chawla and Neena Sondhi	Vikas Publishing House Pvt. Ltd.	..	2016
2.	Research Methods for Business	Sekaran	Wiley, India.	7 th	2018
3.	Research Methodology: Methods and Trends	Dr. C. R. Kothari	New Age International Publishers.	..	2019
4.	Research Methods in Education	Louis Cohen, Manion, Morrison, Routledge(Taylor & Francis Group)	Cambridge University Press India Pvt. Ltd.	7 th	2007
5.	RESEARCH METHODOLOGY a step-by-step guide for beginners	Ranjit Kumar	SAGE Publications Ltd	6 th	2014

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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVOE415, Economics & Management
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVOE415_1	Explain the importance of management in industry. (K ²)
0CVOE415_2	Discuss the importance of feasibility study with profitability of project. (K ²)
0CVOE415_3	Summarize business environment and concept of quality management in industry. (K ²)
0CVOE415_4	Apply various technique in material management. (K ³)
0CVOE415_5	Use various economic comparison method in industry. (K ³)

Course Contents:

Unit 1	Management: Definition, Nature, management environment Principle of management (henry fayol), Function of Management. Management plan, Decision Making.	07 hrs.
Unit 2	Material Management: Inventory control, ABC Analysis, EOQ, Purchasing, Safety stock, Re- order level, Lead time, Stock out.	06 hrs.
Unit 3	Economics & Economic Comparison Method Economics: Meaning, Importance, Time value of money, Equivalence. Economic Comparison Method- Present worth method, EUAC Method, NPV, ROR, Benefit cost ration, Payback period method, linear break even analysis.	09 hrs.
Unit 4	Project Economics: Flow diagram for feasibility study of a project, Construction economics, Comparison of project costs and trade off analysis, Economy of scale and size, Choosing between alternatives including levels of investments, Project profitability.	07 hrs.
Unit 5	Business Environment: Introduction, factor affecting business, external Environment, Business Ethics, Social Responsibility of business. Business Economics.	07 hrs.
Unit 6	Quality Management: Quality management, Quality circle, sampling and testing, ISO standards related to quality , Concept of six sigma	06 hrs.


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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVOE416, Finite Element Method
Prerequisite/s	0CVBS201,0CVPC204,0CVPC207
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of the course, the student should be able to

0CVOE416_1	Explain terminology used in FEM.(K ²)
0CVOE416_2	Apply variational and direct approach method for 1D, 2D problems.(K ³)
0CVOE416_3	Determine relationship between natural and cartesian coordinate system.(K ³)
0CVOE416_4	Develop stiffness matrix for linear spring, bars, beam and truss (1D, 2D & 3D problem).(K ⁶)
0CVOE416_5	Formulate element stiffness matrix for axisymmetric elements.(K ⁶)

Course Contents:

Unit 1	1D Problems: Elementary theory of Elasticity: stress-strain, strain displacement relations, plane stress and plane strain problems. Equations for two and three dimensional problems Finite element procedure, Principle of minimum potential energy, Galerkin approach, Rayleigh Ritz method	07 hrs
Unit 2	Discretization: Discretization of continuum, displacement model, application to linear spring, bars with constant and variable cross sections subjected to axial forces. Numbering of nodes, minimization of band width. finite representation of infinite bodies	07 hrs
Unit 3	2-D Problems : Development of element stiffness matrix and nodal load vector for beam and truss elements. Transformation of matrix, 2-D elements of triangular shapes for plane stress and plane strain problems. Application of FE method to beam and plane truss.	08 hrs
Unit 4	Convergence requirements: Convergence requirements selection of order of polynomial, confirming and non confirming elements, element aspect ratio, Pascal's triangle.	06 hrs
Unit 5	Isoperimetric Elements Shape function. Natural coordinate systems, classification- isoperimetric, sub parametric, super parametric elements, 1D & 2D isoperimetric elements,	07 hrs

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	Gauss quadrature integration.	
Unit 6	Axisymmetric Elements : Various 3-D elements, development of element stiffness matrix and nodal load vector for tetrahedron element. Axisymmetric problems, Formulation of stiffness matrix of Axi-symmetric elements.	07 hrs

Text Books :

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to the Finite Element Method	C. S. Desai & J. F. Abel	CBS Pub	1 st	2005
02	An introduction to the finite element method	J. N. Reddy	Tata McGraw Hill Publication Co. Ltd.	3 rd	2015
03	Introduction to the Finite Element in Engineering	T.R.Chandrupatla and Belegundu	Prentice Hall of India, Pvt. Ltd.	3 rd	2012
04	Programming in finite element method	C.S.Krishnamoorthy	Tata McGraw Hill Publication Co. Ltd.	2 nd	2004

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Finite Element Method with application in Engineering	A. H. Shah, Y. M. Desai, T. I. Eldho	Pearson Education	1 st	2013
02	Finite Element Procedures	Bathe K.J.	PHI Learning Pvt. Ltd.	Eastern economy edition	1996
03	The Finite Element Method Vol.I and II	O.C.Zienkiewicz and R.L.Taylor	Tata McGraw	6 th	2005
04	Concept and Application of Finite Element Analysis	R. D. Cook	John Wiley & sons	4 th	2001


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Course Details:

Class	B. Tech. Sem.-VII
Course Code and Course Title	0CVOE417, Disaster Management
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE-I/MSE/ ISE-II /ESE	10/30/10/50

Course Outcomes(COs):

Upon successful completion of this course, the student will be able to:

0CVOE417_1	Explain disaster and disaster management cycle (K ²)
0CVOE417_2	Discuss disaster preparedness and response activities various types of disaster(K ²)
0CVOE417_3	Describe Physical and Socio-economic Impacts of Disasters (K ²)
0CVOE417_4	Explain current scenario of disaster management in India (K ²)
0CVOE417_5	Apply various advanced techniques for disaster management (K ³)

Course Contents:

Unit 1	Understanding of Disasters : Meaning, Factors and Significance, Distinguishing between an emergency and a disaster situation. Understanding Disasters- Causes and Effects, Types of natural and non-natural disasters, Disasters -A Global View, Disaster Profile of India- Regional, and Seasonal.	07 hrs.
Unit 2	Disaster management cycle: Mitigation, Preparedness, Response and Recovery, Introduction to Disaster Management Cycle, Disaster Mitigation, Mitigation strategies, Hazard identification and vulnerability analysis, Mitigation strategies or measures, Disaster Mitigation and Infrastructure Considerations, Disaster and Development, The impact of disasters on development programmes.	07hrs.
Unit 3	Disaster Preparedness& Response to Disaster: Introduction to Disaster Preparedness, Disaster Risk Reduction (DRR), The Emergency Operation Plan (EOP), Developing and Writing the EOP. Introduction to Disaster Response, Aims of disaster response, Disaster Response Activities, Modern and traditional responses to disasters, Modern methods of disaster response, Disaster Recovery, The Recovery Plan, Disasters as opportunities for development initiatives.	07 hrs.
Unit 4	The Role of Technology in Disaster Management: Introduction to Emergency Management Systems (EMS), significance of EMS, Geographic Information Systems (GIS) and Disaster Management. GIS Applications, Global Positioning System (GPS) and Disaster Management, Application of GPS to Disaster Management. Remote Sensing and its significance in Disaster Management.	07 hrs.

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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVPC451, Estimating and costing Laboratory
Prerequisite/s	0CVPC205, 0CVPC209, 0CVPC210
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE/ESE	50/25

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC451_1	Make schedule of reinforcement of various RCC elements. (K ³)
0CVPC451_2	Calculate value of land and existing properties.(K ³)
0CVPC451_3	Generate detailed estimate and rate analysis of various construction items(K ⁶)
0CVPC451_4	Communicate effectively about laboratory work both orally and in writing Journals.(S ²)
0CVPC451_5	Practice knowledge of quantity estimation and valuation for societal context (A ³)

Sr. No.	Title of Exercise
1	Prepare detailed specification of any five civil engineering items.(Data should be collected from construction site)
2	Collect G+1 municipal drawing of residential building
3	Prepare detailed estimate of G+1 residential framed building (sub structure) Note- Use excel spread sheet for preparation of measurement & abstract sheet
4	Prepare detailed estimate of G+1 residential framed building (super structure) Note- Use excel spread sheet for preparation of measurement & abstract sheet
5	Prepare rate analysis of any ten civil engineering items of work
6	Prepare schedule of reinforcement- column and column footing, Beam
7	Prepare schedule of reinforcement - Slab, Retaining wall etc.
8	Prepare valuation report of residential building


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Estimating, Costing and Specification in civil engineering	M. Chakraborti	MonojitChakraborti Pvt. Ltd.	27 th	2016
02	A textbook of estimating and costing.	G.S. Birde	DhanpatRai& Sons	7 th	2008
03	Estimating and Costing	B.N.Dutta	UBS Publisher	25 th	2002
04	Elements of Estimating and Costing	S. C. Rangwala.	Charotar Publishing house	4 th	1998
05	Civil Engineering Contracts &Estimates	B. S. Patil,	Orient Langman Ltd	7 th	2015

