St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF CIVIL ENGINEERING

I YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits	Internal (CIE)	External (SEE)	Total
1	MA101BS	Linear Algebra and Calculus	3	1	0	4	30	70	100
2	EP102BS	Engineering Physics	3	1	0	4	30	70	100
3	CS105ES	Programming for Problem Solving	3	1	0	4	30	70	100
4	ME106ES	Engineering Graphics	1	0	4	3	30	70	100
5	EP103BS	Engineering Physics Lab	0	0	3	1.5	30	70	100
6	CS107ES	Programming for Problem Solving Lab	0	0	3	1.5	30	70	100
		Total	**10**	**3**	**10**	**18**	**180**	**420**	**600**
Mandatory Course (Non-Credit)									
7	*ES104BS	Environmental Science	3	0	0	-	100	-	100
8	*TS109	Technical Seminar	0	0	2	-	100	-	100
		Induction Programme							

I YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits	Internal (CIE)	External (SEE)	Total
1	MA201BS	Advanced Calculus	3	1	0	4	30	70	100
2	CH202BS	Engineering Chemistry	3	1	0	4	30	70	100
3	ME208ES	Engineering Mechanics	3	1	0	4	30	70	100
4	ME207ES	Engineering Workshop	1	0	3	2.5	30	70	100
5	EN203HS	Professional English	2	0	0	2	30	70	100
6	CH204BS	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
7	EN205HS	English Language and Communication Skills Lab	0	0	2	1	30	70	100
		Total	**12**	**3**	**8**	**19**	**210**	**490**	**700**
Mandatory Course (Non-Credit)									
8	*MP209	Micro Project	0	0	2	-	100	-	100

*MC – Satisfied/Unsatisfied
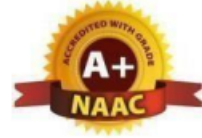
DEPARTMENT OF CIVIL ENGINEERING

II YEAR I SEMESTER

S.No.	Course Code	Course Title	Hours per week			Credits	Maximum Marks		
			L	T	P		Internal CIE	External SEE	total
1.	PS301BS	Probability Statistics and Complex variables	3	1	0	4	30	70	100
2.	CE302PC	Strength of Materials – I	3	1	0	4	30	70	100
3.	CE303PC	Surveying and Geomatics	3	0	0	3	30	70	100
4.	CE304PC	Fluid Mechanics	3	0	0	3	30	70	100
5.	EE305ES	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100
6.	CE306PC	Surveying Laboratory	0	0	2	1	30	70	100
7.	CE307PC	Strength of Materials Laboratory	0	0	3	1.5	30	70	100
8.	CE308PC	Fluid Mechanics Laboratory	0	0	3	1.5	30	70	100
		Total Credits	**15**	**02**	**8**	**21**	**240**	**560**	**800**
	Mandatory course								
9.	*GS309MC	*Gender Sensitization Lab	0	0	2	-	**100**	**-**	**100**

II YEAR II SEMESTER

S.No.	Course Code	Course Title	Hours per week			Credits	Maximum Marks		
			L	T	P		Internal CIE	External SEE	total
1.	CE401PC	Structural Analysis-I	3	1	0	4	30	70	100
2.	CE402PC	Strength of Materials - II	3	1	0	4	30	70	100
3.	CE403PC	Hydraulics and Hydraulic Machinery	3	0	0	3	30	70	100
4.	CE404ES	Engineering Geology	3	0	0	3	30	70	100
5.	CE405PC	Building Materials Construction and Planning	3	0	0	3	30	70	100
6.	CE406PC	Computer Aided Drafting of Buildings Laboratory	0	0	2	1	30	70	100
7.	CE407ES	Engineering Geology Laboratory	0	0	3	1.5	30	70	100
8.	CE408PC	Hydraulics and Hydraulic Machinery Lab	0	0	3	1.5	30	70	100
		Total Credits	**15**	**02**	**8**	**21**	**240**	**560**	**800**
	Mandatory course								
9.	*CI309MC/ *CI407MC/ *CI707MC/	*Constitution of India	3	0	0	-	**100**	**-**	**100**

*MC - Satisfactory/ Unsatisfactory

DEPARTMENT OF CIVIL ENGINEERING

III YEAR I SEMESTER

S.No.	Course Code	Course Title	Hours per week			Credits	Maximum Marks		
			L	T	P		Internal CIE	External SEE	total
1.	CE501PC	Geotechnical Engineering	3	0	0	3	30	70	100
2.	CE502PC	Structural Engineering – I (RCC)	3	1	0	4	30	70	100
3.	CE503PC	Structural Analysis-II	3	0	0	3	30	70	100
4.	BE504MS	Engineering Economics and Accountancy	2	0	0	2	30	70	100
5.		Professional Elective-I	3	0	0	3	30	70	100
6.	CE506PC	Transportation Engineering	3	0	0	3	30	70	100
7.	CE507PC	Highway Engineering and Concrete Technology Laboratory	0	0	3	1.5	30	70	100
8.	CE508PC	Geotechnical Engineering Lab	0	0	3	1.5	30	70	100
9.	EN509HS	Advanced Communication Skills Laboratory	0	0	2	1	30	70	100
		Total Credits	**17**	**01**	**8**	**22**	**270**	**630**	**900**
	Mandatory course								
10.	* IP510MC/ * IP609MC	Intellectual Property Rights	3	0	0	0	100	-	**100**

III YEAR II SEMESTER

S.No.	Course Code	Course Title	Hours per week			Credits	Maximum Marks		
			L	T	P		Internal CIE	External SEE	Total
1.	CE601PC	Structural Engineering – II (STEEL)	3	1	0	4	30	70	100
2.	CE602PC	Hydrology & Water Resources Engineering	3	1	0	4	30	70	100
3.	CE603PC	Water and Wastewater Engineering	3	0	0	3	30	70	100
4.	CE604PC	Foundation Engineering	3	0	0	3	30	70	100
5.		Open Elective –I	3	0	0	3	30	70	100
6.		Professional Elective – II	3	0	0	3	30	70	100
7.	CE607PC	Computer Aided Design Laboratory	0	0	2	1	30	70	100
8.	CE608PC	Environmental Engineering Laboratory	0	0	2	1	30	70	100
		Total Credits	**18**	**02**	**04**	**22**	**240**	**560**	**800**
	Mandatory course								
10.	* BS609HS	*Environmental Science	3	0	0	-	100	-	**100**

*MC - Satisfactory/ Unsatisfactory

Note- Environmental Science should be registered by Lateral Entry Students only

DEPARTMENT OF CIVIL ENGINEERING

IV YEAR I SEMESTER

S.No.	Course Code	Course Title	Hours per week			Credits	Maximum Marks		
			L	T	P		Internal CIE	External SEE	Total
1.	CE701PC	Estimation, Costing & Project Management	3	1	0	4	30	70	100
2.		Open Elective-II	3	0	0	3	30	70	100
3.		Professional Elective – III	3	0	0	3	30	70	100
4.		Professional Elective – IV	3	0	0	3	30	70	100
5.	SM702MS	Professional Practice law & Ethics	2	0	0	2	30	70	100
6.	CE708PR	Industry Oriented Mini Project/ Summer Internship	0	0	0	2	-	100	100
7.	CE709PR	Project Stage- I	0	0	6	3	100	-	100
8.	CE710PR	Seminar	0	0	2	1	100	-	100
		Total Credits	**14**	**1**	**12**	**21**	**350**	**450**	**800**

IV YEAR II SEMESTER

S.No.	Course Code	Course Title	Hours per week			Credits	Maximum Marks		
			L	T	P		Internal CIE	External SEE	Total
1.		Open elective- III	3	0	0	3	30	70	100
2.		Professional Elective-V	3	0	0	3	30	70	100
3.		Professional Elective-VI	3	0	0	3	30	70	100
4.	CE804PR	Project Stage - II	0	0	14	7	30	70	100
		Total Credits	**9**	**0**	**14**	**16**	**120**	**280**	**400**

LINEAR ALGEBRA AND CALCULUS

I B. TECH- I SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
MA101BS	**B. Tech**	**3**	**1**	**0**	**4**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn

1. Types of matrices and their properties.
2. Concept of a rank of the matrix which is used to know the consistency of system of linear equations.
3. Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
4. Determine the maxima and minima of functions of several variables by using partial differential coefficients.
5. Evaluation of improper integrals using Beta and Gamma functions.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations.
2. Find the Eigen values and Eigen vectors, reduce the quadratic form to canonical form using orthogonal transformations.
3. Apply the Mean value theorems for the single variable functions.
4. Apply maxima and minima for functions of several variables and Lagrange's method of multipliers.
5. Evaluate the improper integrals using Beta and Gamma functions.

UNIT-I	**MATRICES**	**Classes: 12**

Matrices: Types of Matrices, Symmetric, Hermitian, Skew-symmetric, Skew-Hermitian, orthogonal matrices, Unitary Matrices, rank of a matrix by Echelon form and Normal form, Inverse of Non-singular Matrices by Gauss-Jordan method, System of linear equations, solving system of Homogeneous and Non- Homogeneous equations. Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II	**EIGEN VALUES AND EIGEN VECTORS**	**Classes:12**

Linear Transformation and Orthogonal Transformation, Eigen values and Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III	MEAN VALUE THEOREMS	Classes:12

Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Applications: Finding areas, volumes of revolutions of curves (Only in Cartesian coordinates)

UNIT-IV	FUNCTIONS OF SEVERAL VARIABLES	Classes: 12

Definitions of Limit and continuity. Partial Differentiation; Euler's Theorem; Total derivative, Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers. Application: Errors and approximations.

UNIT-V	FIRST ORDER PARTIAL DIFFERENTIAL EQUATIONS AND SPECIAL FUNCTIONS	Classes: 12

First Order linear and nonlinear Partial Differential Equations, Method of separation of variables.

Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition.
2. Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2017.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

REFERENCE BOOKS

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,2010.

2. B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint,2002.

WEB REFERENCES

1. https://www.efunda.com/math/gamma/index.cfm

2. https://ocw.mit.edu/resources/#Mathematics

3. https://www.sosmath.com/

4. https://www.mathworld.wolfram.com/

E -TEXT BOOKS

1. https://www.e-
2. booksdirectory.com/listing.php?category=4https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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ENGINEERING PHYSICS

I B. TECH- I SEMESTER (R 20)								

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
EP102BS	**B. Tech**	**3**	**1**	**0**	**4**	**30**	**70**	**100**

COURSE OBJECTIVES:

To learn
1. The basic concepts of mechanics in a broader sense with a view today foundation for the core engineering courses.
2. The competence and understanding the concepts of Harmonic oscillations.
3. The behavior of waves in one dimension.
4. The wave nature of light through the phenomena of Interference and Diffraction.
5. The basic principles and working of laser and optical fibers.

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to
1. Understand the basic concepts of mechanics.
2. Differentiate the types of oscillations.
3. Explain the behavior of waves in one dimension and its types.
4. Get knowledge about interference and Diffraction.
5. Analyze the properties of laser and its propagation in optical fiber.

UNIT-I	**INTRODUCTION TO MECHANICS**	**Classes: 12**

Introduction to scalars and vectors, Transformation of scalars and vectors under rotation Forces of Nature, Newton's laws and its completeness in describing particle motion, Galilean Transformation, Form invariance of Newton's second law, Solving Newton's equations o motion in polar and Cylindrical coordinates, basic concepts of constraints and friction, D Alembert's principle.

UNIT-II	**SIMPLE HARMONIC OSCILLATIONS**	**Classes: 12**

Introduction to Simple Harmonic Motion, Motion of Simple Harmonic Oscillator, Wave equation, frequency and energy of Simple Harmonic Oscillator, Complex number notation and phasor representation of SHM, Mechanical and Electrical oscillator, Free oscillation, Damped oscillation: Critical, Heavy and Light damping, Energy decay and Quality factor Forced oscillation: Steady state motion and power absorption by oscillator.

UNIT-III	**WAVES IN ONE DIMENSION**	**Classes:12**

General wave equation on a string, Transverse wave on a string, Reflection and transmission of waves at a boundary, standing waves and their Eigen frequencies, Harmonicwaves, Longitudinal waves on a string, Acoustic waves and speed of sound, Standing sound waves.

UNIT-IV	INTERFERENCE AND DIFFRACTION	Classes: 12

Introduction to Interference, Huygens's principle, Superposition of waves, Interference of light: Wave front and amplitude splitting, Young's double slit experiment, Newton's rings, Michelson's interferometer.

Introduction to Diffraction, Fraunhofer diffraction from a single slit and N -slits, Diffraction grating – Resolving Power, Rayleigh criterion for limit of resolution.

UNIT-V	LASER AND FIBRE OPTICS	Classes: 12

Laser: Introduction, Interaction of radiation with matter, characteristics, Principle and working of laser, Population inversion, Pumping and its methods, Construction and working Ruby laser, He – Ne laser, Applications of lasers.
Fiber optics: Introduction, Propagation of light in optical fiber: Total Internal Reflection, Acceptance angle, Acceptance cone and numerical aperture, Step and Graded index fibers, Losses associated with optical fibers, Applications of optical fibers.

TEXT BOOKS:

1. MK Harbola , "Engineering Mechanics", 2 Edn., Cengage Learning, 2012
2. I. G. Main, "Vibrations and waves in physics", 3 rd Edn., Cambridge University Press, 2018.
3. Ajoy Ghatak, "Optics", 5 th Edn., McGraw Hill Education, 2012.

REFERENCE BOOKS:

1. M. K. Verma, "Introduction to Mechanics", Universities press, 2009.
2. H. J. Pain," The physics of vibrations and waves ", 6th Edn., Wiley, 2006
3. O. Svelto," Principles of Lasers", 5 th Edn., Springer Science & Business Media, 2010.

WEB REFERENCES:

1. https://www.physicsclassroom.com/class
2. https://www.khanacademy.org/science/physics
3. https://ocw.mit.edu/courses/physics/8-03sc-physics-iii-vibrations-and-waves-fall-2016/part-i-mechanical-vibrations-and-waves/
4. https://ocw.mit.edu/courses/physics/8-03sc-physics-iii-vibrations-and-waves-fall-2016/part-iii-optics/

E -TEXT BOOKS:

1. http://www.freebookcentre.net/physics-books-download/Advances-in-Lasers-and-Electro-Optics.html
2. https://www.sciencebooksonline.info/physics/mechanics.html

MOOCS Course:

1. https://nptel.ac.in/courses/122105023/
2. https://nptel.ac.in/courses/122107035/

PROGRAMMING FOR PROBLEM SOLVING

I B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS105ES	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems.

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C Programs.
3. To code and test, a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs
6. Searching and sorting problems

UNIT-I	INTRODUCTION TO C PROGRAMMING LANGUAGE	Classes: 16

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc. Number systems Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming.

Introduction to C Programming Language: I/O: Simple input and output with scanf and printf, variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, type conversion

UNIT-II	CONDITIONAL BRANCHING, LOOPS, ARRAY AND STRINGS	Classes: 14

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops.

Arrays: one- and two-dimensional arrays, creating, accessing and manipulating elements of arrays.

Strings: Introduction to strings, handling strings as array of characters, basics tring functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings.

UNIT-III	STRUCTURE AND POINTER	Classes:10

Structures: Defining structures, initializing structures, unions, Array of structures.
Pointers: Idea of pointers, defining pointers, Pointers to Arrays and Structures, Use o
Pointers in self- referential structures, usage of self-referential structures in linked list (no
implementation), Enumeration data type.
Dynamic memory allocation: Allocating and freeing memory, Allocating memory for
arrays of different datatypes

UNIT-IV	FUNCTION AND STORAGE CLASSES	Classes: 12

Functions: Designing structured programs, Declaring a function, Signature of a function
Parameters and return type of a function, passing parameters to functions, call by value
Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C
standard functions and libraries
Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations o
Recursive functions
Storage classes (auto, extern, static and register)

UNIT-V	FILES AND PRE-PROCESSOR	Classes: 12

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef,
ifndef.
Files: Text and Binary files, Creating and Reading and writing text and binary files,
Appending data to existing files, Writing and reading structures using binary files, Random
access using fseek, ftell and rewind functions

TEXT BOOKS

1. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI
2. Computer System & Programming in C by S Kumar & S Jain, Nano Edge Public
   publications, Meerut.
3. Fundamentals of Computing and C Programming, R. B. Patel, Khanna Publications,
   2010, NewDelhi.