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Professional Practices (Estimating & Valuation)	RoshanNama vati	LBD Publishers	4 th	1984
02	Estimating and Costing for Building and Civil Engineering Works Based on Indian Standard Method of Measurement (I.S.1200)	P. L. Bhasin	Chand Publisher	5th	2002
03	Standard Specification Vol. I & II	---	PWD, Maharastra	---	---
04	Standard Schedule of Rates- Recent SSR	---	PWD, Maharastra	---	---
05	Indian Standard 1200 (Part 1 To 10)	---	---	---	---


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Course Details:

Class	B. Tech, Sem. -VII
Course Code and Course Title	0CVHS452, General Proficiency Laboratory II
Prerequisite/s	0CVHS257
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVHS452_1	Show the key traits in oneself comprising of attitude skill & knowledge (K ³)
0CVHS452_2	Proficiently apply skills for improving presentations of any format. (S ³)
0CVHS452_3	Professionally communicate in both technical and non technical terms. (S ⁵)
0CVHS452_4	Display the traits required to improve employability skills. (A ³)
0CVHS452_5	Exhibit effective communication techniques. (A ⁵)

Practical No.	Title of Activity
1	General Aptitude I
2	General Aptitude II
3	Technical Aptitude I (Structural Part)
4	Technical Aptitude II (Non Structural Part)
5	Group Discussion
6	Debate
7	Interview skill
8	Resume Writing

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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVES453, Soft Computing Skills in Civil Engineering – II
Prerequisite/s	-
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE	25

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVES453_1	Adopt software skills in the field of Civil Engineering. (K ³)
0CVES453_2	List various commands for implementation of software. (K ³)
0CVES453_3	Compute various technical parameters with the help of software. (K ³)
0CVES453_4	Communicate effectively about software work both orally and in writing journals. (S ²)
0CVES453_5	Practice professional and carry forward in their life as lifelong learning. (A ³)

Course Contents:

1	<p>The lab work shall consist of Software training. List of Software training floated by Department will be in the field of:</p> <ol style="list-style-type: none"> 1. Structural Design 2. Construction Planning and Management 3. Transportation Engineering 4. Environmental Engineering 5. Quantity Estimation
2	<ol style="list-style-type: none"> 1. Structural Design (StaadPro, E Tab etc) Analysis & design of structural members and System by any design software. 2. Construction Planning and Management (MSP, Primavera, etc) Planning of all construction activity and management of them by any software. 3. Transportation Engineering (IIT pave, VISSIM, etc) Analysis and Design of pavement and traffic by any Software. 4. Environmental Engineering (EPANET, etc) Pipe network analysis. 5. Quantity Estimation (Estimator, etc) Estimate the various quantities required in the construction field.

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Text Book

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Step by step Microsoft project 2013	Chafield	Prentice Hall India Learning Private Limited	1 st	2013
02	Microsoft project : Plain and simple	Howard B	Prentice Hall India Learning Private Limited	1 st	2013
03	Primavera P6 Project planner	P. Vinayagam	I K International publishing house pvt.lim	1 st	2017
04	Staad pro V8i	T.S. Sharma	Notion Press	1 st	2017
05	VISSIM	Hand book			

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Course Details:

Class	B. Tech, Sem.- VII
Course Code and Course Title	OCVPR455, Project Phase - I
Prerequisite/s	---
Teaching Scheme: Lecture/Practical	00/06
Credits	06
Evaluation Scheme: ISE / ESE (OE)	100/50

Course Outcomes(COs):

Upon successful completion of the course, the student should be able to

OCVPR 455_1	Identify the real life institutional, social, local industrial problems relevant to the societal and environmental issues for sustainable development. (K ³ A ³)
OCVPR 455_2	Formulate, analyze complex engineering problems and give cost-effective, optimal solution considering societal, health, legal, safety and cultural issues. (K ⁴ A ³)
OCVPR 455_3	Design/Development of system components or processes that meet the specified needs by using advance tools/ techniques/ resources (K ⁵ S ³)
OCVPR 455_4	Function effectively as an individual or as a team for understanding of the engineering and management principles and apply these to manage projects maintaining professional and ethical principles. (S ³ A ²)
OCVPR 455_5	Communicate effectively on complex engineering activities, write effective reports, design documentation and make effective presentations, (S ³)
OCVPR 455_6	Engage in independent and life-long learning in the broadest context of technological change (A ³)

Course Contents:

01	The student project should finalize the research topic in consultation with the project supervisor.
02	Students should collect the relevant literature pertaining to the topic for understanding what the current level of research is in this area. Read and understand the topic thoroughly and make a note of what is being done.
03	Prepare the proposal for the project idea that will be done in VII and VIII semester and divide the work in 3-4 time bound phases.
04	Make preparation for experimentation, or any study visit.
05	Write one review paper on literature review, so as to get exposure to the process of technical report writing.
06	Students are required to report their project supervisor every week and brief about the work done for that week. Maintain a separate diary for this purpose
07	Prepare the report of literature review and gap analysis by referring to various published work in National, International journals, thesis and projects.

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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPC421, Design of Concrete Structures II
Prerequisite/s	0CVBS201,0CVPC204,0CVPC207,0CVPC402
Teaching Scheme: Lecture/Tutorial	03/01
Credits	04
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50


Course Outcomes:

Upon successful completion of the course, the student should be able to

0CVPC421_1	Examine behavior of RC member under torsion & Bending by limit state method. (K ⁴)
0CVPC421_2	Calculate the various design parameters of water tank by working state method. (K ⁴)
0CVPC421_3	Use limit state method for design of combined footing. (K ⁴)
0CVPC421_4	Calculate the various design parameters of Retaining Wall.(K ⁴)
0CVPC421_5	Examine pre-stressed member and losses in pre-stress member. (K ⁴)

Course Contents:

Unit 1	Limit State of Collapse Torsion Behavior of R.C. rectangular sections subjected to torsion, Design of sections subjected to combined bending and torsion, combined shear and torsion.	06 Hrs.
Unit 2	Water Tank a) Design of water tank - Introduction to working stress method for water tank design, Design criteria, permissible stresses, design of water tank resting on ground using IS code method – (i) circular water tanks with flexible and rigid joint between wall and floor, (ii) rectangular water tanks.	08 Hrs.
Unit 3	Combined footing Design of rectangular and Trapezoidal combined footing.	07 Hrs.
Unit 4	Retaining Wall Analysis and Design of cantilever and counter fort retaining walls with Horizontal Surcharge.	07 Hrs.
Unit 5	Prestressing Basic concept of pre-stressing, Historical development, Types and systems of pre-stressing, Analysis of rectangular and symmetrical I sections, Different cable profiles, Losses of prestress in Pre & Post tensioned members.	06 Hrs.
Unit 6	Design of Prestressing Rectangular and Symmetrical I sections for following criteria: (i) Design of section for flexure (ii) Design of section for the limit state of collapse in flexure.	08 Hrs.


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Text Books :					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Reinforced Concrete Structural element	Purushotaman.P	McGraw Hill Publication Co. Ltd.	4 th	2010
02	Reinforced Concrete VOL.II (Advanced Reinforced Concrete)	H.J Shah	Charotar Publishing House Pvt. Ltd	7 th	2014
03	R.C.C Design & Drawing	Neelam Sharama	S.K.Kataria	3 rd	2013
04	Reinforced Concrete VOL.I	H.J Shah	Charotar Publishing House Pvt. Ltd	7 th	2014
05	Advance R.C.C Design (R.C.C Volume II)	S.S.Bhavikatti	New Age International	2nd	2014
06	Design of Reniforced Concrete Structures	S.Ramamrutham	Dhanpat Rai Publishing Company	16 th	2010
07	Limit State Design	B.C.Punmia, A.K.Jain,	Laxmi Publications Ltd.	1 st	2017
08	R.C.C Designs	B.C.Punmia, A.K.Jain, Arun K Jain	Charotar Publishing House Pvt. Ltd	7 th	2015

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Prestressed Concrete	N Krishna Raju	McGraw Hill Publication Co. Ltd.	5 th	2010
02	IS 456-2000	Indian Standard Code	B.I.S, New Delhi	4 th	2000
03	SP16	Design Aids For Reinforced Concrete	B.I.S, New Delhi	2 nd	1998
04	IS:1343	Indian Standard Code	B.I.S, New Delhi	4 th	2009
05	IS:3370	Indian Standard Code	B.I.S, New Delhi	1 st	2009

List of Tutorials		
Sr. No	Title of Tutorial	Contact Hrs.
01.	Analysis and design of Beam subjected to torsion, Bending and Shear.	02
02.	Analysis and design of Circular Water tank	02
03.	Analysis and design of Rectangular Water tank	02


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04.	Analysis and design of Combined Rectangular footing	01
05.	Analysis and design of Cantilever Retaining wall	02
06.	Analysis and design of Counterfort Retaining wall	02
07.	Analysis of Prestress member.	01
08.	Analysis and design Prestress member	02

NOTE:

It is necessary to have knowledge of IS Code.

Use of IS456:2000, IS: 1343, IS: 3370 codes are allowed in examination.



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Course Details:

Class	B. Tech, Sem.- VIII
Course Code and Course Title	0CVPC422, Project Management
Prerequisite/s	0CVPC206
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC422_1	Discuss various excavation equipment's (K ²)
0CVPC422_2	Explain the risk Management and safety engineering in construction projects (K ²)
0CVPC422_3	Describe the basic concept of project management. (K ²)
0CVPC422_4	Apply the knowledge of different earth moving equipment's for different site condition, also calculate cycle time and production time (K ³)
0CVPC422_5	Calculate the critical path and various time estimates by use of CPM and PERT techniques. (K ⁴)

Course Contents:

Unit 1	Introduction to Project Management – Objectives, Agencies, Phases; Work Breakdown Structure. Construction project organization: structure, qualities of project manager, project coordinator. Activity lists, estimating durations, sequence of activities. Project Planning - Bar Chart, Mile Stone Chart. Site Layout - Site layout, Factors affecting, Typical layout of construction projects.	08 Hrs.
Unit 2	CPM Network CPM– Time Estimates, Floats, Critical Path. Network Compression, Resource Allocation, Network Updating.	08 Hrs.
Unit 3	PERT Network - Concept of Probability, Normal and Beta Distribution, Time Estimates, Slack, Probability of Project Completion. Introduction to Precedence Network.	06 Hrs.
Unit 4	Earth Moving Equipments Introduction – Mechanical v/s manual construction, Earth Work Operations Equipment- Tractors, Bulldozers, Scrappers, Power shovel, Hoes. Simple Numerical problems on cycle time and production rates.	07 Hrs.
Unit 5	Excavation Equipments Drag line, Clamshell, Trenchers, Compactors, Tippers, and Cranes performance, operating efficiencies, lifting capacities of all equipment's. Excavation in hard rock: Rippers, Jack Hammers, Drills, Blasting Explosives, Detonators, Fuses.	07 Hrs.


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Unit 6	Risk Management and Safety Engineering Risk Management - Risk in Construction : Identification, Classification, Mitigation, Sources of risk in construction Safety Engineering – Importance of Safety, Classification of Accidents, Causes of Accidents, Safety Policy, Safety Organization, Safety Plan, Safety Training, and Various Safety Equipment used on site.	06 Hrs.
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Project Planning and Control with PERT and CPM	Dr. B. C. Punmia and K. K. Khandelwal.	Laxmi Publications	4 th	2016
02	PERT and CPM: Principles and Applications	L. S. Srinath	Affiliated East-West Press (Pvt.) Ltd.	3 rd	2001
03	Construction Project Management	Kumar Neeraj Jha	Pearson Education India	1 st	2011
04	Heavy Construction – Planning Equipment, Methods	Jagman Singh	CRC Press	3 rd	2009

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Construction Project Management: Planning, Scheduling and Controlling.	Chitkara K. K.	Tata McGraw - Hill Education	2 nd	2010
02	Construction Equipment and Management.	Sharma S.C.	Khanna Publishers New Delhi,	2 nd	2017
03	Construction planning, equipment, and methods.	Robert Peurifoy.	McGraw-Hill,	8 th	2010
04	Construction Planning and Management	P.S. Gahlot, B. M. Dhir	New Age International Publishers	2 nd	2018



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Course Details:

Class	B. Tech, Sem.- VIII
Course Code and Course Title	0CVPC423, Entrepreneurship
Prerequisite/s	0CVPC206
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC423_1	Explain entrepreneurship along with its need and scope (K ²)
0CVPC423_2	Describe the procedure to start a small scale industry (K ²)
0CVPC423_3	Illustrate the techniques of market survey for selection of product (K ³)
0CVPC423_4	Use various strategies for business planning and marketing management (K ³)
0CVPC423_5	Classify the data for financial analysis (K ⁴)
0CVPC423_6	Compose the data available in the form of a project report (K ⁶)

Course Contents:

Unit 1	Introduction to entrepreneurship: Definition of entrepreneur and enterprise, need and scope of entrepreneurship, traits of an entrepreneur, present scenario of Indian industry and the place of SSI with respect to entrepreneurship, SWOC analysis for selection of business opportunities, Barriers for self-growth.	07 Hrs.
Unit 2	Small Scale Industries: Latest policy resolutions, tiny industries, procedure to start a SSI, Infrastructure of SSI, whom to approach for what. Introduction to industries developing agencies (financial, technical, marketing): DST, DIC, SFC, SIDBI, SSICD, SISI, ICICI, export promotion councils, banks, technical consultancy organizations and their role.	08 Hrs.
Unit 3	Selection of product: Criteria for selection of product for SSI, market survey techniques, marketing viability of the product, typical areas of civil engineering.	06 Hrs.
Unit 4	Finance and accountancy: Working capital and fixed capital assessment, incentives from financial institutions and government, financial ratios, their significance, break even analysis, cash flow charts, financial statements; applying for business loans, introduction to taxation.	09 Hrs.
Unit 5	Project report: Preliminary and final project report preparation, financial technical commercial and economic viability, project implementation process project profiles.	06 Hrs.


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Unit 6	Business planning & marketing management: Selling your venture: planning for succession, diversifying business, valuation of business, elements of contract law; Industrial sickness, marketing skills, sales promotion.	06 Hrs.
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The practice of entrepreneurship	Geofferey Meredith	International Labour Office	4 th	1982
02	Entrepreneurship	Gordon Baty	Beardbooks	3 rd	2003
03	The dynamics of entrepreneurial development and management	Vasant desai	Himalaya Publishing House	2 nd	2011
04	Entrepreneurship	Robert Hisrich	Mcgraw Hill Education	1 st	2018

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Entrepreneurship & small business management	M. B. Shukla	Kitab Mahal	2 nd	2007
02	Entrepreneurial development	Dr. S. S. Khanka	S. Chand	4 th	2012
03	Entrepreneurship	T. V. Rao	Cengage	1 st	2012
04	Entrepreneurship development	Abhinav Ganpule	Jatayu Prakashan	1 st	2018


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Course Details:

Class	B. Tech, Sem. – VIII
Course Code and Course Title	0CVPE424, Management Information System
Prerequisite	0CVPC206
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE424_1	Explain the concepts of MIS in the organization (K ²)
0CVPE424_2	Summarize various decision making theories of MIS (K ²)
0CVPE424_3	Discuss various Implementation and Maintenance techniques of MIS (K ²)
0CVPE424_4	Describe various software in MIS for data management (K ²)
0CVPE424_5	Apply MIS techniques in various departments of organization (K ³)

Course Contents:

Unit 1	Introduction to MIS: Definition Role, Impact, Evolution, Structure of MIS in organization.	07 Hrs.
Unit 2	Decision Making: Programmed and Non programmed decisions, Stages in decision making, Concepts of Information, Systems Theory, Decision Support System	08 Hrs.
Unit 3	Computers in MIS: Hard ware, Software, Communication networks Office automation.	06 Hrs.
Unit 4	Data Management: Collection and analysis of data, Database Management system.	07 Hrs.
Unit 5	Applications of MIS: Materials, Finance, HRD, Marketing and Service sector.	07 Hrs.
Unit 6	Implementation and Maintenance of MIS: Socio-technical approach, Factors of success and failure, Quality assurance of MIS.	07 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Management Information System	Jawadekar W. S.	Tata McGraw Hill	4 th	2009

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02	Information System For Modern Management	Robert G. Murdick, Joel E Ross, Janes R. Claggeett.	Englewood Cliffs, NJ	3 rd	1984
03	Management Information Syste	C. Laudon Kenneth P. Laudon Jane	Pearson Publications	15th	2018
04	Management Information System	James O Brien, George M. Marakas , Ramesh Behl	McGraw Hill Publications	10th	2019

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Management Information System	Jerome Kanter.	Jerome Kanter	3 rd	1984
02	The Management Information System	Gary W. Dickson Janes C. Weatherbe	McGraw Hill Book company.	2 nd	1985
03	Management Information Systems	Girdhar joshi	Oxford Higher Education	5 th	2013
04	Management Information Systems	Kelly Rainer , Brad Prince, Hugh Watson	Wiley India publications	2 nd	2015



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Course Details:

Class	B-Tech Sem. - VIII
Course Code and Course Title	0CVPE425, Structural Dynamics
Prerequisite	0CVPC403
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPE425_1	Examine the theoretical and practical aspects of structural dynamics. (K ³)
0CVPE425_2	Illustrate the concept of damping induced in structure. (K ³)
0CVPE425_3	Apply dynamics in formulating mathematical model. (K ⁴)
0CVPE425_4	Compare the free and force vibration induced in structure. (K ³)
0CVPE425_5	Decide the methodologies for the safe and stable design of structures. (K ⁵)

Course Contents:

Unit 1	Vibration: Sources of vibration, types of excitations, Principle and working of piezoelectric transducers, Spring action and damping; Degrees of freedom; Application of Newton's laws, D' Alembert's principle,	6 Hrs.
Unit 2	Single Degree of Freedom System(SDOF): Idealization of structure as Single Degree of Freedom (SDOF) system, Formulation of equation of motion for various SDOF system. Free vibrations of undamped and viscously damped systems;	7 Hrs.
Unit 3	Free Motion: Effect of damping, Response to harmonic forces and periodic forces. Coulomb damping material and radiation damping. Response of viscously damped SDOF systems to harmonic excitation; Principle of vibration measuring instruments Equivalent viscous damping; structural damping, Response of an undamped SDOF to short duration impulse; unit impulse response.	8 Hrs.
Unit 4	Forced Motion: Response of undamped system of rectangular, triangular and ramp loading; response to general dynamic excitation; Duhamel integral method. Response spectra, Numerical evolution of dynamic response of linear systems, Frequency domain analysis, Fast Fourier Transform	7 Hrs.
Unit 5	Multiple Degree of Freedom System: Vibration of undamped 2 DOF systems; Response of 2 DOF to harmonic excitation, mode superposition, vibration absorber, Lagrange equation and their application to lumped parameter models of MDOF (up to 3 DOF). Free vibration of MDOF (up to 3 DOF) systems, methods of solving Eigen value problems, iteration methods.	7 Hrs.