REFERENCE BOOKS

1. Computer Fundamentals and Programming in C, Reema Theraja, Oxford
2. Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin,
   1998,TMH
3. Theory and problem of programming with C, Byron C Gottfried,TMH

WEB REFERENCES

1. https://www.tutorialspoint.com/cprogramming/
2. https://www.tutorialspoint.com/cplusplus/
3. https://www.cprogramming.com/tutorial/c-tutorial.html

E -TEXT BOOKS

1. https://fresh2refresh.com/c-programming/
2. https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
3. https://www.sanfoundry.com/simple-c-programs/

MOOCS Course

1. nptel.ac.in/courses/106105085/4
2. https://www.quora.com/Are-IIT-NPTEL-videos-good-to-learn-basic-C-programming

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ENGINEERING GRAPHICS

I B. TECH- I SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
ME106ES	**B. Tech**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		1	**0**	**4**	**3**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn

The course aims at empowering the students with drafting skills and enhancing their visualization capacity in order to draw different views of the given object.

To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.

To expose them to existing national standards related to technical drawings.

To impart knowledge about standard principles of orthographic projection of objects.

It will help students to use the techniques, skills, and modern engineering tools and communicate effectively.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

Familiarize with the fundamentals and standards of Engineering graphics

Project orthographic projections of lines and plane surfaces.

Convert orthographic views to isometric views and vice-versa and know the basics of AutoCAD.

Preparing working drawings to communicate the ideas and information.

Know and use common drafting tools with the knowledge of drafting standards.

UNIT-I	INTRODUCTION TO ENGINEERING DRAWING	Classes: 15

Introduction to Engineering Graphics: Principles of Engineering Graphics and their significance, Usage of Drawing instruments, lettering, Conic sections including Rectangular Hyperbola (General method only); Cycloid, Epicycloids and Involutes.

 Scales: Plain & Diagonal Scales.

UNIT-II	ORTHOGRAPHIC PROJECTIONS	Classes:15

Projections of points: Principles of orthographic projections – conventions – first and third angle projections. Projection of points in all quadrants.

Projection Of Lines – lines inclined to single plane, lines inclined to both the planes.

Projection of Planes: Projection of regular planes – planes inclined to one plane, planes inclined to both planes.

UNIT-III	**PROJECTION OF SOLIDS & SECTION OF SOLIDS**	**Classes:12**

Projection of Solids: Projections of regular solids like cube, prism, pyramid, cylinder and cone. Axis inclined to both the reference planes.

Section of Solids: Sectioning of above solids in simple vertical position with the cutting planeisinclinedtotheoneplaneandperpendiculartotheother–trueshapeofsection.

UNIT-IV	**DEVELOPMENT OF SURFACES & ISOMETRIC PROJECTIONS**	**Classes: 15**

Development of Surfaces: Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions –Plane Figures, Simple and Compound Solids.

UNIT-V	**TRANSFORMATION OF PROJECTIONS & INTRODUCTION AUTO CAD**	**Classes: 15**

Transformation of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.
Introduction to Auto CAD: Introduction, Salient features of AutoCAD software, Basic Commands, construction, editing and dimensioning, two dimensional drawings.

TEXT BOOKS

1 Engineering Drawing - N.D. Bhatt & V.M. Panchal, 50th edition, 2013-Charotar Publishing House, Gujarat.
2 Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3 K.L.Narayana, P. Kannaiah, "Engineering Drawing", SciTech Publishers. 2nd Edition, 2013
4 Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2009.

REFERENCE BOOKS

1 Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited,2011.
2 K. V. Natarajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai,2015.
3 Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore,2007.
4 Trymbaka Murthy, "Computer Aided Engineering Drawing", I.K. international Publishing House, 3rd Edition, 2011.

WEB REFERENCES

1 http://freevideolectures.com/Course/3420/Engineering-Drawing
2 https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing
3 https://www.wiziq.com/tutorials/engineering-drawing
4 http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics

E -TEXT BOOKS

1 http://rgpv-ed.blogspot.com/2009/09/development-of-surfaces.html
2 http://www.techdrawingtools.com/12/l1201.htm

MOOCS Course

1 https://nptel.ac.in/course.php
2 https://swayam.gov.in/explorer

ENGINEERING PHYSICS LAB

I B. TECH- I SEMESTER (R 20)							
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	T	P	C	CIE	SEE	Total
EP103BS	**B.Tech**	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn
1. The basic experimental skills which are very essential for an engineering student.
2. The basic concepts of oscillations through experiment and the working of electrical harmonic oscillator.
3. The behavior of waves in one dimension.
4. The wave nature of light through Interference and Diffraction.
5. The characteristics and working of laser and optical fibers.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to
1. Understand the working principle of Mechanical harmonic oscillators.
2. Know the properties of waves.
3. Understand the working principle of electrical harmonic oscillators.
4. Demonstrate the wave nature of light.
5. Illustrate the working principle of laser and optical fibers.

LIST OF EXPERIMENTS

1. **Melde'sexperiment:**

   To determine the frequency of a vibrating bar or turning fork using Melde's arrangement.

2. **Torsional pendulum:**

   To determine the rigidity modulus of the material of the given wire using Torsional pendulum.

3. **Newton's rings:**

   To determine the radius of curvature of the plano – convex lens by forming Newton's rings.

4. **Diffraction grating:**

   To determine the wavelength of given laser source.

5. **Dispersive power:**

   To determine the dispersive power of prism by using spectrometer.

6. **Coupled Oscillator:**

   To determine the spring constant by single coupled oscillator.

7. **LCR Circuit:**

   To determine quality factor and resonant frequency of LCR circuit.

8. **LASER:**

   To study the characteristics of LASER sources.

9. **Optical fibre:**

   To determine the bending losses of Optical fibres.

10. **Optical fibre:**

    To determine the Numerical aperture of a given fibre.

    NOTE: Any 8 experiments are to be performed

TEXT BOOKS

1. Dr. Y. Aparna, "Laboratory manual of Engineering Physics", VGS Techno series,2009.
2. T. Radha Krishna, V. Rajeshwar Rao, "Practical Physics for Engineering Students",S. M. Enterprises, 3rd Edn, 2009.

REFERENCE BOOKS

1. Main, I. G., Vibrations and Waves in Physics. 2nd. edition. Cambridge University Press,1984.
2. Eugene Hecht, "Optics" , 5th Edition,AdelphiUnioversity,2016.

WEB REFERENCES

1. https://lecturenotes.in/practicals/20039-lab-manual-for-engineering-physics-ep-by-rakesh-kumar-behera
2. https://www.aurora.ac.in/images/pdf/departments/humanities-and-sciences/engg-phy-lab-manual.pdf
3. http://www.bsauniv.ac.in/UploadImages/Downloads/PHYSICS-LAB-MANUAL2017-(new-regulation).pdf
4. http://www.bvrit.ac.in/Freshman_Lab_Manuals/freshman_enginering_physics/Engineering%20Physics.pdf

E -TEXT BOOKS

1. http://www.lehman.edu/faculty/kabat/F2019-166168.pdf
2. https://www.scribd.com/doc/143091652/ENGINEERING-PHYSICS-LAB-MANUAL

MOOCS Course

1. https://nptel.ac.in/courses/115105110/
2. https://swayam.gov.in/nd1_noc19_ph09/preview

PROGRAMMING FOR PROBLEM SOLVING LAB

I B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS107ES	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems

LIST OF EXPERIMENTS

1. Write a simple program that prints the results of all the operators available in C
2. Write a simple program to convert the temperature from Fahrenheit to Celsius
3. Write a program for find the max and min from the three numbers using if else statement
4. Write a C program to find the roots of a Quadratic equation.
5. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators+,-,*, /, % and use Switch Statement)
6. Write a program that finds if a given number is a prime number
7. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
8. Write a C program to generate the Fibonacci sequence of numbers.
9. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
10. Write a C program to find the minimum, maximum and average in an array of integers
11. Write a C program that uses functions to perform the following:1) Addition of Two Matrices   2) Multiplication of Two Matrices
12. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

13. Toinsertasub- string into a given main string from a given position. e. ii. To delete Characters from a given position in a given string
14. WriteaCprogramthatdisplaysthepositionofacharacterchinthestringSor–1if Sdoesn'tcontainch
15. Write a C program to count the lines, words and characters in a given text.
16. Define a structure student to store the details like Roll Number, Name, and Marks in three subjects of a student and display the same.
17. Write a C program to perform specified operation on complex numbers.
18. Write a C program to store the information about three students.
19. Write a C Program to illustrate the use of nested structures.
20. Write a C Program to perform arithmetic operations using pointers.
21. Write a C Program to display the array elements in reverse order using pointer.
22. Write a C Program to find factorial of a number using functions.
23. Write a C Program to find factorial of a number using recursive functions.
24. Write a C Program to implement call by value and call by reference.
25. Write a C Program to copy the data from one file to another
26. Write a C Program to append data to the file
27. Write a C Program to merge the two files
28. Write a C Program to display the file content on reverse order.
29. Write a C Program to count number of vowels, consonants, digits, words in a given file

TEXT BOOKS

1. TheCProgrammingLanguagebyDennisMRitchie,BrianW.Kernigham,1988,PHI Publications, 2010,NewDelhi.
2. ComputerSystem&ProgramminginCbySKumar&SJain,NanoEdge Public publications,Meerut.
3. 3 Fundamentals of Computing and C Programming, R. B. Patel,Khanna

REFERENCE BOOKS

1. Computer Fundamentals and Programming in C, ReemaTheraja,Oxford
2. Informationtechnology,DennisP.Curtin,KimFoley,Kunal Sen,Cathleen Morin,1998,TMH
3. Theory and problem of programming with C, Byron CGottfried,TMH.

TEXT BOOKS

1. https://www.tutorialspoint.com/cprogramming/
2. https://www.w3schools.in/c-tutorial/
3. https://www.cprogramming.com/tutorial/c-tutorial.html
4. www.studytonight.com/c/

REFERENCE BOOKS

1. http:///programming-with-c
2. https://developerinsider.co/best-c-programming-book-for-beginners/

REFERENCE BOOKS

1. https://nptel.ac.in/courses/106105085/4
2. https://www.coursera.org/courses?query=c%20programming

ENVIRONMENTAL SCIENCE

I B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
ES104BS	B. Tech	3	0	0	-	100	-	100

COURSE OBJECTIVES

To learn
1. Analyze the inter relationship between living organism and environment
2. Describe various types of natural resources available on the earth surface
3. Identify the values, threats of biodiversity, endangered and endemic species of India along with the conservation of biodiversity
4. Explain the causes, effects and control measures of various types of environmental pollutions
5. Understand the importance of environment by assessing its impact on the human world

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Differentiate between various biotic and abiotic components of ecosystem
2. Describe the various types of natural resources
3. Examine the values, threats of biodiversity, the methods of conservation, endangered and endemic species of India
4. Illustrate causes, effects, and control measures of various types of environmental pollutions
5. Understand technologies on the basis of ecological principles environmental regulations which in turn helps in sustainable development

UNIT-I	ECOSYSTEMS	Classes: 8

Definition, Scope, and Importance of ecosystem. Classification, structure and function of an ecosystem, food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification.

UNIT-II	NATURAL RESOURCES	Classes: 8

Classification of Resources: Living and Non-Living resources.
Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems.
Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources
Land resources: Forest resources.
Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT-III	BIODIVERSITY AND BIOTIC RESOURCES	Classes: 7

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic, optional values and hotspots of biodiversity. Endangered and endemic species of India, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT-IV	ENVIRONMENTAL POLLUTION	Classes: 9

Types of pollution, Causes, effects and prevention and control measures of air, water, soil, noise and thermal pollution. Solid waste and e-waste management.

UNIT-V	ENVIRONMENTAL POLICY AND SUSTAINABLE DEVELOPEMENT	Classes: 10

Concept of sustainable development: Sustainable development goals. Threats to sustainability: Population explosion- crazy consumerism. Green building concept. Water conservation, Rainwater harvesting, watershed management. Environmental Policies and Legislations: Environment Protection Act, Air (Prevention and Control of Pollution) Act, Forest (conservation) Act, 1980. Wildlife Protection Act.

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission
2. Environmental Studies by R. Rajagopalan, Oxford UniversityPress.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi,12th Edition, 2015

REFERENCE BOOKS

1. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, NewDelhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, NewDelhi
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIAedition

WEB REFERENCES

1. https://www.britannica.com/science/ecosystem
2. https://ocw.mit.edu/resources/#EnvironmentandSustainability

E -TEXT BOOKS

1. P N Palanisamy Environmental Science ISBN:9788131773253, eISBN:97899332509771 Edition: Secondedition
2. Environmental Studies. Author, Dr. J. P. Sharma. Publisher, Laxmi Publications, 2009 ISBN, 8131806413,9788131806418.

MOOCS COURSE

1. https://nptel.ac.in/courses/122103039/38
2. https://nptel.ac.in/courses/106105151/12

ADVANCED CALCULUS

I B. TECH- II SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
MA201BS	**B. Tech**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**1**	**0**	**4**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn
1. Methods of solving the differential equations of first and highe rorder
2. Evaluation of multiple integrals and their applications
3. The physical quantities involved in engineering field related to vector valued functions
4. The basic properties of vector valued functions and their applications
5. Vector point functions and scalar point functions

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Identify whether the given differential equation of first order is exact or not.
2. Solve higher order differential equation and apply the concept of differential equation to real problems.
3. Evaluate the multiple integrals and apply the concept to find areas and volumes.
4. Is able to find gradient, directional derivative, divergence and curl.
5. Evaluate the line, surface and volume integrals and converting them from one to another.

UNIT-I	**FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS**	**Classes: 10**

Exact, linear and Bernoulli's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, Applications: Newton's law of cooling, Law of natural growth and decay, Simple Harmonic Motion

UNIT-II	**ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER**	**Classes: 12**

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, $\sin ax$, $\cos ax$, polynomial in x^m, $e^{ax}V(x)$ and $xV(x)$, method of variation of parameters, Applications: LCR Circuit.

UNIT-III	MULTIPLE INTEGRATION	Classes:12

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals)

UNIT-IV	VECTOR DIFFERENTIATION	Classes: 12

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors

UNIT-V	VECTOR INTEGRATION	Classes: 12

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

REFERENCE BOOKS

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

WEB REFERENCES

1. https://www.efunda.com/math/gamma/index.cfm
2. https://ocw.mit.edu/resources/#Mathematics
3. https://www.sosmath.com/
4. https://www.mathworld.wolfram.com/

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=4
2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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ENGINEERING CHEMISTRY

I B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CH202BS	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. To provide basic knowledge on atomic, molecular orbitals and the bonding interaction between atoms
2. To analyze the impact of water hardness and its various methods for removal of hardness of water, numerical problems to calculate the hardness of water in a given sample
3. To discover the importance of electrical energy which originates from chemical reactions essential for industrial needs
4. To understand the basic concepts of spectroscopy and drug molecules to extrapolate their chemical knowledge in day to day life
5. To enable the students to understand the use of engineering materials such as polymers, lubricants and study the industrial applications in the field of engineering and technology

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Achieve the basic concepts of atomic, molecular and electronic changes related to molecular bonding and magnetism
2. Familiarize with fundamentals of treatment technologies and considerations for its design and implementation in water treatment plants
3. To extrapolate the knowledge of cell, electrode, electrolysis, electromotive force. To analyze and develop a technical solution to corrosion problems related to engineering materials
4. Acquire the significant knowledge about basic concepts of spectroscopy and synthesis of drug molecules would be known to the students
5. Comprehended and explore engineering applications of polymers and lubricants

UNIT-I	MOLECULAR STRUCTURE AND THEORIES OF BONDING	Classes: 10

Introduction to VBT, Postulates and draw backs of VBT- Atomic and Molecular orbitals, Linear Combination of Atomic Orbitals (LCAO), Introduction to Crystal Field Theory (CFT): Salient features of CFT-Crystal Field Splitting of transition metal ion d-orbitals in tetrahedral, octahedral and square planar geometries. Applications of CFT- color and magnetic properties.

Postulates of MOT, molecular orbitals of diatomic molecules-molecular orbital energy level diagrams of N_2, O_2 and CO molecules.