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Unit 6	Continuous system: Dynamic response of MDOF (2 DOF) systems-modal superposition method. Vibration of Continuous Systems: Free vibrations of Continuous systems-axial and transverse vibration of bars / beams. Response of continuous systems to dynamic loads. Energy Principle, Rayleigh-Ritz method.	7 Hrs.
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Structural Dynamics – Theory and Computations	Mario Paz	CBS publishers	4 th	1997
02	Dynamics of structure	Chopra A. K.	Prentice Hall, NY	3 rd	2007
02	Earthquake Resistant Design of Structures	Agarwal. P and Shrikhande. M	Prentice Hall of India Pvt. Ltd	2 nd	2007
03	Dynamics of Structures	Clough. R. W. and Penzien J	McGraw-Hill Education / Asia	2 nd	1993
04	Dynamics of Structures	Humar J. L.	Prentice Hall Inc.	3 rd	1990

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Elements of Earthquake Engineering	Jai Krishna, Chandrasekaran. A. R., and Brijesh Chandra	South Asia Publishers	3 rd	1994
02	Advanced Dynamics	Timoshenko S.	Mc Graw – Hill Book Company	2 nd	1948
03	Design of Earthquake Resistant Buildings	Minoru Wakabayashi	Mc Graw – Hill Book Company	3 rd	1986
04	Elements of vibration analysis	Meirovitch L.	McGraw Hill International Edition, Singapore 1986	2 nd	1986
05	Structural Dynamics	Martin Williams	CRS Press, Taylor and Francis Group	3 rd	2016


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Course Details:

Class	B. Tech, Sem.- VIII
Course Code and Course Title	0CVPE426, Site Investigations Methods & Practices
Prerequisite/s	0CVPC302, 0CVES304,
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
0CVPE426_1	Discuss scope of site investigation and its applications in Civil Engineering. (K ²)
0CVPE426_2	Explain subsurface exploration techniques with its suitability. (K ²)
0CVPE426_3	Apply knowledge geophysical methods and its interpretation techniques. (K ³)
0CVPE426_4	Apply basic concepts site investigation in field. (K ³)
0CVPE426_5	Recommend site suitability by preparing site investigation report. (K ⁴)

Course Contents:		
Unit 1	Introduction to Site investigation: Introduction, the Importance of Site Investigation, Purposes of a Site Investigation, Objectives, Need for Site investigation, Advantages of Site Investigation, Phases in site investigation process, Approach to site investigation.	07 Hrs.
Unit 2	Methodology of site investigation: Preliminary site investigation: Preliminary desk study, Topographical maps, Geological records, Mining records, Site walk-over survey, Reconnaissance of site works.	07 Hrs.
Unit 3	Site Investigation using Non-Destructive Tests: Introduction, Electrical Methods, Magnetic Methods, Gravity Methods, Acoustic Emission Methods, Seismic Methods.	07 Hrs.
Unit 4	Site investigation using in situ testing: Introduction, Penetration testing - Standard penetration test & Cone penetration test, Strength and compressibility testing - Field vane shear test, Pressure meter test, Plate loading test.	07 Hrs.
Unit 5	Sampling: Introduction , Sample sizes, Soil Disturbance, Soil disturbance during drilling, Soil disturbance during sampling, Disturbance after sampling, Undisturbed sampling techniques, Sand Sampling, Preparation of disturbed samples for testing, Preparation of undisturbed samples for testing.	07 Hrs.



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Unit 6	<p>Laboratory testing for site investigation: Introduction, Purpose of soil testing, Purpose & Significance of following test – Plasticity tests Cone penetrometer test, Compaction tests (Proctor compaction test), Particle density(Specific gravity) determination, Tests for Geotechnical parameters - Strength tests (CBR test, Lab vane test, Direct shear test, Triaxial test)</p> <p>Technical Report writing: Standard format for a site investigation report</p>	07 Hrs.
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Site Investigation Practice	Clayton, Mathews and Simons	Halsted Press	2 nd	1982
02	A short course in Geotechnical site investigation	Simons, Menzies, Matthews	Thomson Telford Ltd. London	1 st	2002
03	Site Investigation Practice	Joyce, M.D.	ESFN, SPON Publishers	1 st	1982
04	Advances in Site Investigations Practices	C. Craig	ICE Publications	1 st	2014

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Geotechnical Engineering Investigation Handbook	R.E. Hunt	CRC Press	2 nd	2019
02	Geotechnical and Geophysical Site Characterization	An-Bin Huang, Paul W Mayne	CRC Press	1 st	2008
03	An Introduction to Geophysical Exploration	Kearey, Brooks, Hill	Wiley India	3 rd	2016
04	Site Investigation in Constructions	Site Investigation Steering Group	ICE Publications	1 st	2014

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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPE427, Advanced Engineering Geology and Rock Mechanics
Prerequisite/s	0CVES304
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE427_1	Discuss the behavior of subsurface water, natural resources and environmental impact in civil engineering structures. (K ²)
0CVPE427_2	Describe the knowledge of tectonic activities in evolution of Deccan traps. (K ²)
0CVPE427_3	Explain the preliminary geological investigations for civil engineering projects. (K ³)
0CVPE427_4	Classify the stratigraphic sequence of India. (K ³)
0CVPE427_5	Apply skills of geophysical methods for geological investigation of civil engineering sites. (K ³)

Course Contents:

Unit 1	Stratigraphy and Indian Geology: Scope, Geological Time scale, Physiographic divisions of India, General study of important geological formations of India and its Civil engineering significance.	05 Hrs.
Unit 2	Seismic activity of Deccan trap region: Continental Drift and Plate Tectonics, Seismic zones of world, Seismic activity of Deccan trap region, Theories on origin of the seismic activity, Reservoir induced seismicity. Nature and characteristics of seismic activity. Tectonic nature of seismic activity of Deccan trap region.	06 Hrs.
Unit 3	Subsurface exploration: Various steps in the geological studies of project site, Engineering consideration of structural features, Exploratory drilling—observations, preservation and limitations, core logging, Graphical representation, Problems on width of outcrop. Subsurface water: Groundwater—aquifer parameters, water bearing capacity of common rocks, springs, cone of depression and its significance in civil Engineering, Natural and artificial recharge of aquifers, Saline water intrusions - control and prevention. Interpretation of groundwater quality based on Piper trilinear, Gibbs, Wilcox and USSL diagrams.	09 Hrs.


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Unit 4	Engineering geology of Deccan traps: Types of basalts and their engineering characteristics. Compact and amygdaloidal basalt as construction material, Tail channel erosion problem in Deccan Trap region, Suitability of basalts from tunneling point of view. Problems due to columnar basalt, dykes and fractures, red bole, tachylitic basalt and Volcanic breccia. Laterites-Origin, occurrence and engineering aspects. Occurrence of groundwater in Deccan Trap region, Geological conditions suitable and unsuitable for construction of percolation tanks. Nature of alluvium and sand of Deccan Trap region, Scarcity of sand in Deccan Trap area.	09 Hrs.
Unit 5	Geophysics: Geophysical methods--- Basic principles of seismic, magnetic gravitational and electrical resistivity methods. Application of electrical resistivity method using Wenner configuration in Civil Engineering aspects such as--i) Finding out the thickness of over burden and depth of hard rock, ii) Locating the spot for ground water.	06 Hrs.
Unit 6	Rock Mechanics: Physical properties of intact rocks; stresses and strains; thermal, hydraulic and mechanical properties of rocks and rock masses; applications of theory of elasticity in rock mechanics; visco-elasticity; rock discontinuities; rock slope engineering and underground excavations in rock.	06 Hrs.