UNIT-II	WATER AND ITS TREATMENT	Classes: 12

Introduction-hardness of water-causes of hardness. Types of harness: Temporary and Permanent. Expression and units of hardness. Estimation of hardness of water by complexometric method (EDTA method), Numerical problems. Boiler troubles- scales, sludges, carryover and caustic embrittlement. Internal treatment- Calgon conditioning, phosphate conditioning and colloidal conditioning. External treatment of water- Ion exchange process. Desalination of brackish water-Reverse osmosis. Potable water and its specifications. Steps involved in the treatment of water by chlorination and ozonization.

UNIT-III	ELECTROCHEMISTRY AND CORROSION	Classes: 14

Electrochemical cells- electrode potential, standard electrode potential, Galvanic cell, Nernst equation- Applications. EMF of a cell. Types of electrodes-standard hydrogen electrode, calomel and glass electrode- construction and working. Numerical problems.

Batteries - Primary (Lithium cell) and secondary batteries (Lithium ion, Lead acid storage cell)- Applications.

Corrosion: Introduction, Causes and effects of corrosion- theories of chemical and electrochemical corrosion- mechanism of electrochemical corrosion. Corrosion control methods-Cathodic protection- sacrificial anodeandim pressed current cathodic methods. Metallic coatings- Methods of preparation of surface- Hot dipping- Galvanization and tinning. Electro plating and electro less plating.

UNIT-IV	SPECTROSCOPY AND SYNTHESIS OF DRUG MOLECULES	Classes: 08

Spectroscopy- Introduction, electromagnetic spectrum, principles of UV-visible, IR spectroscopy- selection rules and applications. Basic concepts of Nuclear magnetic resonance spectroscopy, chemical shift, spin-spin splitting. Magnetic resonance imaging.

Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

UNIT-V	MATERIAL CHEMISTRY	Classes: 12

Polymers: Introduction, Classification of polymers with examples. Types of polymerization: Addition and Condensation polymerization with examples.
Plastics: Introduction, Characteristics. Thermoplastic and thermosetting plastics. Compounding and fabrication of plastics (compression and injection molding). Preparation, properties and engineering applications of PVC, Teflon and Bakelite.
Lubricants: Introduction, Characteristics, mechanism-thick film, thin film, extreme pressure lubrication, properties- flash point, fire point, cloud point, pour point, mechanical stability and their significance- applications of lubricants.

TEXT BOOKS

1. P. C. Jain and M. Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company Ltd., New Delhi,18th edition(2018)
2. Prasanta Rath, B. Rama Devi, Ch. Venkataramana Reddy, S. Chakrovarthy, "A Text book of Engineering Chemistry", Cengage publications(2019)
3. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai & Co. Publishers., New Delhi,15th edition(2015)
4. C.N. Banwell, "Fundamentals of MolecularSpectroscopy"

REFERENCE BOOKS

1. B. H. Mahan, "University Chemistry", Narosa Publishing house, New Delhi, 3rd edition (2013)
2. B.R.Puri,L.R.SharmaandM.S.Pathania,"PrinciplesofPhysicalChemistry",S.Nagin Chand & Company Ltd., 46th edition(2013)
3. J.D. Lee, "Concise Inorganic Chemistry", Willey Publications, 5th edition(2008)
4. P.W. Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8th edition(2006)
5. G. L. David Krupadanam, D. Vijaya Prasad, K. Varaprasad Rao, K.L.N. Reddy and C. Sudhakar, "Drugs", Universities Press (India) Limited, Hyderabad(2007)

WEB REFERENCES

1. Chemistry: foundations and applications. J. J. Lagowski, editor in chief. New York, Macmillan Reference USA, c2004. 4v
2. Polymer data handbook. Edited by James E. Mark. 2nd ed. Oxford, New York, Oxford University Press, 2009
3. https://www.wyzant.com/resources/lessons/science/chemistry
4. http://www.chem1.com/acad/webtext/virtualtextbook.html

E -TEXT BOOKS

1. Krishnamurthy, N., Vallinayagam, P., Madhavan, D., Engineering Chemistry, ISBN: 9789389347005, eBook ISBN: 9789389347012, Edition: FourthEdition
2. Vijayasarathy, P. R., Engineering Chemistry, Print Book ISBN : 9789387472778, eBook ISBN : 9789387472785, Edition : Third Edition

MOOCS COURSE

1. https://onlinecourses-archive.nptel.ac.in
2. https://www.mooc-list.com/tags/chemistry

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ENGINEERING MECHANICS

I B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
ME208ES	**B.Tech**	**3**	**1**	**0**	**4**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn
1. Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium.
2. Perform analysis of bodies lying on rough surfaces.
3. Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections.
4. Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.
5. Explain the concepts of work-energy method and its applications and concept of Mechanical vibrations

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Determine resultant of forces acting on a body and analyze equilibrium of a body subjected to a system of forces.
2. Solve problem of bodies subjected to friction.
3. Find the location of centroid and calculate moment of inertia of a given section.
4. Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
5. Solve problems using work energy equations and solve problems of Mechanical vibration.

UNIT-I	INTRODUCTION TO ENGINEERING MECHANICS	Classes: 15

Force Systems :Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams.

UNIT-II	FRICTION, CENTROID AND CENTRE OF GRAVITY	Classes: 15

Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction and ladder friction.
Centroid and Centre of Gravity: Centroid of Lines, Areas and Volumes from first principle, centroid of composite sections; Centre of Gravity and its implications. – Theorem of Pappus.

UNIT-III	AREA MOMENT OF INERTIA , MOMENT OF INERTIA OF MASSES	Classes:15

Area moment of inertia: Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections.
Moment of Inertia of Masses: Transfer Formula for Mass Moments of Inertia – Mass moment of inertia of composite bodies.

UNIT-IV	KINEMATICS & KINETICS	Classes: 15

Kinematics: Rectilinear motion **-** Motion of Rigid Body under uniform and variable accelerations -motion under gravity- curvilinear motion – Projectiles - rotary motion. **Kinetics:** Analysis as a Particle and Analysis as a Rigid Body in Translation – D' Alembert's Principle - Connected bodies- Kinetics of rotating bodies.

UNIT-V	WORK, POWER, ENERGY & MECHANICAL VIBRATIONS	Classes: 15

Work, Power and Energy: Introduction**,** work-energy equation - motion of connected bodies-work done by a spring - general plane motion.
Mechanical Vibrations: Definitions, concepts - simple harmonic motion - free vibrations – Simple and compound pendulums.

TEXT BOOKS

1. Shames and Rao (2006) , Engineering Mechanics, Pearson Education
2. Reddy Vijay Kumar K. and J. Suresh Kumar (2010), Singer's Engineering Mechanics– Statics & Dynamics

REFERENCE BOOKS

1. Timoshenko S.P and Young D.H.,"Engineering Mechanics" McGraw Hill, International Edition,1983.
2. Andrew Pytel, JaanKiusalaas, "Engineering Mechanics",CengageLearning,2014.
3. Beer F.P & Johnston E.R Jr. Vector, "Mechanics for Engineers",TMH,2004.
4. Hibbeler R.C & Ashok Gupta, "Engineering Mechanics", PearsonEducation,2010.
5. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", UmeshPublications,2011.

WEB REFERENCES

1. http://www.mlipsett.com/blog/
2. http://jntuh-elsdm.in/
3. https://www.sciencedirect.com/science/book/9781857180336

E -TEXT BOOKS

1. https://akuengineers.files.wordpress.com/2016/12/engineering-mechanics-rs-khurmi.pdf
2. http://clkmein.com/q2KmTm

MOOCS COURSE

1. https://nptel.ac.in/courses/112103109/
2. https://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/engg_mechanics/ui/Coursehome7.htm

ENGINEERING WORKSHOP

I B. TECH- II SEMESTER (R 20)								

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
ME207ES	B.Tech	1	0	3	2.5	30	70	100

COURSE OBJECTIVES

To learn
1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, , equipment's and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at workplace.
5. It explains the construction, function, use and application of different working tools, equipment and machines.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to
1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including Fitting, Carpentry, Foundry, Tin-smithy, House Wiring and Welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

LIST OF EXPERIMENTS

TRADES FOR EXERCISES(Any two exercises from each trade)
1. Tin-Smithy – (Square Tin, Cone and Cylinder)
2. Carpentry – (T-Lap Joint, Planning Sawing & DovetailJoint)
3. Welding Practice – (Arc Welding-Butt Joint, Lap Joint&T-Joint)
4. Black Smithy – (Round to Square, S-Hook&U-Clamp)
5. Foundry – (Mould using Single Piece and SplitPattern)
6. Fitting – (V-Fit, Square Filing & Semi-circular fit)
7. House-wiring – (Two-way Switch and one-way switch inseries)
TRADES FOR DEMONSTRATION
8.Plumbing, Machine Shop, Power tools in construction, Wood turning lathe and Casting Process.
 Note: At least perform 10 Exercises out of 14 Exercises.

TEXT BOOKS

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ ScitechPublishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/SixthEdition
3. Workshop Technology byChapman
4. A Textbook Of Workshop Technology : Manufacturing Processes/J. KGUPTA

REFERENCE BOOKS
1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech 2. Workshop Manual / Venkat Reddy/BSP 3. Workshop Technology byHazra-Chowdhary 4. Production Engineering byR.K.Jain
WEB REFERENCES
1. https://nptel.ac.in/courses/112105126/ 2. https://nptel.ac.in/downloads/112105127/ 3. https://nptel.ac.in/courses/112107145/ 4. https://nptel.ac.in/courses/122104015/
E -TEXT BOOKS
1. http://103.135.169.82:81/fdScript/RootOfEBooks/MED/Introduction Workshop%20Technology 2. https://www.quora.com/Download-free-mechanical-engineering-ebooks-sites
MOOCS Course
1. http://www.nits.ac.in/workshops/Workshop_on_MOOCS_26082017.pdf 2. https://www.nitttrc.ac.in/swayam/index.html

PROFESSIONAL ENGLISH

I B. TECH- II SEMESTER (R 20)								
Course Code	**Programme**	**Hours /Week**			**Credits**	**Maximum Marks**		
EN203HS	B. Tech	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		2	0	0	2	30	70	100

COURSE OBJECTIVES:

To enable students

1. To enhance their vocabulary and basic grammar rules for communicative competence.
2. To hone their comprehensive skills through various reading techniques.
3. To develop the professional writing with the practice of formal letters, e-mails, reports, resumes, etc.
4. To use various sentence structures effectively in formal and informal contexts.
5. To improve scientific and technical communication skills through technical vocabulary and appropriate prose texts.

COURSE OUTCOMES:

Upon successful completion of the course, the students are able to

1. Use vocabulary effectively and syntactically.
2. Translate the reading techniques and apply them in literary texts.
3. Demonstrate enhanced competence in standard Written English.
4. Develop the competence in writing professional documents.
5. Exhibit appropriate communicative approaches to suit various contexts.

UNIT-I	THE RAMAN EFFECT	Classes:7

Vocabulary: Word Formation, Use of affixes,
Grammar: Articles, Prepositions
Writing: Paragraph Writing, Organizing principles of Paragraphs in documents

UNIT-II	THE LOST CHILD	Classes:9

Vocabulary: Synonyms and Antonyms
Grammar: Noun – Pronoun Agreement and Concord
Reading: Significance & Techniques of reading; Skimming – Reading for the gist of a
      text; Scanning– Reading for specific information; Intensive; Extensive
      reading; SQ3R Technique; Reading Comprehension;
      Reading Poetry -The Road Not Taken
Writing: Narrative Writing

UNIT-III	SATYA NADELLA'S EMAIL TO HIS EMPLOYEES	Classes:10

Vocabulary: Homonyms-Homophones-Homographs
Grammar: Tenses
Writing : Significance & Effectiveness of Writing; Writing Descriptions;
      Letter writing; E-mail writing

UNIT-IV	WHAT SHOULD YOU BE EATING?	Classes:10

Vocabulary: Technical vocabulary; Words from Foreign Languages; abbreviations
        and acronyms
Grammar: Misplaced Modifiers; Redundancies and Cliches
Writing: Information Transfer, Note Making, Writing an Abstract and Report Writing

UNIT-V	HOW A CHINESE BILLIONAIRE BUILT HER FORTUNE	Classes:9

Vocabulary: Words often Confused; Idioms and Phrasal verbs, One- word Substitutes;
Grammar: Conditional Sentences; Degrees of Comparison; Simple-Complex-
        Compound Sentences and Common errors
Writing: Essay writing

TEXTBOOKS:

1. Sudarshana, N.P. and Savitha, C. (2018). English forEngineers. Cambridge UniversityPress.
2. Education for Life and Work – English Workbook prepared by English Faculty of St. Martin's EngineeringCollege.

REFERENCE BOOKS:

1. Swan, M. (2016). Practical English Usage. Oxford UniversityPress.
2. Kumar, S and Lata, P. (2018). Communication Skills. Oxford UniversityPress.
3. Zinsser, William. (2001). On Writing Well. Harper ResourceBook.

WEB REFERENCES:

1. www.edufind.com
2. www.myenglishpages.com
3. http://grammar.ccc.comment.edu
4. http://owl.english.prudue.edu

E –TEXTBOOKS:

1. http://bookboon.com/en/communication-ebooks-zip
2. http://learningenglishvocabularygrammar.com/files/idiomsandphraseswithmeanin gsandexamlespdf.pdf

MOOCS COURSE:

1. https://mooec.com/courses/grammar-guru-1
2. https://mooec.com/courses/learning-styles

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ENGINEERING CHEMISTRY LABORATORY

I B. TECH- II SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
CH204BS	**B. Tech**	**0**	**0**	**3**	**1.5**	**30**	**70**	**100**

COURSE OBJECTIVES

To learn

1. Estimationofhardnessandchloridecontentinwatertocheckitssuitabilityfordrinking purpose
2. To find the concentration of ions present in an unknown solution
3. To know the handling procedure of colorimetric and conductometric instruments
4. The fundamentals of drug synthesis
5. The measurement of physical properties like surface tension, viscosity and acid value

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand the total dissolved salts present in a sample of water
2. Determine the concentration of ions existing in a solution
3. Find the strength of an acid by conductometric methods
4. Acquire basic knowledge on the chemical reaction used to synthesize drug molecules like aspirin and Paracetamol
5. Select lubricants for various purposes such as to reduce the friction between two movable surfaces and to determine the surface tension of a given liquid

LIST OF EXPERIMENTS

Volumetric Analysis

1. Determination of total hardness of water by complexometric method using EDTA.
2. Determination of chloride content of water by Argentometry.
3. Determination of acid value of coconut oil.

Potentiometry

4. Determination of Fe^{2+} ions present in the given sample by Potentiometric titration.

Conductometry

5. Estimation of HCl by conductometric titration.
6. Estimation of acetic acid by conductometric titration.

Calorimetry

7. Estimation of Copper by colorimetric method.

Synthesis of Drugs

8. Synthesis of aspirin and Paracetamol.

Physical constants

9. Determination of viscosity of the given sample by using Ostwald's Viscometer.
10. Determination of surface tension of a given liquid using stalagmometer.

TEXT BOOKS

1. Senior practical physical chemistry, B. D. Khosla, A. Gulati and V. Garg (R. Chand and Co.,Delhi)
2. Prasanta Rath, B. Rama Devi, Ch. Venkataramana Reddy, S. Chakrovarthy, "A Text book of Engineering Chemistry", Cengage publications(2019)
3. An introduction to practical; chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, NewDelhi)
4. Vogel's text book of practical organic chemistry, 5th edition
5. S. S. Dhara, Text book on experiments and calculations in engineering chemistry, B.S Publications

REFERENCE BOOKS

1. G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney, "Vogel's Text Book of Quantitative ChemicalAnalysis"
2. O. P. Vermani & Narula, "Theory and Practice in Applied Chemistry", New Age InternationalPublishers
3. Gary D. Christian, "Analytical chemistry", 6th Edition, WileyIndia

WEB REFERENCES

1. Phillip E. Savage, Industrial & Engineering Chemistry: At the Forefront ofChemical Engineering Research since 1909, *Ind. Eng.Chem.Res.*20195811
2. Elias, AI. Sundar Manoharan S. and Raj, H. "Laboratory Experiments for General Chemistry", I.I.T. Kanpur,1997

E -TEXT BOOKS

1. Payal B Joshi, Experiments In Engineering Chemistry, Edition: First, ISBN:978-93-85909-13-9, Publisher: I.K. International Publishing House Pvt.Ltd

2. Mohapatra, Ranjan Kumar, Engineering Chemistry With Laboratory Experiments, ISBN: 978- 81-203-5158-5, PHI Learning PrivateLimited

MOOCS COURSE

1. https://sce.ethz.ch/en/programmes-and-courses/suche-angebote.html?polycourseId=1299
2. https://www.classcentral.com/course/open2study-chemistry-building-blocks-of-the-world-1297

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

I B. TECH- II SEMESTER (R20)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
EN205HS	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES:

To train students
1. Touseaccurateandappropriatepronunciationthroughthepracticeofphonetic sounds, symbols, word accent and intonation.
2. ToimprovetheirfluencyinspokenEnglishandneutralizetheirmothertongue influence through JAM Sessions, Role-play, etc.
3. To comprehend the speech of people of various regions through Listening practice exercises.
4. To enable students to transfer information verbally with the right usage of Body language through individual and group activities.
5. TounderstandnuancesofEnglishlanguagebypracticingvariousexercisesat Multi-media lab.

COURSE OUTCOMES:

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

1. Differentiate the speech sounds in English and demonstrate accurate pronunciation.
2. Communicate with others in clear and confident manner.
3. Improve their effective and empathetic listening ability.
4. Show the zeal to participate in Public Speaking Sessions.
5. Neutralize the Mother tongue influence in day to communication.

LIST OF EXPERIMENTS:

EXERCISE: I

CALL LAB:

Introduction to Phonetics – Speech sounds - vowels and consonants

ICS LAB:
Ice-breaking Activity – Non-verbal Communication
EXERCISE: II
CALL LAB:
Minimal Pairs – Consonant Clusters – Past Tense Marker and Plural Marker Rules
ICS LAB:
Role Play – Expressions in various Situations – Making Requests and Seeking Permissions

EXERCISE: III
CALL LAB: Structure of Syllables – Word Accent –Stress shift–Intonation **ICS LAB:** Telephone Communication –Etiquette
EXERCISE: IV **CALL LAB:** Listening Comprehension Tests **ICS LAB:** Presentations Skills & JAM Session
EXERCISE: V **CALL LAB:** Mother Tongue Interference – Differences in British and American Pronunciation **ICS LAB:** Interview Skills – Mock Interviews

TEXTBOOKS:

1. ELCS Lab Manual prepared by English faculty of St. Martin's EngineeringCollege.
2. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. OxfordUniversity Press.

REFERENCE BOOKS:

1. T Balasubramanian. A Textbook of English Phonetics for Indian Students,Macmillan,2008
2. J Sethi et al. A Practical Course in English Pronunciation, Prentice Hall India,2005.
3. Priyadarshi Patnaik. Group Discussions and Interviews, Cambridge University Press PvtLtd2011.
4. Arun Koneru, Professional Speaking Skills, Oxford UniversityPress,2016.

WEB REFERENCES:

1. https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935321&section=References
2. Argyle,MichaelF.,Alkema,Florisse,&Gilmour,Robin."Thecommunicationof friendly and hostile attitudes: Verbal and nonverbal signals." European Journalof Social Psychology, 1, 385-402:1971
3. Blumer, Herbert. Symbolic interaction: Perspective and method. Engle wood Cliffs; NJ: PrenticeHall.1969

E –TEXTBOOKS:

1. Mc corry Laurie Kelly Mc Corry Jeff Mason, Communication Skills forthe Healthcare Professional, 1st edition,ISBN:1582558140, ISBN-13:9781582558141
2. RobertEOwens,Jr,LanguageDevelopment, 9^{th}edition, ISBN:0133810364,9780133810363

MOOCS Course:

1. https://www.coursera.org/specializations/improve-english
2. https://www.edx.org/professional-certificate/upvalenciax-upper-intermediate-english

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DEPARTMENT OF CIVIL ENGINEERING

PROBABILITY STATISTICS AND COMPLEX VARIABLES

II B. TECH- I SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
PS301BS	**B. Tech**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. The ideas of random variables and various discrete and continuous probability distributions and their properties.
2. The basic ideas of statistics including measures of central tendency.
3. The statistical methods of studying data samples.
4. Differentiation and integration of complex valued functions.
5. Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Formulate and solve problems involving random variables
2. Understand the foundations for classical inference involving confidence intervals
3. Apply statistical methods for analyzing experimental data.
4. Analyse the complex function With reference to their analyticity integration using Cauchy's integral theorems.
5. Analyse the complex function with reference to their analyticity, integration using Cauchy's residue theorems.

UNIT-I	RANDOM VARIABLE AND DISTRIBUTIONS	Classes: 12

Random variables: Discrete and continuous random variables, Expectation of Random Variables, Variance of random variables, Binomial, Poisson, evaluation of statistical parameters for these distributions. Continuous random variables and their properties, distribution functions and densities, Normal distributions.

UNIT-II	SAMPLING DISTRIBUTION AND ESTIMATION	Classes: 12

Population and samples, Sampling Distribution of mean, Proportions, difference of means, Estimation: Point and Interval, Bayesian estimations.

UNIT-III	TESTING OF HYPOTHESIS	Classes: 12

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means; Test for single mean, difference of means for small samples, test for ratio of variances for small samples.

UNIT-IV	COMPLEX VARIABLES (DIFFERENTIATION)	Classes: 12

Limit, Continuity and Differentiation of Complex functions, Analyticity, Cauchy-Riemann equations (without proof), finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties.

UNIT-V	COMPLEX VARIABLES (INTEGRATION)	Classes: 12

Line integral, Cauchy's theorem, Cauchy's Integral formula, Zeros of analytic functions, Singularities, Taylor's series, Laurent's series; Residues, Cauchy Residue theorem.

TEXT BOOKS

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for engineers and scientists, 9th Edition, Pearson Publications.
2. Fundamentals of Mathematical Statistics, Khanna Publications, S CGuptha and V.KKapoor.
3. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
4. Churchill R.V., "Complex Variable and its Applications", McGraw Hill, New York, 9th edition 2013.

REFERENCE BOOKS

1. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.
3. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.
4. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

WEB REFERENCES

1. https://www.efunda.com/math/probability/probability.cfm
2. https://ocw.mit.edu/resources/#Mathematics
3. https://www.sosmath.com/
4. https://www.mathworld.wolfram.com/

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=15
2. https://www.e-booksdirectory.com/listing.php?category=34

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING

STRENGTH OF MATERIALS - I

II B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE302PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. To understand the nature of stresses developed in simple geometries such as bars, cantilevers and beams for various types of simple loads
2. To calculate the elastic deformation occurring in simple members for different types of loading.
3. To show the plane stress transformation with a particular coordinate system for different orientation of the plane.
4. To know different failure theories adopted in designing of structural members

COURSE OUTCOMES

On completion of the course, the student will be able to:

1. Understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, related to the strength of structured and mechanical components.
2. Recognize various types loads applied on structural components of simple framing geometries and understand the nature of internal stresses that will develop within the components.
3. To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading
4. Analyze various situations involving structural members subjected to plane stresses by application of Mohr's circle of stress

UNIT-I	SIMPLE STRESSES AND STRAINS	Classes: 12

Concept of stress and strain- St. Venant's Principle-Stress and Strain Diagram - Elasticity and plasticity – Types of stresses and strains- Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Pure shear and Complementary shear - Elastic modulii, Elastic constants and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain Energy – Resilience, Gradual, sudden, impact and shock loadings and simple applications. Principle of superposition for various types of beams.

UNIT-II	SHEAR FORCE AND BENDING MOMENT	Classes: 12

Types of beams – Bending moment (BM) and shear force (SF) diagrams. BM and SF diagrams for cantilever, simply supported and fixed beams with or without overhangs. Calculation of maximum BM and SF and the point of contra flexure under concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments. Relation between S.F, B.M and rate of loading at a section of beam.

UNIT-III	FLEXURAL STRESSES	Classes: 12

Theory of simple bending – Assumptions – Derivation of bending equation- Section Modulus Determination of flexural/bending stresses of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections. Shear Stresses: Derivation of formula for shear stress distribution – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle and channel sections

UNIT-IV	DEFLECTION OF BEAMS	Classes: 12

Slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load and couple -Mohr's theorems – Moment area method – Application to simple cases. Conjugate Beam Method: Introduction – Concept of conjugate beam method - Difference between a real beam and a conjugate beam - Deflections of determinate beams with constant and different moments of inertia.

UNIT-V	PRINCIPAL STRESSES	Classes: 12

Introduction – Stresses on an oblique plane of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Principal stresses – Mohr's circle of stresses – ellipse of stress - Analytical and graphical solutions. Theories of failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Maximum shear stress theory- Strain Energy and Shear Strain Energy Theory (Von Misses Theory).

TEXT BOOKS

1. Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New York, USA.
2. Kazmi, S. M. A., "Solid Mechanics" TMH, Delhi, India.
3. Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall, 2004.
4. Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 2nd ed. New York, NY: McGraw Hill, 1979.

REFERENCE BOOKS

1. Mechanics of material by R.C. Hibbeler, Prentice Hallpublications
2. Engineering Mechanics of Solids by Egor P. Popov, Prentice Hallpublications
3. Strength of Materials by T.D.GunneswaraRao and M.Andal, CambridgePublishers
4. Strength of Materials by R.K. Bansal, Lakshmi Publications House Pvt. Ltd.

WEB REFERENCES

1. https://nptel.ac.in/courses/112106141/
2. http://nptel.ac.in/courses/112104118/ui/TOC.htm
3. https://nptel.ac.in/courses/105101082/2
4. http://www.nptelvideos.in/2012/11/strength of materials.html

E -TEXT BOOKS

1. http://engineeringstudymaterial.net/tag/strength of materials-books/
2. http://www.allexamresults.net/2015/10/Download-Pdf-strengthofmaterials-by-rk-Bansal.html

MOOCS COURSE

1. https://www.coursera.org/learn/mechanics-1
2. https://pe.gatech.edu/courses/mechanics-materials-i-fundamentals-stress-and-strain-and-axial-loading

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DEPARTMENT OF CIVIL ENGINEERING

SURVEYING AND GEOMATICS

II B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE303PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

The objective of this Course is

1. Know the principle and methods of surveying.
2. Measure horizontal and vertical- distances and angles
3. Recording of observation accurately
4. Perform calculations based on the observation Identification of source of errors and rectification methods
5. Apply surveying principles to determine areas and volumes and setting out curves Use modern surveying equipment's for accurate results

COURSE OUTCOMES

At the end of the course, the student will be able to:

1. Identify the uses of three basic surveying tools: the tape, the level, and the Theodolite & application of geometric and trigonometric principles to basic surveying calculations.
2. Assemble efficient and accurate, legible and complete notes in a well-prepared surveying field book & basic types of surveys, and the responsibilities of a surveying team.
3. Differentiate the limitations of the basic surveying instruments and the possible errors that could arise.
4. Interpret of drawing techniques in the development of a topographic map & calculation of areas and volumes of irregular and regular boundaries.
5. Evaluate and recognize the different methods of calculation of heights and distances using angular measurements.

UNIT-I	INTRODUCTION AND BASIC CONCEPTS	Classes: 12

Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying.

Measurement of Distances and Directions
Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections.
Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination and dip.

UNIT-II	LEVELING	Classes: 12

Types of levels and levelling staves, temporary adjustments, methods of levelling, booking
and Determination of levels, Effect of Curvature of Earth and Refraction.
Contouring- Characteristics and uses of Contours, methods of contour surveying.
Areas - Determination of areas consisting of irregular boundary and regular boundary.
Volumes - Determination of volume of earth work in cutting and embankments for level section,
volume of borrow pits, capacity of reservoirs.

UNIT-III	THEODOLITE SURVEYING	Classes: 12

Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal
angle by repetition method and reiteration method, measurement of vertical Angle,
Trigonometrical levelling when base is accessible and inaccessible.
Traversing: Methods of traversing, traverse computations and adjustments, Omitted
measurements.

UNIT-IV	CURVES	Classes: 12

Types of curves and their necessity, elements of simple, compound, reverse, transition and
vertical curves. Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods
of Tacheometry,
Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station-
advantages and Applications. Field Procedure for total station survey, Errors in Total Station
Survey, Global Positioning System- Principle and Applications.

UNIT-V	PHOTOGRAMMETRY SURVEYING GPS	Classes: 12

Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt
displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension
for photographic mapping- aerial triangulation, radial triangulation, methods; photographic
mapping- mapping using paper prints, mapping using stereoplotting instruments, mosaics, map
substitutes.

Study on GPS- Introduction to Global Positioning System, Components of GPS,GPS Survey
Planning, GPS Survey Techniques

TEXT BOOKS

1. Chandra A M, "Plane Surveying and Higher Surveying", New age International Pvt. Ltd.,
   Publishers, New Delhi.
2. Duggal S K, "Surveying (Vol. I and II), Tata McGraw Hill Publishing Co. Ltd. New Delhi.
3. Bhavikatti, S.S., "Surveying and Levelling", I.K. International, Vol. I and II, 2010.
4. Manoj, K. Arora and Badjatia, "Geomatics Engineering", Nem Chand & Bros, 2011.

REFERENCE BOOKS

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill.
2. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi
3. Anji Reddy, M., "Remote sensing and Geographical information system", B. S.
   Publications, 2001
4. Arora, K.R., "Surveying", Standard Book House, Vol-I, II and III, 2015.

WEB REFERENCES

1. https://nptel.ac.in/courses/105104100/43
2. https://www.coloradomesa.edu/wccc/programs/land-surveying-geomatics.html.
3. https://books.google.co.in/books?id=FaCgAAQBAJ&printsec=frontcover&dq=surveying+and+geomatics+ONLINE+text+books&hl=en&sa=X&ved=0ahUKEwi1wP3x24HgAhUJ5o8KH
4. S2EDzkQ6AEIMzAB# v=onepage&q&f=false
5. https://nptel.ac.in/courses/105104100/43

E -TEXT BOOKS

1. https://www.jntubook.com/surveying-textbook-free-download
2. http://www.freeengineeringbooks.com/Civil/Surveying-Books.php
3. https://www2.unb.ca/gge/Study/Undergraduate/Handbook.pdf

MOOCS COURSE

1. https://nptel.ac.in/courses/105/107/105107122/
2. https://nptel.ac.in/courses/105/107/105107122/

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DEPARTMENT OF CIVIL ENGINEERING

FLUID MECHANICS

II B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE304PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

The student will develop competencies in

1. The application of Disaster Concepts to Management
2. Analyzing Relationship between Development and Disasters.
3. Ability to understand Categories of Disasters and
4. Realization of the responsibilities to society

COURSE OUTCOMES

1. Is to introduce the concepts of fluid mechanics useful in Civil Engineering applications.
2. The course provides a first level exposure to the students to fluid statics, kinematics and dynamics. Measurement of pressure, computations of hydrostatic forces on structural components and the concepts of Buoyancy all find useful applications in many engineering problems.
3. A training to analyse engineering problems involving fluids – such as those dealing with pipe flow, open channel flow, jets, turbines and pumps, dams and spillways, culverts, river and groundwater flow - with a mechanistic perspective is essential for the civil engineering students.

UNIT-I	PROPERTIES OF FLUID & FLUID STATICS	Classes: 12

Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavitation; surface tension, capillarity, Bulk modulus of elasticity, compressibility.
Fluid Pressure: Pressure at a point, Pascals law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U-Tube Differential Manometer, Micromanometers. pressure gauges. Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT-II	FLUID KINEMATICS & FLUID DYNAMICS	Classes: 12

Classification of fluid flow: steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two- and three-dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two- and three-dimensional continuity equations in Cartesian coordinates.

Surface and Body forces -Euler's and Bernoulli's equation; Energy correction factor; Momentum equation. Vortex flow – Free and Forced. Bernolli's equation to real fluid flows. Resistance to flow of fluid on smooth and rough pipes; Moody's diagram.

UNIT-III	FLOW MEASUREMENT IN PIPES & FLOW OVER NOTCHES & WEIRS	Classes: 12

Practical applications of Bernoulli's equation: venturimeter, orifice meter and pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend.

Flow through rectangular; triangular and trapezoidal notches and weirs; End contractions; Velocity of approach. Broad crested weir.

UNIT-IV	FLOW THROUGH PIPES	Classes: 12

Reynolds experiment, Reynolds number, Loss of head through pipes, Darcy-Wiesbatch equation, minor losses, total energy line, hydraulic grade line, Pipes in series, equivalent pipes, pipes in parallel, siphon, branching of pipes, three reservoir problem, power transmission through pipes. Analysis of pipe networks: Hardy Cross method, water hammer in pipes and control measures.