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Geology for Civil Engineers -	Dr. D. V. Reddy.	Vikas Publishing House Pvt. Ltd.	1 st	2010
02	A Text Book of Engineering Geology	R. B. Gupte	Vidarthi Griha Prakashan, Pune	1 st	2009
03	A Text book of Applied Engineering Geology.	M. T. Maruthesha Reddy	New Age International Publishers, New Delhi	1 st	2007
04	Engineering and General Geology	Prabin Singh, S. K.	Katariya and sons, Delhi	8 th	2008

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Geology of India and Burma	M. S. Krishnan,	Higginbothams Pvt. Ltd.	6 th	2009
2	Groundwater Hydrology	Tood D. K	John Wiley & Son, New York	3 rd	2005
3	Introduction to Rock Mechanics	Verma B. P.	Khanna Publisher Delhi	3 rd	2014


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Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
4	Rock mechanics for underground mining	Brady BHG, Brown ET.	AZ Dordrecht, The Netherlands: Kluwer Academic Publishers	3 rd	2004
5	Principles of Engineering Geology and Geotechnics	D. P. Krynine & W. R. Judd	CBS Publishers & Distributors, New Delhi	1 st	2007
6	Introduction to Rock Mechanics	Verma B. P.	Khanna Publisher Delhi.	3 rd	2014



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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPE428, Structural Audit
Prerequisite/s	0CVPC210, 0CVPC257
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE428_1	Discuss the basic concepts of Structural Audit and its legal aspects (K ²)
0CVPE428_2	Identify parameters of visual inspection for Structural Audit (K ²)
0CVPE428_3	Describe NDT and SDT techniques,(K ²)
0CVPE428_4	Summarize methods of interpretation of testing reports. (K ²)
0CVPE428_5	Explain various schemes of Repairs and Rehabilitation(K ²)

Course Contents:

Unit 1	Introduction to structural audit Definition, necessity of structural audit, structural failures: buildings, bridges, public transport systems, and industries etc., design life, insurance schemes.	07 Hrs.
Unit 2	Legal Aspects and Awareness Government acts and circulars, awareness about safety, precautions, guidelines for public and private participation, identifying and sharing risks, structural auditor registration procedures	06 Hrs.
Unit 3	Defect Mapping and Accessibility to Records Structural condition: visual inspection, reason of distress, safety & quality, availability of drawings, maintenance records, inspection records	08 Hrs.
Unit 4	Testing visual inspection, Nondestructive testing: Rebound hammer test, semi-destructive testing: UPSV test, Carbonation test, Half-cell potentiometer test, Cover meter test, Interpretation of tests, destructive testing, Computerized Testing	09 Hrs.
Unit 5	Audit Report Drawings, Specifications, Tenders for repairs, Structural audit reports	07 Hrs.
Unit 6	Repairs and Rehabilitation schemes Technicality of repairs, structural repairs and paintings, waterproofing work, treatment for vegetation, rehabilitation scheme, estimation of remedial measures	05 Hrs.

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Repair and Rehabilitation of Concrete Structures	Poonam I. Modi	PHI Learning Pvt. Ltd.	1 st	2016
2.	Maintenance, Repair and Rehabilitation works of buildings	P. C. Verghese	PHI Learning Pvt. Ltd.	1 st	2014
3.	Handbook on Repair and Rehabilitation of R. C. C. Buildings	Director General Works	CPWD, New Delhi, India	---	2019
4.	Nondestructive testing of materials and structures	Buyukozturk, O. and Tasdemir, M. A.	Springer Pvt. Ltd. New Delhi.	1 st	2013
5.	Structural Health Monitoring of long	You-Lin Xu and Yong Xia	CRC Press	1 st	2017



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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPE429, Environmental Impact Assessment.
Prerequisite/s	0CVPC303, 0CVPC309
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of the course, the student should be able to

0CVPE429_1	Discuss the basics of Environmental impact assessment.(K ²)
0CVPE429_2	Describe various components and methods of EIA matrices.(K ²)
0CVPE429_3	Apply various prediction tools for EIA (K ³)
0CVPE429_4	Summarize the concept of Socio Economic Impact Assessment. (K ²)
0CVPE429_5	Explain Environment management plan and applications of EIA in construction projects.(K ²)

Course Contents:

Unit 1	Basics of EIA: Historical development of Environmental Impact Assessment (EIA). EIA in Project Cycle. Legal and Regulatory aspects in India. – Types and limitations of EIA – Cross sectoral issues and terms of reference in EIA – Public Participation in EIA. EIA process- screening – scoping - setting – analysis – mitigation	08 Hrs.
Unit 2	Components and Methods For EIA Matrices – Networks – Checklists – Connections and combinations of processes - Cost benefit analysis – Analysis of alternatives – Software packages for EIA – Expert systems in EIA.	07 Hrs.
Unit 3	Prediction tools for EIA – Mathematical modeling for impact prediction – Assessment of impacts – air – water – soil – noise – biological – Cumulative Impact Assessment – Documentation of EIA findings – planning – organization of information and visual display materials – Report preparation. EIA methods in other countries.	06 Hrs.
Unit 4	Socio-Economic Impact Assessment: Definition of social impact assessment. Social impact assessment model and the planning process. Rationale and measurement for SIA variables. Relationship between social impacts and change in community and institutional arrangements. Individual and family level impacts. Communities in transition - neighborhood and community impacts. Selecting, testing and understanding significant social impacts. Mitigation and enhancement in social assessment. Environmental costing of projects.	08 Hrs.
Unit 5	Environmental Management Plan - preparation, implementation and review – Mitigation and Rehabilitation Plans – Policy and guidelines for planning and monitoring programmes – Post project audit – Ethical and Quality aspects of Environmental Impact Assessment.	07 Hrs.

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Unit 6	EIA in Construction Projects- Infrastructure –construction and housing Mining – Industrial - Thermal Power - River valley and Hydroelectric – coastal projects-Nuclear Power. EIA for coastal projects.	06 Hrs.
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Impact Assessment.	R. R. Barthwal	New Age International Publishers	2 nd	2012
02	Environmental Impact Assessment.	S.R. Khandeshwar N.S. Raman, A.R. Gajbhiye	IK International Publishing House Pvt. Ltd.	1 st	2019
03	Environmental Impact Assessment: Theory and Practice.	M. Anji Reddy	BS Publication	1 st	2016
04	Environmental Impact Assessment.	Dr. S Ramchandran	Air Walk Publication	1 st	2019

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Theory and Practice of Environment Impact and Assessment	S. A. Abbasi	Discovery Publishing House Pvt. Ltd	1 st	2003
02	Environmental Impact Assessment Methodologies	Y. Anjaneyulu	BS Publication	1 st	2010
03	Environmental Impact Assessment Management	Dr. U. Sai Jyoti (Ph.D)	SIA Publishers & Distributors Pvt Ltd	1 st	2019
04	Environmental Impact Assessment	Larry W Canter	McGraw Hill Higher Education	2 nd	1997


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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	OCVPE430, Safety Aspects in construction
Prerequisite/s	OCVPC205
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of the course, the student should be able to

OCVPE429_1	Discuss about the importance of safety management in construction.(K ²)
OCVPE429_2	Describe various safety standards and act. (K ²)
OCVPE429_3	Adapt safety culture, safety assurance in construction project. (K ³)
OCVPE429_4	Classify different causes of accident and safety precautions in various construction activities. (K ⁴)
OCVPE429_5	Recommend various safety activities for different construction work. (K ⁵)

Course Contents:

Unit 1	Introduction: Safety – Safety and productivity- Role of Government- National Safety Council, National safety awards.	06 Hrs.
Unit 2	Safety Standards and Legislation: Standards – ILO model code of safety regulation/legislation, factors Act, Boiler Act, Electricity Act, Workman's Compensation Act. National Safety Council.	07 Hrs.
Unit 3	Planning for Safety: Purpose for planning, planning procedure, range of plans, safety policies, Elements of safety policy, implementation.	07 Hrs.
Unit 4	Accidents: Types, Classification of Accidents, Causes, direct and indirect cost of accidents, objective of accident programs.	07 Hrs.
Unit 5	Safety in various construction Activities: Excavation, Scaffolding, Construction Equipment, False work, Roof work, Safety in Tunneling, Safety in work over water, Demolition, Explosives.	08 Hrs.
Unit 6	SMS (Safety Management system), Safety culture, Safety Assurance, Safety Promotion	07 Hrs.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Industrial Safety and Environment	Anupama prashar & Bansal	S.K. Kataria & Sons, New Delhi	4 th	2015
02	Construction Planning & Management	P.S. Gahlot & B.M. Dhir	New Age International (P) Ltd.	6 th	2010
03	Total Quality in construction projects	Ron Baden	Thomas Telford , London	8 th	2005
04	Concerned ISI for Safety in Construction	Bureau of Indian Standards, 2015			
05	Major Safety Control: A practical Manual	National Safety Council, India 1993			

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Hand book of OSHA Construction safety & Health	Charles D.Reese & James V. Edison.	CRS Press	3rd	2006
02	Safety Management in Construction Industry	A Manual for Project Managers NICMAR, Mumbai.	NICMAR, Mumbai	--	2013
03	Safety – health and working condition	Training Manual, National Safety Council, Mumbai, 2000.			
04	Safety Health & Welfare Manual				
05	Concerned ISI for safety in construction – Bureau of Indian Standards.				


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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPE431, Industrial Waste Water Treatment
Prerequisite/s	0CVPC303, 0CVPC309
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE I /MSE/ ISE II / ESE	10/30/10/50

Course Outcomes:

Upon successful completion of the course, the student should be able to

0CVPE431_1	Explain characterization of industrial waste water (K ²)
0CVPE431_2	Discuss various treatment processes and effluent quality standards for industrial waste water. (K ²)
0CVPE431_3	Describe various industrial waste water treatment techniques (K ²)
0CVPE431_4	Compute the various parameters of effluent treatment plant (K ¹)
0CVPE431_5	Classify various industrial waste water and manufacturing processes (K ¹)

Course Contents:

Unit 1	Basics of industrial waste water : Water use in industry, Industrial water quality requirements, Deterioration of water quality, Classification and characterization of Industrial wastewater, Monitoring of wastewater flow in industries, Quality and quantity variations in waste discharge, Water budgeting	06 Hrs.
Unit 2	Classification of Industrial Waste and Manufacturing processes: Water usage, Sources, Quantities, and characteristics of effluents, Pollution effects, Methods of treatment, utilization and disposal, in industries viz. sugar, distillery, dairy, pulp and paper mill, fertilizer, tanning, steel industry, textile, petroleum refining, chemical and power plant.	09 Hrs.
Unit 3	Effluent Quality Standard: Treat ability aspects of raw industrial wastewater with domestic sewage, Partially treated industrial wastewater with domestic sewage, and Completely treated industrial wastewater with domestic sewage. Stream and Effluent standards	06 Hrs.
Unit 4	Treatment Processes: Waste volume reduction, Waste strength reduction, Neutralization, Proportioning, Equalization. Reuse and recycling concepts.	07 Hrs.
Unit 5	Industrial waste water treatment techniques: for removal of specific pollutants in industrial , wastewaters, e.g., oil and grease, cyanide, fluoride, calcium, magnesium, toxic organics, heavy metals, radioactivity.	08 Hrs.


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Unit 6	Effluent treatment plant: Concept, Objectives, Methodology, Cost benefit analysis, Design, Operation and maintenance.	06 Hrs.
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Theories and Practices of Industrial waste treatment	Nelson Nemerow	Addison-Wesley	1 st	1963
02	Waste Water Treatment	M.N.Rao	CBS Publishers and distributors Pvt. Ltd	3 rd	2011
03	Industrial Waste Water	A.D. Patwardhan	Prentice Hall India Learning Private Limited	2 nd	2017
04	Wastewater Engineering: Treatment and Reuse	Metcalf and Eddy	McGraw Hill Publication Education.	4 th	2017

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Industrial Waste Water	Joseph D. Edwards	CRC Press	1 st	1995
2	Industrial Waste Water Pollution Control	W. Eckenfelder	McGraw Hill Publication Education.	3 rd	1999
3	The Industrial Waste Water Systems Handbook	Ralph L. Stephenson James B. Blackburn Jr.	CRC Press	1 st	1997
4	Water and Waste Water Engineering	Mackenzie L. Davis	McGraw Hill Publication Education.	1 st	2017



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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPC457, Entrepreneurship Laboratory
Prerequisite/s	0CVPC423
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC423_1	Survey of existing small scale industry (K ⁴)
0CVPC423_2	Develop a business plan based on financial, technical, and commercial viability (K ⁶)
0CVPC423_3	Integrating project management skills and financial analysis for developing a business plan (S ⁴)
0CVPC423_4	Professionally present the data in written form and orally (S ⁶)
0CVPC423_5	Display ethical and professional behavior while developing the business plan (A ³)

Course Contents:

Expt. 1	Mini Project : Startup of a new enterprise
	Identifying business opportunity or selection of product
	Market research/survey for the identified business idea
	Acquisition of documents required for starting a new business
	Formulating a financial plan for the new business
	Formulating various marketing techniques for the new business
Expt. 2	Presentation on case studies of successful entrepreneurs
Expt. 3	Preparation of report based on visit to any one small scale industry.
Expt. 4	Presentation on the above mini project

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	The practice of entrepreneurship	Geofferey Meredith	International Labour Office	4 th	1982
02	Entrepreneurship	Gordon Baty	Beardbooks	3 rd	2003
03	The dynamics of entrepreneurial development and management	Vasant desai	Himalaya Publishing House	2 nd	2011
04	Entrepreneurship	Robert Hisrich	Mcgraw Hill Education	1 st	2018


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Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Entrepreneurship & small business management	M. B. Shukla	Kitab Mahal	2 nd	2007
02	Entrepreneurial development	Dr. S. S. Khanka	S. Chand	4 th	2012
03	Entrepreneurship	T. V. Rao	Cengage	1 st	2012
04	Entrepreneurship development	Abhinav Ganpule	Jatayu Prakashan	1 st	2018


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Course Details:

Class	B. Tech, Sem. – VIII
Course Code and Course Title	0CVPE461, Management Information System Laboratory
Prerequisite	--
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE461_1	Demonstrate installation and configuration of Oracle/MySQL/SQL Server/Postgre SQL etc. (K ³)
0CVPE461_2	Apply basic of MIS in development of data management system (K ³)
0CVPE461_3	Interpret the problem statement of an enterprise, identify the need, analyse the problem (K ⁴)
0CVPE461_4	Use MIS software as modern tool for data management (S ²)
0CVPE461_5	Display professional & ethical responsibility while performing laboratory work (A ³)

Course Contents:

Software training on database management software: Oracle/ MS Access/ SQL Server/ Posgrace SQL/HP Vertica.

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	McGraw Hill Education	6 th	2011
02	Database Systems- A practical approach to Design, Implementation	Thomos Connolly, Carolyn Begg	Pearson Education.	4 th	2009
03	Database Systems – Design, Implementation and Management	Rob & Coronel	Thomson Course Technology	5 th	2008
04	Database Management Systems	Raghu Ram Krishnan	McGraw Hill	3 rd	2002


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Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Database Systems	RamezElmasri and Shamkant Navathe	Pearson Education	4 th	2007
02	Database Systems: Design, Implementation and Management	Peter Rof, Carlos Coronel	Cengage Learning	7 th	2014
03	Principles of Database Systems	J. D. Ullman	Galgotia publications	1 st	2011
04	SQL: A Complete Reference	Alexis Leon, Mathews Leon	McGraw Hill Education	1 st	2002



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Course Details:

Class	B. Tech, Sem. – VIII
Course Code and Course Title	0CVPE462, Structural Dynamics Laboratory
Prerequisite/s	0CVPE425
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	00/50

Course Outcomes:

Upon successful completion of this course, the student will be able to:

0CVPE462_1	Calculate the vibrations in a system. (K ³)
0CVPE462_2	Compare the free and force vibrations of a system. (K ⁴)
0CVPE462_3	Examine the effect of Damping on a system. (K ⁴)
0CVPE462_4	Expresses the knowledge of dynamics in structural analysis. (A ⁴)
0CVPE462_5	Use of various vibration measuring instruments to carry out structural analysis. (S ²)


Course Contents:

At least 08 experiments from the following

Expt. No.	Title of Experiment
1	To study instrumentations in structural dynamics
2	Study the structural Dynamics and types of analysis.
3	To find natural frequency of SDOF system
4	To find natural frequency of two DOF system
5	Vibration isolation of a system
6	To observe phenomenon of vibration absorption
7	Study of different types of vibrations induced in structure.
8	Dynamics of free-standing rigid bodies under base motions
9	Study of Multi Degree of Freedom system.

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Structural Dynamics – Theory and Computations	Mario Paz	CBS publishers	4 th	1997
02	Earthquake Resistant Design of Structures	Agarwal.P and Shrikhande.M	Prentice Hall of India Pvt. Ltd	2 nd	2007
03	Dynamics of Structures	Clough. R. W, and Penzien J	McGraw-Hill Education / Asia	2 nd	1993
04	Dynamics of Structures	Humar J. L.	Prentice Hall Inc.	3 rd	1990


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Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Elements of Earthquake Engineering	Jai Krishna, Chandrasekaran. A. R., and Brijesh Chandra	South Asia Publishers	3 rd	1994
02	Design of Earthquake Resistant Buildings	Minoru Wakabayashi	Mc Graw – Hill Book Company	3 rd	1986
03	Dynamics of structures – Theory and applications to Earthquake Engineering	Anil K Chopra	Prentice Hall Inc.	3 rd	2007
04	Structural Dynamics	Martin Williams	CRS Press, Taylor and Francis Group	3 rd	2016

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Course Details:

Class	B. Tech, Sem.- VIII
Course Code and Course Title	0CVPE463, Site Investigations Methods and Practices Laboratory
Prerequisite/s	0CVES304, 0CVPC351
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50/00

Course Outcomes:

Upon successful completion of the course, the student should be able to

0CVPE463_1	Explain subsurface exploration techniques with its suitability. (K ²)
0CVPE463_2	Apply knowledge geophysical methods and its interpretation techniques. (K ³)
0CVPE463_3	Compare various test results of soil samples for site investigation. (K3)
0CVPE463_4	Communicate effectively about laboratory work both orally and in writing journals. (S ²)
0CVPE463_5	Practice professional and ethical behavior to carry forward in their life. (A ²)