UNIT-V	LAMINAR & TURBULENT FLOW & BOUNDARY LAYER CONCEPTS	Classes: 12

Laminar flow through: circular pipes, annulus and parallel plates.

Boundary Layer Analysis-Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and Turbulent boundary layers on a flat plate; Laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Separation and Control. Definition of Drag and Lift and types drag, magnus effect.

TEXT BOOKS

1. Hydraulics and Fluid Mechanics, P M Modi and S M Seth, Standard Book House
2. Fluid Mechanics and Machinery, C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli, Oxford
3. University Press, 2010
4. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill
5. Fluid Mechanics with Engineering Applications, R.L. Daugherty and J.B. Franzini.
6. International Student Edition, McGraw Hill

REFERENCE BOOKS

1. Mechanics of Fluids by Potter, M.C D.C Wiggers, B.H RamdanCengage, 2012.
2. Fluid Mechanics by J F Douglas, J M Gasiorek, J A Swaffield and L B Jack, Pearson 2015.
3. Fluid Mechanics and Fluid Machines By S. K. Som, GautamBiswas and S. Chakraborty, Mcgraw Hill Education (India) Pvt. Ltd, New Delhi 2015.
4. Engineering Fluid Mechanics By K L Kumar, S Chand, Eurasia Publishing House, New Delhi, 2014.
5. Fluid Mechanics by Dr. A. K. Jain Khanna Publishers, Twelfth Edition 2014.

WEB REFERENCES

1. https://nptel.ac.in/courses/105101082/
2. https://nptel.ac.in/courses/112104118/
3. https://books.google.co.in/books/about/A_Textbook_of_Fluid_Mechanics.html?id=FzQz6A6SnyoC

E -TEXT BOOKS

1. https://www.mechanicalgeek.com/fluid-mechanics-pdf-rk-bansal/
2. https://easyengineering.net/a-textbook-of-fluid-mechanics-and-hydraulic-machines-in-si-units-by-rajput/
3. https://vscht.cz/uchi/ped/hydroteplo/materialy/introduction.fluid.mech.pdf

MOOCS COURSE

1. https://freevideolectures.com/course/3236/fluid-mechanics-i
2. https://www.classcentral.com/university/iit-kharagpur

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DEPARTMENT OF CIVIL ENGINEERING

BASIC ELECTRONICS AND ELECTRICAL ENGINEERING

II B. TECH- I SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
EE305ES	B. Tech	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase
3. circuits
4. To study and understand the different types of DC/AC machines and Transformers.
5. To import the knowledge of various electrical installations.
6. To introduce the concept of power, power factor and its improvement.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. To analyze and solve electrical circuits using network laws.
2. To analyze and solve electrical circuits using theorems.
3. To understand and analyze basic Electric and Magnetic circuits.
4. To study the working principles of Electrical Machines.
5. To introduce components of Low Voltage Electrical Installations.

UNIT-I	D.C. CIRCUITS	Classes: 15

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenins and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II	A.C. CIRCUITS	Classes: 10

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series RL-C circuit.

UNIT-III	TRANSFORMERS	Classes: 12

Ideal and practical transformer, EMF equation , operation on no load and on load, OC and SC tests, phasor diagrams equivalent circuit, losses in transformers, regulation, Efficiency and condition for maximum efficiency ,Auto-transformer.

UNIT-IV	ELECTRICAL MACHINES	Classes: 12

Generation of rotating magnetic fields, Construction and working of a three-phase induction Motor, Significance of torque-slip characteristics. Loss components and efficiency. Construction, working, torque-speed characteristics of separately excited, Shunt, series and Compound motors torques – Speed Characteristics.

UNIT-V	ELECTRICAL INSTALLATIONS	Classes: 12

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Electrical Safety precautions, electric shock, first aid for electric shock safety rules.

TEXT BOOKS

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010.

REFERENCE BOOKS

1. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.
2. P.V.Prasad, S.sivanagaraju, R.Prasad, "Basic Electrical and Electronics
3. Engineering" Cengage Learning, 1st Edition, 2013.
4. V. D. Toro, – Electrical Engineering Fundamentals Prentice Hall India, 1989.

WEB REFERENCES

1. https://www.electrical4u.com/
2. http://www.basicsofelectricalengineering.com/
3. https://www.khanacademy.org/science/physics/circuits-topic/circuits-resistance/a/ee-voltage-and-current
4. https://circuitglobe.com/

E -TEXT BOOKS

1. https://easyengineering.net/basic-electrical-engineering-by-wadhwa/
2. https://easyengineering.net/objective-electrical-technology-by-mehta/

MOOCS COURSE

1. https://nptel.ac.in/courses/108108076/1
2. https://nptel.ac.in/courses/108102146/
3. https://nptel.ac.in/courses/108108076/35

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DEPARTMENT OF CIVIL ENGINEERING

SURVEYING LABORATORY

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
II B. TECH- I SEMESTER (R 20)								
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
CE306PC	**B. Tech**	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn
1. To impart the practical knowledge in the field- measuring distances, directions, angles.
2. To determining R.L.'s areas and volumes
3. To set out Curves
4. To stake out points
5. To traverse the area
6. To draw Plans and Maps

COURSE OUTCOMES

At the end of the course, the student will be able to:
1. To impart the practical knowledge in the field- measuring distances, directions, angles.
2. Apply the principle of surveying for civil Engineering Applications
3. Calculation of areas, Drawing plans and contour maps using different measuring• equipment at field level
4. Write a technical laboratory report

LIST OF EXPERIMENTS

1. Surveying of an area by chain, and compass survey (closed traverse) & plotting.
2. Determine of distance between two inaccessible points with compass
3. Radiation method, intersection methods by plane table survey.
4. Levelling – Longitudinal and cross-section and plotting
5. Measurement of Horizontal and vertical angle by theodolite
6. Trigonometric leveling using theodolite
7. Height and distances using principles of tachometric surveying
8. Determination of height, remote elevation, distance between inaccessible points using total station
9. Determination of Area using total station and drawing map
10. Traversing using total station for drawing contour map
11. Stake out using total station
12. Setting out Curve using total station
13. Surveying of an area by Chaining across obstacles

TEXT BOOKS

1. Chandra A M, "Plane Surveying and Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi)
2. Duggal S K, "Surveying (Vol. I and II), Tata McGraw Hill Publishing Co. Ltd. New Delhi.
3. Bhavikatti, S.S., "Surveying and Levelling", I.K. International, Vol. I and II, 2010

4. Manoj, K. Arora and Badjatia, "Geomatics Engineering", Nem Chand & Bros, 2011

REFERENCE BOOKS

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill
2. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi.
3. Anji Reddy, M., "Remote sensing and Geographical information system", B. S. Publications, 2001

WEB REFERENCES

1. https://nptel.ac.in/courses/105104100/43
2. https://www.coloradomesa.edu/wccc/programs/land-surveying-geomatics.html

E -TEXT BOOKS

1. https://www.jntubook.com/surveying-textbook-free-download
2. http://www.freeengineeringbooks.com/Civil/Surveying-Books.php

MOOCS COURSE

1. https://nptel.ac.in/courses/105/107/105107122/
2. https://nptel.ac.in/courses/105/107/105107123/

DEPARTMENT OF CIVIL ENGINEERING

STRENGTH OF MATERIALS LABORATORY

II B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE307PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn

1. Make measurements of different strains, stress and elastic properties of materials used in Civil Engineering.
2. Provide physical observations to complement concepts learnt
3. Introduce experimental procedures and common measurement instruments, equipment,devices.
4. Exposure to a variety of established material testing procedures and techniques
5. Different methods of evaluation and inferences drawn from observations

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Configure & Operate a data acquisition system using various testing machines of solid materials
2. Compute and Analyze engineering values (e.g. stress or strain) from laboratory measurements.
3. Write a technical laboratory report

LIST OF EXPERIMENTS

1. Tension test
2. Bending test on Cantilever beam (Wood/Steel)
3. Bending test on simply supported beam (Wood/Steel)
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's reciprocal theorem on beams
11. Use of electrical resistance strain gauge
12. Bending test on Continuous beam (Wood/Steel)
13. Uni - axial tension test on a ductile material.

TEXT BOOKS

1. Strength of Materials by R.K Rajput, S. Chand &CompanyLtd.
2. Mechanics of Materials by Dr. B. C Punmia, Dr. Ashok Kumar Jain and Dr. Arun KumarJain
3. Strength of Materials by R. Subramanian, Oxford UniversityPress.
4. Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New

York, USA

REFERENCE BOOKS

1. Mechanics of Materials by R.C. Hibbeler, PearsonEducation
2. Engineering Mechanics of Solids by Popov E.P. Prentice-HallLtd
3. Strength of Materials by T.D.Gunneswara Rao and M.Andal, CambridgePublishers

WEB REFERENCES

1. https://easyengineering.net/a-textbook-of-strength-of-materials/
2. https://books.google.co.in/books/about/A_Textbook_of_Strength_of_Materials.html?id=2IHEqp8dNWwC

E -TEXT BOOKS

1. https://easyengineering.net/a-textbook-of-strength-of-materials/
2. http://www.allexamresults.net/2015/10/Download-Pdf-strengthofmaterials-by-rk-Bansal.html

MOOCS COURSE

1. https://www.coursera.org/learn/materials-structures
2. https://www.coursera.org/learn/materials-structures

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DEPARTMENT OF CIVIL ENGINEERING

FLUID MECHANICS LAB

II B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE308PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

The objective of this Course is
1. To identify the behaviour of analytical models introduced in lecture to the actual behaviour of real fluid flows.
2. To explain the standard measurement techniques of fluid mechanics and their applications.
3. To illustrate the students with the components and working principles of the Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
4. To analyze the laboratory measurements and to document the results in an appropriate format.

COURSE OUTCOMES

At the end of the course, the student will be able to:
1. Describe the basic measurement techniques of fluid mechanics and its appropriate application. Interpret the results obtained in the laboratory for various experiments.
2. Discover the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
3. Compare the results of analytical models introduced in lecture to the actual behaviour of real fluid flows and draw correct and sustainable conclusions.
4. Write a technical laboratory report

LIST OF EXPERIMENTS

1. Determination of Coefficient of discharge for a small orifice by a constant head method
2. Determination of Coefficient of discharge for a mouth piece
3. Determination of Coefficient of discharge for Triangular / Rectangular Notch
4. Determination of Friction factor for a pipe line
5. Determination of Minor losses in a pipe -sudden expansion
6. Determination of Minor losses in a pipe – Sudden contraction
7. Calibration of Venture meter
8. Calibration of Orifice meter
9. Verification of Bernoulli's Theorem
10. Study of Water hammer effect due to sudden closure of valve

TEXT BOOKS

1. Fluid mechanics and Hydraulic machines by Modi & Seth
2. Fluid mechanics and Hydraulic machines by Raj put

	3. Fluid mechanics and fluid power engineering by D.S. Kumar

REFERENCE BOOKS
1. Fluid mechanics and machinery by D.Rama durgaiah. 2. Hydraulic machines by Banga & Sharma 3. Instrumentation for engineering Measurements by James W. Dally, William E. Riley

WEB REFERENCES
1. https://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/machine/ui/Course_home-1.htm 2. https://lecturenotes.in/subject/560/hydraulics-and-hydraulic-machinery-hhm 3. https://imammaolana.files.wordpress.com/2010/11/hydraulic_machines_textbook.pdf

E -TEXT BOOKS
1. https://www.brijrbedu.org/Brij%20Data/Fluid%20Mechanics/Book/A%20Textbook%20of%20Fluid%20Mechanics%20&%20Hydraulic%20Machines%20By%20R%20K%20Bansal%209%20Ed.pdf. 2. https://mechanicalstudents.com/pdffluid-mechanics-textbook-by-rk-bansal-free-download-2/ 3. https://easyengineering.net/a-textbook-of-fluid-mechanics-and-hydraulic-machines-in-si-units-byrajput/

MOOCS COURSE
1. https://nptel.ac.in/courses/105103096/ 2. https://nptel.ac.in/courses/105103096/

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DEPARTMENT OF CIVIL ENGINEERING

GENDER SENSITISATION

II B. TECH- I SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
GS309MC	**B. Tech**	L	T	P	C	CIE	SEE	Total
		3	0	0	-	100	-	100

COURSE OBJECTIVES

To learn

1. To develop students' sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

COURSE OUTCOMES

Students will have developed a better understanding of important issues related to gender in contemporary India.

1. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
2. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
3. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
4. Men and women students and professionals will be better equipped to work and live together as equals.
5. Students will develop a sense of appreciation of women in all walks of life.
6. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I	UNDERSTANDING GENDER	Classes: 12

Gender: Why Should We Study It? (Towards a World of Equals: Unit -1)
Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2)
Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT-II	GENDER AND BIOLOGY	Classes: 12

Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit -4)
Declining Sex Ratio. Demographic Consequences.
Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10)
Two or Many? Struggles with Discrimination.

UNIT-III	GENDER AND LABOUR	Classes: 12

Housework: the Invisible Labour (Towards a World of Equals: Unit -3)
"My Mother doesn't Work." "Share the Load."
Women's Work: Its Politics and Economics (Towards a World of Equals: Unit -7)
Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and
Conditions of Work.

UNIT-IV	ISSUES OF VIOLENCE	Classes: 12

Sexual Harassment: Say No! (Towards a World of Equals: Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading:
"Chupulu".
Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8)
Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New
Forums for Justice.
Thinking about Sexual Violence (Towards a World of Equals: Unit -11)
Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

UNIT-V	GENDER: CO – EXISTENCE	Classes: 12

Just Relationships: Being Together as Equals (Towards a World of Equals: Unit -12)
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.
Additional Reading: Rosa Parks-The Brave Heart.

TEXT BOOKS

1. All the five Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, VasudhaNagaraj, AsmaRasheed, GoguShyamala, DeepaSreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year 2015.

REFERENCE BOOKS

1.Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2.AbdulaliSohaila. "I Fought For My Life…and Won."Available online
at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

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DEPARTMENT OF CIVIL ENGINEERING

STRUCTURAL ANALYSIS-I

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE401PC	B. Tech	3	1	0	4	30	70	100

II B. TECH- II SEMESTER (R 20)

COURSE OBJECTIVES

To learn

1. The Course will try to introduce the overall concept of structural analysis of different structures especially indeterminate beams, frames etc. which will help the student to understand and solve the different structural members of a structure

COURSE OUTCOMES

At the end of the course students will be able to

1. Analyse the effects of moving loads on simply supported beams and trusses by influence line diagrams.
2. Analyse determinate beams and trusses by strain energy theorems. Differentiate the statically determinate and indeterminate structures.
3. Analyse the statically indeterminate bars
4. Analyse continuous beams and portal frames by slope deflection method.
5. Analyse continuous beams and portal frames by Moment distribution method

UNIT-I	ANALYSIS OF PERFECT FRAMES	Classes: 12

Types of frames - Perfect, Imperfect and Redundant pin jointed plane frames - Analysis of determinate pin jointed plane frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT-II	ENERGY THEOREMS & THREE HINGED ARCHES	Classes: 12

Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's theorem-Unit Load Method - Deflections of simple beams and pin- jointed plane frames - Deflections of statically determinate bent frames.

Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches - Linear Arch - Eddy's theorem - Analysis of Three hinged arches – Normal Thrust and radial shear and bending moment - Geometrical properties of parabolic and circular arches - Three hinged parabolic circular arches having supports at different levels.

UNIT-III	PROPPED CANTILEVER & FIXED BEAMS	Classes: 12

Determination of static and kinematic indeterminacies for beams- Analysis of Propped cantilever

and fixed beams, including the beams with different moments of inertia - subjected to uniformly distributed load - point loads - uniformly varying load, couple and combination of loads - Shear force, Bending moment diagrams and elastic curve for Propped Cantilever and Fixed Beams - Deflection of Propped cantilever and fixed beams - effect of sinking of support, effect of rotation of a support.

UNIT-IV	CONTINUOUS BEAMS & SLOPE DEFLECTION METHOD	Classes: 12

Introduction-Continuous beams - Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed-continuous beams with overhang - effect of sinking of supports.

Derivation of slope-deflection equation, application to continuous beams with and without sinking of supports - Determination of static and kinematic indeterminacies for frames - Analysis of Single Bay, Single storey Portal Frames by Slope Deflection Method including Side Sway - Shear force and bending moment diagrams and Elastic curve.