Course Contents:

Sr. No.	Title of Experiment
1.	Geological and topographical study of selected site.
2.	Different Soil sample tests from site: [5 Practical sessions required]
3.	Electrical Resistivity Survey of the site [2 Practical Sessions]
4.	Preparation of subsurface lithological map of the site,
5.	Preparation of detail site investigation report of site. [2 Practical Sessions]

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Site Investigation Practice	Clayton, Mathews and Simons	Halsted Press	2 nd	1982
02	A short course in Geotechnical site investigation	Simons, Menzies, Matthews	Thomson Telford Ltd, London	1 st	2002
03	Site Investigation Practice	Joyce, M.D.	ESFN, SPON Publishers	1 st	1982
04	Advances in Site Investigations Practices	C. Craig	ICE Publications	1 st	2014


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Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Geotechnical Engineering Investigation Handbook	R.E. Hunt	CRC Press	2 nd	2005
02	Geotechnical and Geophysical Site Characterization	An-Bin Huang, Paul W Mayne	CRC Press	1 st	2008
03	Subsurface exploration and sampling of soils for Civil Engg. purposes	Hvorslev M.J.	Waterways Experiment Station	1 st	1949
04	An Introduction to Geophysical Exploration	Kearey, Brooks, Hill	Wiley India	3 rd	2016
05	Site Investigation in Constructions	Site Investigation Steering Group	ICE Publications	1 st	2014


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Course Details:

Class	B. Tech, Sem.- VIII
Course Code and Course Title	0CVPE464, Advanced Engineering Geology and Rock Mechanics Laboratory
Prerequisite/s	0CVES353
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50/00

Course Outcomes:

Upon successful completion of the course, the student should be able to

0CVPE464_1	Identify engineering properties rocks. (K ²)
0CVPE464_2	Draw sections of geological structural maps with intrusion and faults. (K ³)
0CVPE464_3	Interpret results from electrical resistivity meter. (K ³)
0CVPE464_4	Communicate effectively about laboratory work both orally and in writing Journals. (S ²)
0CVPE464_5	Practice professional and ethical behavior to carry forward in their life. (A ²)

Course Contents:

Sr. No.	Title of Experiment
1.	Study of geological map of Maharashtra state and India
2.	Study of rock mechanics and various properties of common building stones
3.	Structural geological maps with faults [2 Practical Sessions]
4.	Structural geological maps with inclined dykes. [2 Practical Sessions]
5.	Three point problems.
6.	Problems on width of outcrop.
7.	Use of electrical resistivity method for determining depth of bedrock or groundwater. [2 Practical Sessions]
8.	Preparation of Rock core log
9.	Educational study tour to the places important from civil engineering point of view.

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering and General Geology	Prabin Singh, S. K.	Katariya and sons, Delhi	8 th	2008
02	A Text Book of Engineering Geology	R. B. Gupte	Vidyarthi Griha Prakashan, Pune	1 st	2009
03	A Text Book of Geology	G. B. Mahapatra	CBS Publication	2 nd	2009
04	Engineering Geology for Civil Engineers -	Dr. D. V. Reddy	Vikas Publishing House Pvt. Ltd.	1 st	2010
05	Textbook of Engineering Geology	N. Chenna Kesavulu	Laxmi Publications Pvt. Ltd.	3 rd	2018

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Practical Geologist: The Introductory Guide to the Basics of Geology and to Collecting and Identifying Rocks	Dougal Dixon	Touchstone Publisher	8 th	1992
02	Groundwater Hydrology	Tood D. K.	Wiley & Son, New York	2 nd	2010
03	Introduction to Rock Mechanics	Verma B. P.	Khanna Publisher Delhi	3 rd	2014
04	Principles of Engineering Geology and Geotechnics	D. P. Krynine & W. R. Judd	CBS Publishers & Distributors, New Delhi	5 th	2018
05	Practical Field Geology	J H Farrell	Forgotten Books	1 st	2018



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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPE465, Structural Audit Laboratory
Prerequisite/s	0CVPC210, 0CVPC257
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPE465_1	Identify reinforcement position in the concrete (K²)
0CVPE465_2	Calculate strength of concrete by different equipment(K²)
0CVPE465_3	Report of visual inspection and structural audit of structure(K²)
0CVPE465_4	Communicate effectively about laboratory work both orally and in writing journals. (S2)
0CVPE465_5	Practice professional and ethical behavior to carry forward in their life. (A2)

Course Contents:

Sr. No.	Title of Experiment
1.	Assess the quality and strength of concrete by using Rebound Hammer Test.
2.	Assess the quality and strength of concrete with help of Ultrasonic Pulse Velocity Test.
3.	Study the Reinforcement Locating in the concrete
4.	Study the quality and strength of concrete with help of Concrete Core Extraction
5.	Visual Inspection and Structural audit report for brick Masonry Building
6.	Visual Inspection and Structural audit report for Stone Masonry Building
7.	Visual Inspection and Structural audit report for RCC Building/ framed structure.
8.	Preparation of site visit report

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1.	Repair and Rehabilitation of Concrete Structures	Poonam I. Modi	PHI Learning Pvt. Ltd.	1 st	2016
2.	Maintenance, Repair and Rehabilitation works of buildings	P. C. Verghese	PHI Learning Pvt. Ltd.	1 st	2014
3.	Handbook on Repair and Rehabilitation of R. C. C. Buildings	Director General Works	CPWD, New Delhi, India	---	2019
4.	Nondestructive testing of materials and structures	Buyukozturk, O. and Tasdemir, M. A.	Springer Pvt. Ltd, New Delhi.	1 st	2013
5.	Structural Health Monitoring of long	You-Lin Xu and Yong Xia	CRC Press	1 st	2017

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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPE466, Environment Impact Assessment Laboratory
Prerequisite/s	0CVPC357, 0CVPC352
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC357_1	Calculate the level of pollution in industrial waste water. (K ²)
0CVPC357_2	Observe level of noise pollution and air pollution from Industry (K ²)
0CVPC357_3	Review of various MSW and EIA of a specific Industry (K ²)
0CVPC357_4	Proficiently function as an individual and as a team member while designing EIA of specific industry. (S ¹)
0CVPC357_5	Assess impact of engineering solution in environmental and social context (A ²)

Course Contents:

Exp. No.	Title of Experiments
1	Study of pollution in industrial wastewater with different parameters pH, COD, BOD.
2	Study of pollution in industrial wastewater with different parameters DO, Oil and Grease.
3	Study of Air pollutants in nearby industrial area.
4	Study of Noise pollution level in nearby industrial area.
5	Study of various types of MSW in selected areas
6	Visit to industrial wastewater treatment plant
7	Study of existing EIA report for one specific Industry.
8	Study of Introduction of Software related to EIA

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Impact Assessment.	R. R. Barthwal	New Age International Publishers	2 nd	2012
02	Environmental Impact Assessment.	S.R. Khandeshwar N.S. Raman, A.R. Gajbhiye	IK International Publishing House Pvt. Ltd.	1 st	2019
03	Environmental Impact Assessment: Theory and Practice.	M. Anji Reddy	BS Publication	1 st	2016
04	Environmental Impact Assessment.	Dr. S. Ramchandran	Air Walk Publication	1 st	2019


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Theory and Practice of Environment Impact and Assessment	S. A. Abbasi	Discovery Publishing House Pvt. Ltd	1 st	2003
02	Environmental Impact Assessment Methodologies	Y. Anjaneyulu	BS Publication	1 st	2010
03	Environmental Impact Assessment Management	Dr. U. SaiJyoti (Ph.D)	SIA Publishers & Distributors Pvt Ltd	1 st	2019
04	Environmental Impact Assessment	Larry W Canter	McGraw Hill Higher Education	2 nd	1997



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Course Details:

Class	B. Tech, Sem.-VII
Course Code and Course Title	0CVPE467, Safety Aspects in Construction Laboratory
Prerequisite/s	1CVPC205,0CVPC430
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC467_1	Observe current practices followed on site related with safety management.(K ²)
0CVPC467_2	List different safety equipment and safety acts in construction project. (K ³)
0CVPC467_3	Recommend suitable site safety management system for a construction project. (K ³)
0CVPC467_4	Professionally present site safety scenario both verbally and with the help of poster. (S ¹)
0CVPC467_5	Display professional and ethical behavior while collecting data from site. (A ²)

Course Contents:

Exp. No.	Title of Experiments
1	Make a presentation on current scenario of construction site related with accidents and safety.
2	List out and explain different act used in safety management.
3	Make a presentation on safety precaution for different construction activities.
4	Collect information of accidents happened on construction site and list out the causes of accidents and cost associated with it.
5	Make a suitable safety management system for any construction site.
6	List out and give importance of safety equipment used on site by poster presentation.
7	Design of safety management system for any one civil construction project.
8	Safety Awareness Camp in nearby area.(Construction site)

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Industrial Safety and Environment	Anupama prashar & Bansal	S.K. Kataria & Sons, New Delhi	4 th	2015
02	Construction Planning & Management	P.S. Gahlot & B.M. Dhir	New Age International (P) Ltd.	6 th	2010

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03	Total Quality in construction projects	Ron Baden	Thomas Telford , London	8 th	2005
04	Concerned ISI for Safety in Construction	Bureau of Indian Standards, 2015			
05	Major Safety Control: A practical Manual	National Safety Council, India 1993			

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Hand book of OSHA Construction safety & Health	Charles D.Reese & James V. Edison.	CRS Press	3rd	2006
02	Safety Management in Construction Industry	A Manual for Project Managers NICMAR, Mumbai.	NICMAR, Mumbai	--	2013
03	Safety – health and working condition	Training Manual, National Safety Council, Mumbai, 2000.			
04	Safety Health & Welfare Manual				
05	Concerned ISI for safety in construction – Bureau of Indian Standards.				