UNIT-V	MOVING LOADS & INFLUENCE LINES	Classes: 12

Introduction maximum SF and BM at a given section and absolute maximum shear force and bending moment due to single concentrated load ,uniformly distributed load longer than the span, uniformly distributed load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load- Focal length - Definition of influence line for shear force and bending moment - load position for maximum shear force and maximum bending Moment at a section - Point loads, uniformly distributed load longer than the span, uniformly distributed load shorter than the span- Influence lines for forces in members of Pratt and Warren trusses - Equivalent uniformly distributed load -Focal length.

TEXT BOOKS

1. B.C. Punmia, A.K Jain &A.K.Jain [2014], SMTS–2, Theory of Structures, Laxmi Publications.
2. C.S.Reddy [2011], Basic Structural Analysis, Tata McGraw Hill.
3. C.K.Wang, Indeterminate Structural Analysis, Standard Publication House.
4. L.S.NEGI, R.S.JANGID, Structural Analysis, Tata McGraw Hill.

REFERENCE BOOKS

1. Timoshenko & Young, Theory of Structures, Tata McGraw Hill.
2. Wilbur and Norri's , Elementary Structural Analysis, Tata McGraw Hill.
3. Vazirani&Ratwani [2013], Analysis of Structures–Vol.II, Khanna Publishers.
4. Ramamrutham [2012], Theory of Structures, DhapatRai Publications

WEB REFERENCES

1. https://nptel.ac.in/courses/105105166/
2. https://nptel.ac.in/courses/105105166/21
3. https://nptel.ac.in/courses/105105166/36

E -TEXT BOOKS

1. http://www.faadooengineers.com/threads/18572-Structural-Analysis-Full-Book-in-pdf-All-units-of-structure-I-II-III

2. https://www.researchgate.net/publication/292539849_REVIEW_OF_BASICS_IN_STRUCTURAL_ANALYSIS

3. http://civilium-ju.com/wp-content/uploads/2018/02/Hibbeler-Structural-Analysis-8th-ED.pdf

MOOCS COURSE

1. https://nptel.ac.in/courses/105105166/21
2. https://nptel.ac.in/courses/105105166/36

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DEPARTMENT OF CIVIL ENGINEERING

STRENGTH OF MATERIALS - II

II B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE402PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

The objective of this Course is

1. To understand the nature of stresses developed in simple geometries shafts, springs, columns &cylindrical and spherical shells for various types of simple loads
2. To calculate the stability and elastic deformation occurring in various simple geometries for different types of loading.
3. To understand the unsymmetrical bending and shear center importance for equilibrium conditions in a structural member of having different axis of symmetry.

COURSE OUTCOMES

On completion of the course, the student will be able to:

1. Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of structures and mechanical components in particular to torsion and direct compression;
2. To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading
3. Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses;
4. Understand and evaluate the shear center and unsymmetrical bending.
5. Frame an idea to design a system, component, or process

UNIT-I	TORSION OF CIRCULAR SHAFTS	Classes: 12

TORSION OF CIRCULAR SHAFTS: Theory of pure torsion – Derivation of Torsion equation - Assumptions made in the theory of pure torsion – Polar section modulus – Power transmitted by shafts – Combined bending and torsion – Design of shafts according to theories of failure.

SPRINGS: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel.

UNIT-II	COLUMNS AND STRUTS	Classes: 12

COLUMNS AND STRUTS: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions –

Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory– Long columns subjected to eccentric loading – Secant formula – Empirical formulae —Rankine – Gordon formula- Straight line formula – Prof. Perry's formula.

BEAM COLUMNS: Laterally loaded struts – subjected to uniformly distributed and concentrated loads.

UNIT-III	**DIRECT AND BENDING STRESSES**	**Classes: 12**

Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of retaining walls, chimneys and dams – conditions for stability-Overturning and sliding – stresses due to direct loading and bending moment about both axis.

UNIT-IV	**THIN CYLINDERS**	**Classes: 12**

THIN CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

THICK CYLINDERS: Introduction - Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage.

UNIT-V	**UNSYMMETRICAL BENDING**	**Classes: 12**

UNSYMMETRICAL BENDING: Introduction – Centroidal principal axes of section –Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis. Determination of stresses in retaining walls & dams.

SHEAR CENTRE: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L)sections

TEXT BOOKS

1. Strength of Materials by R.K Rajput, S. Chand &CompanyLtd.
2. Mechanics of Materials by Dr. B. C Punmia, Dr. Ashok Kumar Jain and Dr. Arun KumarJain
3. Strength of Materials by R. Subramanian, Oxford UniversityPress.
4. Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New York, USA.

REFERENCE BOOKS

1. Mechanics of Materials by R.C. Hibbeler, PearsonEducation
2. Engineering Mechanics of Solids by Popov E.P. Prentice-HallLtd
3. Strength of Materials by T.D.Gunneswara Rao and M.Andal, CambridgePublishers
4. Strength of Materials by R. K. Bansal, Lakshmi Publications House Pvt.Ltd.
5. Fundamentals of Solid Mechanics by M. L. Gambhir, PHI Learning Pvt.Ltd

WEB REFERENCES

1. https://easyengineering.net/a-textbook-of-strength-of-materials/
2. https://books.google.co.in/books/about/A_Textbook_of_Strength_of_Materials.html?id=2IHEqp8dNWwC

3. https://www.oreilly.com/library/view/strength-of-materials/9789332514829/

E -TEXT BOOKS

1. https://easyengineering.net/a-textbook-of-strength-of-materials/
2. http://www.allexamresults.net/2015/10/Download-Pdf-strengthofmaterials-by-rk-Bansal.html
3. http://varunkamboj.typepad.com/files/engineering-strength of materials-II.pdf

MOOCS COURSE

1. https://www.classcentral.com/course/coursera-mechanics-of-materials-ii-thin-walled-pressure-vessels-and-torsion-5385
2. https://www.coursera.org/learn/materials-structures.
3. https://www.coursera.org/courses?query=mechanics%20of%20materials

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DEPARTMENT OF CIVIL ENGINEERING

HYDRAULICS AND HYDRAULIC MACHINERY

II B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE403PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

The objective of this Course is

1. Strengthen the knowledge of theoretical and technological aspects of hydrodynamic forces on jets
2. Correlate the principles with applications in hydraulic turbines.
3. Apply the practical applications on Francis and Kaplan turbine.
4. Analysis the similarities between prototype and model types of hydraulic similitude

COURSE OUTCOMES

On completion of the course, the student will be able to:

1. Describe the concept of different types of flows, designing of most economical sections of the Open Channel and to understand the concept of specific energy.
2. Describe the concept of dimensional quantities and application of similitude concept in designing model and prototype.
3. Understand the concept, working applications of impact of jets with the importance of constructing velocity triangles.
4. Explore the design concept of Pelton, Francis and Kaplan turbines, Centrifugal pumps along with the design of most economical designs.
5. Understand the working mechanism of different types of the pumps with their important characteristic curves.

UNIT-I	Open Channel Flow – I	Classes: 12

Introduction to Open channel flow-Comparison between open channel flow and pipe flow, Classification of open channels, Classification of open channel flows, Velocity distribution. Uniform flow – Characteristics of uniform flow, Chezy's, Manning's and Bazin formulae for uniform flow – Factors affecting Manning's Roughness Coefficient "n". Most economical sections. Computation of Uniform flow, Normal depth.

Critical Flow: Specific energy – critical depth - computation of critical depth – critical, sub critical and super critical flows-Channel transitions.

UNIT-II	OPEN CHANNEL FLOW – II	Classes: 12

Non-uniform flow – Gradually Varied Flow - Dynamic equation for G.V.F; Classification of channel bottom slopes – Classification and characteristics of Surface profiles – Computation of water surface profiles by Numerical and Analytical approaches. Direct step method.

Rapidly varied flow: Elements and characteristics (Length and Height) of Hydraulic jump in rectangular channel– Types, applications and location of hydraulic jump, Energy dissipation and other uses – Positive and Negative Surges (Theory only).

UNIT-III	DIMENSIONAL ANALYSIS AND HYDRAULIC SIMILITUDE	Classes: 12

Dimensional homogeneity – Rayleigh's method and Buckingham's pi methods – Dimensionless groups. Similitude, Model studies, Types of models. Application of dimensional analysis and model studies to fluid flow problems. Distorted models.

Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency – Angular Buoyancy & Metacentre of submerged objects Metacentric height

UNIT-IV	HYDRAULIC TURBINES – I	Classes: 12

Elements of a typical Hydropower installation – Heads and efficiencies – Classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine – working, working proportions, velocity diagram, work done and efficiency, hydraulic design. Draft tube – Classification, functions and efficiency.

Hydraulic Turbines – II: Governing of turbines – Surge tanks – Unit and specific turbines – Unit speed – Unit quantity – Unit power – Specific speed – Performance characteristics – Geometric similarity – Cavitation. Selection of turbines.

UNIT-V	CENTRIFUGAL PUMPS	Classes: 12

Pump installation details – classification – work done – Manometric head – minimum starting speed – losses and efficiencies – specific speed. Multistage pumps – pumps in parallel – performance of pumps – characteristic curves – NPSH – Cavitation.

Hydropower Engineering: Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS

1. Open Channel flow by K. Subramanya, Tata McGraw Hill Education (India) Pvt Ltd.
2. Fluid Mechanics & Machinery by CSP Ojha, P.N. Chandramouli and R. Berndtsson Oxford University Press.
3. Hydraulic Machines by K. Subramanya McGraw Hill Education(India) Pvt Ltd, 2013

REFERENCE BOOKS

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard Book House, New Delhi.
2. Elements of Open channel flow by Ranga Raju, McGraw Hill Education(India) Pvt Ltd, 2013
3. Flow Through Open Channels by Rajesh Srivastava, Oxford University Press, 2011
4. Open Channel flow Hydraulics by R.H. French, McGraw Book Company, New York, 1986.
5. Fluid Mechanics by Dr. A. K. Jain Khanna Publishers 2016

WEB REFERENCES

1. https://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/machine/ui/Course_home-1.htm
2. https://lecturenotes.in/subject/560/hydraulics-and-hydraulic-machinery-hhm
3. https://imammaolana.files.wordpress.com/2010/11/hydraulic_machines_textbook.pdf

E -TEXT BOOKS

1. https://lecturenotes.in/subject/188/concrete-technology-ct
2. http://www.alphace.ac.in/downloads/notes/cv/10cv42.pdf
3. https://www.slideshare.net/shamjithkeyem/concrete-technology-study-notes
4. https://easyengineering.net/sri-krishna-institute-concrete-technology-notes/

MOOCS COURSE

1. https://www.brijrbedu.org/Brij%20Data/Fluid%20Mechanics/Book/A%20Textbook%20of%20Fluid%20Mechanics%20&%20Hydraulic%20Machines%20By%20R%20K%20Bansal%209%20Ed.pdf.
2. https://mechanicalstudents.com/pdffluid-mechanics-textbook-by-rk-bansal-free-download-2/
3. https://easyengineering.net/a-textbook-of-fluid-mechanics-and-hydraulic-machines-in-si-units-byrajput/

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DEPARTMENT OF CIVIL ENGINEERING

ENGINEERING GEOLOGY

II B. TECH- II SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
CE404ES	**B. Tech**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100

COURSE OBJECTIVES

The objective of this Course is

1. To give the basics knowledge of Geology that is required for constructing various Civil Engineering Structures, basic Geology, Geological Hazardous and Environmental Geology
2. To focus on the core activities of engineering geologists – site characterization and geologic hazard identification and mitigation. Planning and construction of major Civil Engineering projects
3. Engineering geology is an applied geology discipline that involves the collection, analysis, and interpretation of geological data and information required for the safe development of civil works.

COURSE OUTCOMES

On completion of the course, the student will be able to:

1. Site characterization and how to collect, analyze, and report geologic data using standards in engineering practice
2. The fundamentals of the engineering properties of Earth materials and fluids.
3. Distinguish features of igneous, sedimentary and metamorphic rocks.
4. Distinguish various geological structures.
5. Analyze the failures of dams, reservoirs and tunnels due to geological reasons.
6. Rock mass characterization and the mechanics of planar rock slides and topples

UNIT-I	**ROCKS**	**Classes: 12**

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. Importance of Physical geology, Petrology and Structural geology.

Weathering of Rocks: Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like "Granite"

UNIT-II	**MINERALOGY**	**Classes: 12**

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Basic of optical mineralogy, SEM, XED., Study of physical properties of following common rock forming minerals: Feldsper, Quartiz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite,

Hematite, Magnetite, Chrorite , Galena , Pyrolusite, Graphite, Magnesite, and Bauxite.

Petrology: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laerite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT-III	STRUCTURAL GEOLOGY	Classes: 12

Structural Geology: Rock masses as construction material: Definition of Rock masses. Main features constituting rock mass. Main features that affects the quality of rock engineering an design. Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults uncomfornities, and joints - their important types and case studies. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils. Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT-IV	EARTH QUAKES	Classes: 12

Earth Quakes: Magnitude and intensity of Earthquake. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas, Seismic zone in India. Landslides, their causes and effect; measures to be taken to prevent their occurrence.

Importance of Geophysical Studies: Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT-V	GEOLOGY OF DAMS, RESERVOIRS, AND TUNNELS	Classes: 12

Geology of Dams, Reservoirs, and Tunnels: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Factors contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs - Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (i.e. Tithological, structural and ground water) in tunneling over break and lining in tunnels. Failures in Reservoirs, Influence of geology for successful tunneling.

TEXT BOOKS

1. Engineering Geology by N. Chennakesavulu, McMillan, India Ltd. 2005
2. Engineering Methods by D. Venkat Reddy; Vikas Publishers 2015.
3. Engineering Geology by S K Duggal, H K PandeyMcGraw Hill Education Pvt Ltd 2014
4. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications

REFERENCE BOOKS

1. F.G. Bell, Fundamental of Engineering B.S. Publications, 2005.
2. Krynine& Judd, Principles of Engineering Geology &Geotechnics, CBS Publishers & Distribution
3. Engineering Geology by SubinoyGangopadhyay, Oxford university press.
4. Engineering Geology for Civil Engineers – P.C. Varghese PHI
5. Geology for Geotechnical Engineers, J.C.Harvey, Cambridge University Press (1982).

WEB REFERENCES

1. https://web.mst.edu/~rogersda/umrcourses/ge341/
2. https://www.aegweb.org/page/Earthquakes
3. https://www.rockmass.net/information

E -TEXT BOOKS

1. https://easyengineering.net/engineering-geology-books-collection/
2. https://drive.google.com/a/smec.ac.in/uc?id=17jtbuLIyvSWWGUYN_BcebtPY_M5hQ6TK &export=download
3. http://www.sasurieengg.com/e-course-material/CIVIL/IIYear%20Sem%203/CE6301%20Engineering%20Geology.pdf

MOOCS COURSE

1. https://nptel.ac.in/courses/105105106/
2. https://www.mooc-list.com/tags/engineering-geology
3. https://www.edx.org/learn/geology

DEPARTMENT OF CIVIL ENGINEERING

BUILDING MATERIALS CONCTRUCTION AND PLANNING

II B. TECH- II SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
CE405PC	**B. Tech**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100

COURSE OBJECTIVES

The objective of this Course is

1. List the construction material.
2. Explain different construction techniques
3. Understand the building bye-laws
4. Highlight the smart building materials

COURSE OUTCOMES

On completion of the course, the student will be able to:

1. Define the Basic terminology that is used in the industry
2. Categorize different building materials, properties and their uses
3. Understand the Prevention of damage measures and good workmanship
4. Explain different building services

UNIT-I	STONES AND BRICKS	Classes: 12

Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing.
Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics.
Timber, Aluminum, Glass, Paints and Plastics: Wood - structure – types and properties – seasoning – defects; alternate materials for Timber – GI / fibre – reinforced glass bricks, steel &aluminum, Plastics.

UNIT-II	CEMENT & ADMIXTURES	Classes: 12

Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests.
Admixtures – mineral & chemical admixtures – uses.

UNIT-III	BUILDING COMPONENTS AND BUILDING SERVICES	Classes: 12

Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed; foundations – types; Damp Proof Course; Joinery – doors – windows – materials – Types. Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire Hazards – Classification of

fire- resistant materials and constructions	

UNIT-IV	**MORTARS, MASONRY AND FINISHING'S MORTARS**	**Classes: 12**

Lime and Cement Mortars Brick masonry – types – bonds; Stone masonry – types; Composite masonry – Brick-stone composite; Concrete, Reinforced brick.
Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.
Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT-V	**BUILDING PLANNING**	**Classes: 12**

Principles of Building Planning, Classification of buildings and Building by laws.

Green Buildings and New Building Material Concepts.(Fiber Reinforced Concrete, Different Bricks, Translucent Concrete)

TEXT BOOKS

1. Building Materials and Construction – Arora&Bindra, Dhanpat Roy Publications.
2. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.

REFERENCE BOOKS

1. Building Materials by Duggal, New Age International.
2. Building Materials by P. C. Varghese, PHI.
3. Building Construction by PC Varghese PHI.
4. Construction Technology – Vol – I & II by R. Chubby, Longman UK.
5. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications.

WEB REFERENCES

1. http://www.nptelvideos.in/2012/11/building-materials-and-construction.html
2. https://nptel.ac.in/courses/105102088/
3. https://sites.google.com/a/mitr.iitm.ac.in/iitmcivil/ce2330

E -TEXT BOOKS

1. https://www.pdfdrive.com/building-materials-construction-planning-textbook-free-e37863771.html
2. https://ondoc.logand.com/d/4061/pdf
3. https://www.alljntuworld.in/download/building-materials-construction-planning-bmcp-materials-notes/

MOOCS COURSE

1. http://www.nptelvideos.in/2012/11/building-materials-and-construction.html
2. https://sites.google.com/a/mitr.iitm.ac.in/iitmcivil/ce2330

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DEPARTMENT OF CIVIL ENGINEERING

COMPUTER AIDED DRAFTING OF BUILDINGS LABORATORY

II B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE406PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn
1. The objective of this lab is to teach the student basic drawing Fundamentals in various civil engineering applications, especially in building drawing.

COURSE OUTCOMES

At the end of the course, the student will be able to
1. Master the usage of AutoCAD commands for drawing 2D & 3D building drawings required for different civil engineering applications.

LIST OF EXPERIMENTS

1. Introduction to computer aided drafting and different coordinate system
2. Drawing of Regular shapes using Editor mode
3. Introduction GUI and drawing of regular shapes using GUI
4. Exercise on Draw tools
5. Exercise on Modify tools
6. Exercise on other tools (Layers, dimensions, texting etc.)
7. Drawing of building components like walls, lintels, Doors, and Windows. using CAD software
8. Drawing a plan of Building and dimensioning
9. Drawing a plan of a residential building using layers
10. Developing a 3-D plan from a given 2-D plan
11. Developing sections and elevations for given
    a) Single storied buildings b) multi storied buildings
12. Auto CAD applications in surveying, mechanics etc
13. Development of working drawings of buildings – Electrical Layout
14. Development of working drawings of buildings – Plumbing Layout

TEXT BOOKS

1. Computer Aided Design Laboratory by M. N. SeshaPraksh& Dr. G. S. Servesh –Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

REFERENCE BOOKS

1. M. L. Gambhir, "Fundamentals of reinforced concrete design", Printice Hall of India Pvt. Ltd, New Delhi.
2. P. Purushotham, "Reinforced concrete structural elements – behaviour, Analysis and design", Tata McGraw Hill, 1994.

WEB REFERENCES

1. http://www.nptel.ac.in/courses/105105105/
2. http://www.nptel.ac.in/courses/105105104/

E -TEXT BOOKS

1. http://weccivilians.weebly.com/uploads/2/4/6/2/24623713/design_of_reinforced_concrete_9th_edition_jack_c._mccormac.pdfhttp://www.faadooengineers.com/threads/13449-Engineering-Maths-II-eBook

MOOCS COURSE

1. https://www.pdfdrive.com/computer-aided-design-and-manufacturing-cadcam-techniques-d10304838.html

DEPARTMENT OF CIVIL ENGINEERING

ENGINEERING GEOLOGY LABORATORY

II B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE407ES	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn
1. The objective of this lab is that to provide practical knowledge about physical properties of minerals, rocks, drawing of geological maps, showing faults, uniformities etc.

COURSE OUTCOMES

At the end of the course, the student will be able to:
1. Understands the method and ways of investigations required for Civil Engg projects
2. Identify the various rocks, minerals depending on geological classifications
3. Will able to learn to couple geologic expertise with the engineering properties of rock and unconsolidated materials in the characterization of geologic sites for civil work projects and the quantification of processes such as rock slides and settlement.
4. Write a technical laboratory report.

LIST OF EXPERIMENTS

1. Study of physical properties of minerals.
2. Study of different group of minerals.
3. Study of Crystal and Crystal system.
4. Identification of minerals: Silica group: Quartz, Amethyst, Opal; Feldspar group: Orthoclase, Plagioclase; Cryptocrystalline group: Jasper; Carbonate group: Calcite; Element group: Graphite; Pyroxene group: Talc; Mica group: Muscovite; Amphibole group: Asbestos, Olivine, Hornblende, Magnetite, Hematite, Corundum, Kyanite, Garnet, Galena, Gypsum.
5. Identification of rocks (Igneous Petrology): Acidic Igneous rock: Granite and its varieties, Syenite, Rhyolite, Pumice, Obsidian, Scoria, Pegmatite, Volcanic Tuff. Basic rock: Gabbro, Dolerite, Basalt and its varieties, Trachyte.
6. Identification of rocks (Sedimentary Petrology): Conglomerate, Breccia, Sandstone and its varieties, Laterite, Limestone and its varieties, Shales and its varieties.
7. Identification of rocks (Metamorphic Petrolody): Marble, slate, Gneiss and its varieties, Schist and its varieties. Quartzite, Phyllite.
8. Study of topographical features from Geological maps. Identification of symbols in maps.
9. Simple structural Geology Problems (Folds, Faults & Unconformities)
10. Electrical resistivity Method, Microscopic study of Rocks

TEXT BOOKS

1. Engineering Geology by N. Chennakesavulu, McMillan, India Ltd. 2005
2. Engineering Methods by D. Venkat Reddy; Vikas Publishers 2015.
3. Engineering Geology by S K Duggal, H K PandeyMcGraw Hill Education Pvt Ltd 2014
4. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications

REFERENCE BOOKS

1. F.G. Bell, Fundamental of Engineering B.S. Publications, 2005
2. Krynine& Judd, Principles of Engineering Geology &Geotechnics, CBS Publishers & Distribution
3. Geology for Geotechnical Engineers, J.C.Harvey, Cambridge University Press (1982).

WEB REFERENCES

1. https://web.mst.edu/~rogersda/umrcourses/ge341/
2. https://www.aegweb.org/page/Earthquakes

E -TEXT BOOKS

1. https://easyengineering.net/engineering-geology-books-collection/
2. http://www.sasurieengg.com/e-course-material/CIVIL/IIYear%20Sem%203/CE6301%20Engineering%20Geology.pdf

MOOCS COURSE

1. https://nptel.ac.in/courses/105105106/
2. https://www.mooc-list.com/tags/engineering-geology

DEPARTMENT OF CIVIL ENGINEERING

Hydraulics and Hydraulic Machinery LAB

II B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE408PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

The objective of this Course is
1. To identify the behaviour of analytical models introduced in lecture to the actual behaviour of real fluid flows.
2. To explain the standard measurement techniques of fluid mechanics and their applications.
3. To illustrate the students with the components and working principles of the Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
4. To analyze the laboratory measurements and to document the results in an appropriate format.

COURSE OUTCOMES

At the end of the course, the student will be able to:
1. Describe the basic measurement techniques of fluid mechanics and its appropriate application. Interpret the results obtained in the laboratory for various experiments.
2. Discover the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
3. Compare the results of analytical models introduced in lecture to the actual behaviour of real fluid flows and draw correct and sustainable conclusions.
4. Write a technical laboratory report

LIST OF EXPERIMENTS

1. Impact of jet on vanes
2. Performance Characteristics of a Reciprocating pump
3. Performance Characteristics of a single stage Centrifugal Pump
4. Performance Characteristics of a multi stage Centrifugal Pump
5. Determination of Energy loss due to Hydraulic jump
6. Determination of Manning's and Chezy's constants for Open channel flow
7. Performance Characteristics of Pelton wheel turbine
8. Performance Characteristics of Francis turbine
9. Performance characteristics of Kaplan Turbine

TEXT BOOKS

1. Fluid mechanics and Hydraulic machines by Modi & Seth
2. Fluid mechanics and Hydraulic machines by Raj put
3. Fluid mechanics and fluid power engineering by D.S. Kumar

REFERENCE BOOKS

1. Fluid mechanics and machinery by D.Rama durgaiah.
2. Hydraulic machines by Banga & Sharma
3. Instrumentation for engineering Measurements by James W. Dally, William E. Riley

WEB REFERENCES

1. https://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/machine/ui/Course_home-1.htm
2. https://lecturenotes.in/subject/560/hydraulics-and-hydraulic-machinery-hhm
3. https://imammaolana.files.wordpress.com/2010/11/hydraulic_machines_textbook.pdf

E -TEXT BOOKS

1. https://www.brijrbedu.org/Brij%20Data/Fluid%20Mechanics/Book/A%20Textbook%20of%20Fluid%20Mechanics%20&%20Hydraulic%20Machines%20By%20R%20K%20Bansal%209%20Ed.pdf.
2. https://mechanicalstudents.com/pdffluid-mechanics-textbook-by-rk-bansal-free-download-2/
3. https://easyengineering.net/a-textbook-of-fluid-mechanics-and-hydraulic-machines-in-si-units-byrajput/

MOOCS COURSE

1. https://nptel.ac.in/courses/105103096/
2. https://nptel.ac.in/courses/105103096/

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DEPARTMENT OF CIVIL ENGINEERING

CONSTITUTION OF INDIA

II B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
*CI309MC/ *CI407MC/ *CI707MC/	B. Tech	L	T	P	C	CIE	SEE	Total
		3	0	0	0	100	0	100

COURSE OBJECTIVES

1. Sovereign -independent to conduct internal as well as external affairs
2. Socialist - preventing concentration of wealth into few hands
3. Secular - respecting all religions equally
4. Democratic- government by the people, of the people, for the people
5. Republic - Head of the state will be elected not hereditary

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. To understand the basic concepts of democracy, republicanism, constitutionalism and to know about the constitutional theories, virtues and constitutional interpretation
2. To study and analyze the quasi-federal nature of Indian Constitution and the basic function of a written constitution regarding the allocation of State power, the functions, powers and limits of the organs of state
3. To analyze elaborately regarding the emergency and amendment procedures; the need for granting of special status or special provisions to some states
4. To know about Panchayats, Municipalities, Scheduled and Tribal areas

UNIT-I	INTRODUCTION TO INDIAN CONSTITUTION	Classes: 9

1. Meaning and importance of Constitution
2. Making of Indian Constitution
3. Salient features and the Preamble
4. Fundamental rights
5. Fundamental duties
6. Directive Principles

UNIT-II	THE AMENDMENT OF THE CONSTITUTION	Classes: 8

1. Need for Amendment
2. Types of Amendment
3. Judicial Review of Constituent Power
4. Doctrine of Basic Structure
5. Major Amendments and their Constitutional Values

UNIT-III	UNION & STATE EXECUTIVE AND LEGISLATURE	Classes: 10

1. Lok Sabha & Rajya Sabha (Composition, Powers & Functions)
2. President & Prime Minister (Powers, Functions, position)
3. Supreme Court-Composition, Powers & Functions
4. The President: Powers, Functions and Procedure for Impeachment
5. Judicial Review of Presidents Actions
6. Governor: Powers, Functions
7. Legislative Power of the Executive – Ordinance
8. Parliament and State Legislature
9. Privileges of Legislature
10. Council of Ministers - Prime Minister

UNIT-IV	MAJOR FUNCTIONARIES & EMERGENCY POWERS	Classes: 8

1. Union Public Service Commission
2. Election Commission
3. Plannig Commission (NITI)
4. Significance of Emergency Powers
5. National Emergency – Grounds – Suspension of Fundamental Rights
6. State Emergency – Grounds – Judicial Review
7. Financial Emergency

UNIT-V	INDIAN JUDICIARY	Classes: 9

1. Supreme Court of India – Appointment of Judges – Composition
2. Jurisdiction: Original, Appellate and Writ Jurisdiction
3. Prospective Overruling and Judge - Made Laws in India (Art. 141)
4. Review of Supreme Court Decision
5. High Courts – Judges - Constitution
6. Jurisdiction: Original, Appellate, Writ Jurisdiction and Supervisory Jurisdiction

TEXT BOOKS

1. H.M. Seervai: Constitutional Law of India
2. M.P. Jain: Indian Constitutional Law
3. Mahendra P. Singh: V. N. Shukla's Constitution of India
4. Granville Austin: The Indian Constitution: Cornerstone of a Nation
5. D.D. Basu: Shorter Constitution of India

REFERENCE BOOKS

1. An Introduction to the Constitution of India by Dr. Durga Das Basu
2. An Introduction to the Constitution of India by M. V. Pylee
3. Indian Constitutional Law by M.P. Jain

WEB REFERENCES

1. http://www.wdl.org/en/item/2672/
2. https://nptel.ac.in/courses/109103135/24

E -TEXT BOOKS

1. https://iasexamportal.com/ebook/the-constitution-of-india

2. https://www.india.gov.in/my-government/documents/e-books

MOOCS COURSE

1. http://nludelhi.ac.in/images/moocs/moocs-courses.pdf
2. https://www.classcentral.com/tag/constitutional-law

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DEPARTMENT OF CIVIL ENGINEERING
GEOTECHNICAL ENGINEERING

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE501PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Understand the formation of soil and classification of the soils
2. Determine the Index & Engineering Properties of Soils
3. Determine the flow characteristics & stresses due to externally applied loads
4. Estimate the consolidation properties of soils
5. Estimate the shear strength and seepage loss

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Characterize and classify the soils
2. Able to estimate seepage, stresses under various loading conditions and compaction characteristics
3. Able to analyse the compressibility of the soils
4. Able to understand the strength of soils under various drainage conditions

UNIT-I	INTRODUCTION AND INDEX PROPERTIES OF SOILS	Classes: 12

Introduction: Soil formation and structure – moisture content – Mass, volume relationships – Specific Gravity-Field density by core cutter and sand replacement methods-Relative density.

Index Properties of Soils: Grain size analysis – consistency limits and indices – I.S. Classification of soils.

UNIT-II	PERMEABILITY AND EFFECTIVE STRESSES	Classes: 12

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law-permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability oflayered soils.

Effective stress & seepage through soils : Total, neutral and effective stress – principle of effective stress – quick sand condition- seepage through soils – Flow nets: Stream and potential functions, characteristics and uses of flow nets.

UNIT-III	**STRESS DISTRIBUTION IN SOILS AND COMPACTION**	**Classes: 12**

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loadedcircular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties – Field compaction Equipment – compaction quality control**.**

UNIT-IV	**CONSOLIDATION**	**Classes: 12**

Consolidation: Types of compressibility – Immediate Settlement, primary consolidation and secondaryconsolidation - stress history of clay; e-p and e-log(p) curves – normally consolidated soil, over consolidated soil and under consolidated soil – pre consolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT-V	**SHEAR STRENGTH OF SOILS**	**Classes: 12**

Shear Strength of Soils: Importance of shear strength – Mohr's– Coulomb Failure theories – Types oflaboratory tests for strength parameters – strength tests based on drainage conditions – strength envelops – Shear strength of sands - dilatancy – critical void ratio, Introduction to stress path method.

TEXT BOOKS

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt Ltd
2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors
3. Foundation Engineering by P.C. Varghese, PHI
4. Principles of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers, 8th Edition, (2014).

REFERENCE BOOKS

1. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
2. Principals of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers.
3. Geotechnical Engineering by C. Venkataramiah, New age International Pvt. Ltd, (2002).
4. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.

WEB REFERENCES

1. https://www.geotechnicalinfo.com/
2. https://www.quickprofiler.com/
3. https://www.geotechnicaldirectory.com/
4. https://www.ejge.com/

E -TEXT BOOKS

1. https://www.easyengineering.net
2. https://nptel.ac.in.courses/105/103/105103097/

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING
STRUCTURAL ENGINEERING – I (RCC)

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE502PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. Identify the basic components of any structural system and the standard loading for the RC structure
2. Identify and tell the various codal provisions given in IS. 456
3. Describe the salient feature of limit state method, compare with other methods and the
4. concepts of limit state of collapse and limit state of serviceability
5. Evaluate the behaviour of RC member under flexure, shear and compression, torsion and bond.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Compare and Design the singly reinforced, doubly reinforced and flanged sections.
2. Design the axially loaded, uniaxial and biaxial bending columns.
3. Classify the footings and Design the isolated square, rectangular and circular footings.
4. Distinguish and Design the one-way and two-way slabs.