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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPE468, Industrial Waste Water Laboratory
Prerequisite/s	0CVPC352, 0CVPC357
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE / ESE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVPC357_1	Calculate the level of pollution in industrial wastewater. (k^2)
0CVPC357_2	Observe various units of industrial wastewater treatment plant(k^2)
0CVPC357_3	Compute the of various units of wastewater treatment Plant(k^2)
0CVPC357_4	Proficiently function as an individual and as a team member while designing industrial waste water treatment plant (S^3)
0CVPC357_5	Practice education of industrial waste water system in environmental and social context. (A^5)

Course Contents:

Exp. No.	Title of Experiments
1	Determination of various of industrial wastewater quality parameters (Physical chemical parameters)
2	To determine Solids in Industrial Sewage: Total Solids, Suspended Solids and Volatile
3	Determination of DO of industrial wastewater
4	Determination of BOD of industrial wastewater
5	Determination of COD of industrial wastewater
6	Determination of Oil and Grease content of industrial waste water.
7	Visit to industrial effluent treatment plant.(Sugar, Dairy, etc.)
8	Design of industrial effluent treatment plant for any one industry.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Sewage disposal and air pollution engineering	S.K.Garg	Khanna publishers	33 rd	2015
02	Water Supply & Sanitary Engineering	G. S. Birdie	Dhanpat Rai & Sons, New Delhi	18 th	2007
03	Waste Water Treatment, Disposal and Reuse	Metcalf and Eddy	Tata McGraw Hill Publications	2 nd	2000

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04	Wastewater Engineering	B.C. Punmia, Jain	Laxmi Publications (P) Ltd	2 nd	1998
05	Air pollution	Rao M. N. and Rao H.V.	Tata McGraw Hill	2 nd	1990

Reference Books/manuals:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Manual of Water & Wastewater Analysis	-	NEERI Publication.	2 nd	2002
02	Standard Methods for Examination of Water and Wastewater	Water Pollution Control Federation, American Water Works Association, Washington DC.	American Publication	1 st	1995
03	Environmental Engineering	H.S. Peavy, D.R. Rowe	McGraw Hill	2 nd	1985
04	Chemistry for Environment Engineering	Sawyor and McCarthy	Tata McGraw Hill Publishing Company Ltd.	9 th	1967


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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVPC458, Mini Project – II (Structural design and drawing-II)
Prerequisite/s	0CVPC402,0CVPC421
Teaching Scheme: Practical	04
Credits	02
Evaluation Scheme: ISE / ESE	50/50

Course Outcomes:

Upon successful completion of the course, the student should be able to

0CVPC458_1	Calculate primary and combination design loads on building consulting appropriate standards and handbooks (K ²)
0CVPC458_2	Draw the detailing of design data on sheet (K ³)
0CVPC458_3	Design the component parts of the building manually (K ⁶)
0CVPC458_4	Create model and analyze building using any standard software (K ⁶)
0CVPC458_5	Function effectively as an individual and as a team member while structural designing (S ²)
0CVPC458_6	Enhance in lifelong learning structural drawing and design (A ²)

Course Contents:

Course Contents:		No. of practical turns
1.	This course deals with design of various structural elements such as R.C. beams, slabs, stairs, columns & footings using modern Limit State Method. Design of these elements is made using guidelines of I.S. 456:2000, a code of practice for plain & reinforced cement concrete. Analysis and design of RCC framed building- manually and using any standard software, sketching the detailing of the reinforcement. Residential G+2 storied building. (Minimum 150 sq. mt.) Drawings prepared shall indicate ductility details as per the provision in IS: 13920.	18
2.	Retaining wall (cantilever or counter fort type)	4
3.	Analysis and design of RCC framed structure using software.	4
4.	At least one site visit to be conducted to show the onsite detailing.(Report on site visit)	2

Note: 1. Project should be done individually.

2. Drawing details should be on full empirical drawing sheets drawn by hand.


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Text Books :					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Reinforced Concrete Structural element	Purushotaman.P	McGraw Hill Publication Co. Ltd.	4 th	1992
02	Reinforced Concrete VOL..II (Advanced Reinforced Concrete)	H.J Shah	Charotar Publishing House Pvt. Ltd	7 th	2014
03	Prestressed Concrete	N Krishna Raju	McGraw Hill Publication Co. Ltd.	5 th	2010
04	Limit State Theory and Design	Karve and Shah	Structures Publications, Pune	2 nd	2013

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Design of Reinforced Concrete Structures	S.Ramamrutham	Dhanpat Rai Publishing Company	16 th	2010
02	Limit State Design	B.C.Punmia, A.K.Jain,	Laxmi Publications Ltd.	1 st	2017
03	Prestressed Concrete	N.Rajgopalan	Narosa Publishing House, Mumbai	2 nd	2014
04	Fundamentals of Reinforced Concrete	Sinha and Roy	S. Chand and Company Ltd, New Delhi	3 rd	2013



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Course Details:

Class	B. Tech, Sem.- VIII
Course Code and Course Title	OCVPR459, Project Phase – II
Prerequisite/s	---
Teaching Scheme: Practical	00/06
Credits	10
Evaluation Scheme: ISE / ESE (OE)	100/100

Course Outcomes:

Upon successful completion of the course, the student should be able to

OCVPR459_1	Identify the real life institutional, social, local industrial problems relevant to the societal and environmental issues for sustainable development. (K³ A³)
OCVPR459_2	Formulate, analyze complex engineering problems and give cost-effective, optimal solution considering societal, health, legal, safety and cultural issues. (K⁴ A³)
OCVPR459_3	Design/Development of system components or processes that meet the specified needs by using advance tools/ techniques/ resources (K⁵ S³)
OCVPR459_4	Function effectively as an individual or as a team for understanding of the engineering and management principles and apply these to manage projects maintaining professional and ethical principles. (S³ A²)
OCVPR459_5	Communicate effectively on complex engineering activities, write effective reports, design documentation and make effective presentations. (S³)
OCVPR459_6	Engage in independent and life-long learning in the broadest context of technological change (A³)

Course Contents:

I	<ol style="list-style-type: none"> The student group should continue the project work on the selected topic as per the formulated methodology under the same supervisor. Students are permitted to execute major part of their project work at the premises of identified industry. Students should develop and implement an original research or a creative project with the ability to explain the conceptual viability of the project and describe the major components involved. At the end of the semester, after completing the work to the satisfaction of the supervisor and review committee, a detailed report should be prepared and submitted to the department.
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Course Details:

Class	B. Tech, Sem.-VIII
Course Code and Course Title	0CVAC460, Stress Management
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial	1/0
Credits	-
Evaluation Scheme:	-

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CVAC212_1	Discuss Stress and discuss its types. (K ²)
0CVAC212_2	Describe relation between stress and brain reaction. (K ²)
0CVAC212_3	Explain Occupational Stress interventions. (K ²)
0CVAC212_4	Summarize Mindfulness techniques. (K ²)
0CVAC212_5	Apply Cognitive Approach to Stress Management. (K ³)

Course Contents:

Unit 1	Stress Introduction, Definition, Types	01Hrs.
Unit 2	Occupational Stress Occupational stress, it's consequences, causes	02Hrs.
Unit 3	Brain and Stress Amygdala reaction, facing and accepting emotions, gaining control over your stress, learning self-compassion	03Hrs.
Unit 4	Occupational Stress intervention Developing Time management skills and assertive skills to manage Stress	02Hrs.
Unit 5	Mindfulness and Stress Management Mindfulness, mind-body connection, Mindfulness Techniques	03Hrs
Unit 6	Cognitive Approach to Stress Management Thinking Traps and Stress Management, Becoming Cognitively Flexible Disputing Thinking Error	03Hrs.

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Overcoming your Workplace Stress	Matin R. Bamber	Routledge Taylor & Francis group	1 st	2011
02	The Stress Proof Brain	Melanie Greenberg	New Harbinger Publication, Inc.	1 st	2016
03	Mindfulness Stress Reduction Workbook	Bob Stahl, Elisha Goldstein	New Harbinger Publication, Inc.	4 th	2010


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