UNIT-I	INTRODUCTION TO RCC STRUCTURES AND DESIGN & ANALYSIS OF RC SECTIONS	Classes: 14

Introduction- Structure - Components of structure - Different types of structures - Equilibrium and compatibility– Safety and Stability - Loads – Different types of Loads – Dead Load, Live Load, Earthquake Load and Wind Load– Forces – What is meant by Design? – Different types of materials – RCC, PSC and Steel – Planning of structural elements- Concepts of RCC Design – Different methods of Design- Working Stress Method and Limit State Method – Load combinations as per Limit state method - Materials - Characteristic Values – Partial safety factors – Behaviour and Properties of Concrete and Steel- Stress Block Parameters as per IS 456 -2000.

Limit state Analysis and design of sections in Flexure – Behaviour of RC section under flexure - Rectangular, T and L-sections, singly reinforced and doubly reinforced Beams – Detailing of reinforcement

UNIT-II	DESIGN OF SHEAR, BOND AND TORSION	Classes: 12

Design for Shear, Bond and Torsion - Mechanism of shear and bond failure - Design of shear using limit state concept – Design for Bond –Anchorage and Development length of bars - Design of sections for torsion - Detailing of reinforcement

UNIT-III	DESIGN OF SLABS	Classes: 14

Design of Two-way slabs with different end conditions, one-way slab, and continuous slab Using I S Coefficients – Design of dog-legged staircase – Limit state design for serviceability for deflection, cracking and codal provisions-

UNIT-IV	DESIGN OF COLUMNS	Classes: 12

Design of compression members - Short Column - Columns with axial loads, uni-axial and bi-axial bending – Use of design charts- Long column – Design of long columns - I S Code provisions.

UNIT-V	DESIGN OF FOOTINGS	Classes: 12

Design of foundation - Different types of footings – Design of wall footing – Design of flat isolated square, rectangular, circular footings and combined footings for two columns. Introduction to Design of Footings by using STAAD Pro and its applications

TEXT BOOKS

1. Limit state designed of reinforced concrete – P.C. Varghese, PHI Learning Pvt. Ltd.

2. Reinforced concrete design by S. Unnikrishna Pillai & Devdas Menon, Tata McGraw Hill.

3. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International

Publishers.

REFERENCE BOOKS

1. Reinforced concrete structures, Vol. 1, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd.

2. Fundamentals of Reinforced concrete design by M. L. Gambhir, Prentice Hall of India Pvt.Ltd.,

3. Design of Reinforced Concrete Structures by N.Subramanian, Oxford University Press

4. Design of concrete structures by J.N. Bandhyopadhyay PHI Learning Private Limited.

5. Design of Reinforced Concrete Structures by I. C. Syal and A. K. Goel, S. Chand & company.

6. Design of Reinforced Concrete Foundations – P.C. Varghese Prentice Hall of India.

WEB REFERENCES

1. https://nptel.ac.in/courses/105/105/105105105/
2. https://nptel.ac.in/courses/105/105/105105104/

E -TEXT BOOKS

1. https://drive.google.com/file/d/1kIoeuzWbtU32NZ1KCRv9ha3mKLSWNxvM/view
2. https://nptel.ac.in/courses/105/105/105105104/

MOOCS COURSE

1. http://www.facweb.iitkgp.ac.in/~dmaity/
2. https://nptel.ac.in/noc/individual_course.php?id=noc18-ce21

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DEPARTMENT OF CIVIL ENGINEERING
STRUCTURAL ANALYSIS – II

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE503PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Identify the various actions in arches.
2. Understand classical methods of analysis for statically indeterminate structures.
3. Differentiate the approximate and numerical methods of analysis for indeterminate structures.
4. Find the degree of static and kinematic indeterminacies of the structures.
5. Plot the variation of S.F and B.M when a moving load passes on indeterminate structure

COURSE OUTCOMES

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

1. Analyse the two hinged arches.
2. Solve statically indeterminate beams and portal frames using classical methods
3. Sketch the shear force and bending moment diagrams for indeterminate structures.
4. Formulate the stiffness matrix and analyse the beams by matrix methods
5. To Analyse spring self - centring energy Dissipation Braces.

UNIT-I	Two Hinged Arches-Moment Distribution Method	Classes: 12

Two Hinged Arches**:** Introduction – Classification of Two hinged Arches – Analysis of two hinged parabolic arches – Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

Moment Distribution Method- Analysis of continuous beams with and without settlement of supports using - Analysis of Single Bay Single Story Portal Frames including side Sway - Analysis of inclined frames - Shear force and Bending moment diagrams, Elastic curve.

UNIT-II	Kani's Method - Cables and suspension bridges	Classes: 12

Kani's Method: Analysis of continuous beams including settlement of supports - Analysis of

single bay single storey and single bay two Storey Frames including Side Sway using Kani's Method - Shear force and bending moment diagrams - Elastic curve.

Cables and suspension bridges: Equilibrium of a Suspension Cable subjected to concentrated loads and uniformly distributed loads - Length of a cable - Cable with different support levels - Suspension cable supports - Suspension Bridges - Analysis of Three Hinged Stiffening Girder Suspension Bridges.

UNIT-III	Approximate Methods of Analysis	Classes: 12

Approximate Methods of Analysis**:** Introduction – Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method and Factor method - Analysis of multi-storey frames for gravity loads - Substitute Frame method - Analysis of Mill bents.

UNIT-IV	Matrix Methods of Analysis	Classes: 12

Matrix Methods of Analysis: Introduction to Flexibility and Stiffness matrix methods of analyses using 'system approach' upto three degree of indeterminacy– Analysis of continuous beams including settlement of supports using flexibility and stiffness methods -Analysis of pin-jointed determinate plane frames using flexibility and stiffness methods- Analysis of single bay single storey portal frames using stiffness method - Shear force and bending moment diagrams - Elastic curve.

UNIT-V	Influence Lines For Indeterminate Beams	Classes: 12

Influence Lines for Indeterminate Beams: Introduction – influence line diagram for shear force and bending moment for two span continuous beam with constant and different moments of inertia - influence line diagram for shear force and bending moment for propped cantilever beams.

TEXT BOOKS

1. Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
2. Indeterminate Structural Analysis by K.U. Muthu et al., I.K. International Publishing House Pvt. Ltd
3. Structural Analysis Vol I & II by G.S. Pandit S.P. Gupta Tata McGraw Hill Education Pvt. Ltd.

REFERENCE BOOKS

1. Structural analysis T. S Thandava moorthy, Oxford university Press

2. Mechanics of Structures Vol –II by H.J. Shah and S.B. Junnarkar, Charotar Publishing House Pvt. Ltd.

3. Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
4. Examples in Structural Analysis by William M.C. McKenzie, Taylor & Francis.

5. Structural Analysis by R. C. Hibbeler, Pearson Education

6. Structural Analysis by Devdas Menon, Narosa Publishing House.

7. Advanced Structural Analysis by A.K. Jain, Nem Chand & Bros.

WEB REFERENCES

1. http://www.asce.org

2. http://www.icivilengineer.com
3. https://www.omicsonline.org/steel-structures-construction.php

E -TEXT BOOKS

1. https://nptel.ac.in/courses/105/101/10510086/

2. http://www.facweb.iitkgp.ac.in/~dmaity/

MOOCS COURSE

1. https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ce26/

2. https://nptel.ac.in/noc/individual_course.php?id=noc18-ce21

3. https://nptel.ac.in/courses/105105163/

DEPARTMENT OF CIVIL ENGINEERING
ENGINEERING ECONOMICS AND ACCOUNTANCY

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
BE504MS	B. Tech	2	0	0	2	30	70	100

COURSE OBJECTIVES

To prepare engineering students to analyze cost/ revenue/ financial data and to make economic and financial analysis in decision making process and to examine the performance of companies engaged in engineering.

COURSE OUTCOMES

To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF Methods. To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.

UNIT-I	INTRODUCTION TO ECONOMICS	Classes: 10

Basic Principles and Methodology of Economics– Fundamental Concepts- Demand – Demand Determinants - Law of Demand- Demand Forecasting and Methods- Elasticity of Demand- Theory of Firm – Supply- Elasticity of Supply.

UNIT-II	MACRO ECONOMIC CONCEPTS	Classes:8

National Income Accounting - Methods of Estimation- Various Concepts of National Income - Inflation – Definition – Causes of Inflation and Measures to Control Inflation – New Economic Policy 1991 (Industrial policy, Trade policy, and Fiscal policy) Impact on Industry.

UNIT-III	CASH FLOWS AND CAPITAL BUDGETING	Classes: 10

Significance of Capital Budgeting - Time Value of Money- Choosing between alternative investment proposals- Methods of Appraisal Techniques- Pay Back Period - Average Rate of Return – Net Present Value- Internal Rate of Return – Profitability Index.

UNIT-IV	BORROWINGS ON INVESTMENT	Classes: 8

Equity Vs Debt Financing- Leverages- Concept of Leverage- Types of Leverages: Operating Leverage- Financial Leverage and Composite Leverage. (Simple Problems)

UNIT-V	INTRODUCTION TO ACCOUNTING	Classes: 8

Accounting Principles- procedure- Double entry system - Journal- ledger- Trial balance- Trading and Profit and Loss account- Balance Sheet. Cost Accounting, Introduction- Classification of costs- Breakeven Analysis, Meaning and its application, Limitations.

(Simple Problems).

TEXT BOOKS

1. Dr. A. R. Aryasri, Business Economics and Financial Analysis, McGraw Hill Education, First Edition 2020.
2. Henry Malcom Steinar-Engineering Economics, Principles, McGraw Hill Pub.
3. Arora, M.N." Cost Accounting, Vikas Publication.

REFERENCE BOOKS

1. D.D. Chaturvedi, S.L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
3. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

WEB REFERENCES

1. https://nptel.ac.in/courses/130/104/130104114/
2. https://nptel.ac.in/courses/110106050/39
3. https://nptel.ac.in/courses/110106050/38

E -TEXT BOOKS

1. https://www.sciencedirect.com/book/9780750644549/business-economics
2. http://www.freebookcentre.net/Business/Economics-Books.html

MOOCS COURSE

1. https://nptel.ac.in/courses/110106050/
2. https://nptel.ac.in/courses/110106050/11

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DEPARTMENT OF CIVIL ENGINEERING
TRANSPORTATION ENGINEERING

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE506PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

This course aims at providing a comprehensive insight of various elements of Highway transportation engineering. Topics related to the highway development, characterization of different materials needed for highway construction, structural and geometric design of highway pavements along with the challenges and possible solutions to the traffic related issues will be covered as a part of this course.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. An ability to apply the knowledge of mathematics, science and engineering in the areas of traffic engineering, highway development and maintenance

2. An ability to design, conduct experiments to assess the suitability of the highway materials like soil, bitumen, aggregates and a variety of bituminous mixtures. Also the students will develop the ability to interpret the results and assess the suitability of these materials for construction of highways.

3. An ability to design flexible and rigid highway pavements for varying traffic compositions as well as soil sub grade and environmental conditions using the standards stipulated by Indian Roads Congress.

4. An ability to evaluate the structural and functional conditions of in-service highway pavements and provide solution in the form of routine maintenance measures or designed overlays using Indian Roads congress guidelines.

5. An ability to assess the issues related to road traffic and provide engineering solutions supported with an understanding of road user psychological and behavioural patterns.

UNIT-I	IMPORTANCE OF HIGHWAYS	Classes: 12

Introduction, History and Importance of Highways, Characteristics of road transport, Current road development plans in India, Highway development in India, Highway planning, Highway alignment, Engineering surveys for Highway alignment, Highway projects, Highway drawings and reports,

Detailed Project Report preparation, PPP schemes of Highway Development in India, Government of India initiatives in developing the highways and expressways in improving the mobility and village road development in improving the accessibility.

UNIT-II	INTRODUCTION TO HIGHWAY GEOMETRIC DESIGN	Classes: 12

Introduction to Highway Geometric Design; Width of Pavement, Formation and Land, Cross Slopes etc; Concept of Friction: Skid and Slip; Elements of geometric design of highways; Sight Distances: Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance; Horizontal alignment: Design of horizontal curves, super elevation, extra widening of pavement at curves; Vertical Alignment: Gradients, Compensation in Gradient, Design of summit curves and valley curves using different criteria; Integration of Horizontal and Vertical Curves. Introduction to MX ROAD SOFTWARE: Geometric design of highways using MX Roads.

UNIT-III	TRAFFIC ENGINEERING	Classes: 12

Basic traffic characteristics: Speed, volume and concentration, relationship between flow, speed and concentration; Highway capacity and Level of service (LOS) concepts: Factors affecting capacity and LOS, relationship between V/C ratio and LOS; Traffic volume and spot speed studies: Methods; Road Safety; Traffic Signals: Types, warrants for signalization, design of isolated traffic signal by IRC method; Parking and road accidents: Types of parking facilities – on-street and off street, introduction to parking studies; Accident studies, road safety auditing; Introduction to street lighting; Road Intersections: Design considerations of at-grade intersections, introduction to interchanges.

UNIT-IV	TESTS ON SOIL AND BITUMINOUS	Classes: 12

Tests on soils: CBR, Field CBR, modulus of sub-grade reaction, Tests on Aggregates: specific gravity, shape (flakiness and elongation indices), angularity number, water absorption, impact, abrasion, attrition, crushing resistance, durability (weathering resistance), stone polishing value of aggregates; Tests on bitumen: spot, penetration, softening point, viscosity, ductility, elastic recovery, flash and fire points, Introduction to modified bituminous binders like crumb rubber modified, natural rubber modified and polymer modified bitumen binders; Bituminous Concrete: Critical parameters controlling bituminous concrete mixture design, aggregate blending concepts viz. Rothfuch's method, trial and error procedure. Introduction to advanced concretes for road applications.

UNIT-V	INTRODUCTION OF PAVEMENT DESIGN	Classes: 12

Introduction to Pavement Design: Types of pavements and their typical cross sections: flexible, rigid and composite; Flexible Pavement analysis and design: Introduction to multi layered analysis, IRC 37-2012 method of flexible pavement design; Rigid pavement analysis and design: Factors controlling rigid pavement design, types of stresses in rigid pavements, critical load positions, load stresses and temperature stresses in interior, corner and edge locations of jointed plain cement concrete pavement slabs, IRC 58-2015 method of rigid pavement design; Overlay Designs: Types of overlays on flexible and rigid pavements.

TEXT BOOKS

1. Khanna, S.K, Justo, A and Veeraragavan, A, 'Highway Engineering', Nem Chand & Bros. Revised Tenth Edition, 2014
2. Kadiyali L.R. and Lal N B, Principles and Practices of Highway Engineering; Seventh Edition,

First Reprint; Khanna Publishers, New Delhi, 2018

Code of Provisions:

Design Codes: IRC 37-2012, IRC 58-2015, IRC 81-1997

REFERENCE BOOKS

1. Papacoastas, C. S. and Prevedouros, Transportation Engineering and Planning, Third Edition, Third Impression; Pearson Education, 2018.
2. Khisty C J and Lall B Kent; Transportation Engineering: An Introduction, Third Edition, 1st Indian Adaptation; Pearson India Education Service Pvt. Ltd, New Delhi 2017.
3. Subhash C Saxena, Text Book of Highway and Traffic Engineering; First Edition; CBS Publishers and Distributors. New Delhi, 2014
4. C Venkatramaih, Transportation Engineering Volume 1 – Highway Engineering, 1st Edition, Universities Press, 2016
5. Garber, N.J. and Hoel, L.A. Traffic and Highway Engineering, Fourth Edition; Cengage Learning, Stamford, CT, USA, 2010
6. Partha chakroborty and Animesh Das, Principles of Transportation Engineering, PHI, 2013
7. Nicholas J Garber and Lester A Hoel, Traffic and Highway Engineering, 5th Edition, Cengage Learning India Private Limited, New Delhi, 5th Indian Reprint, 201

WEB REFERENCES

1. https://www.sciencedirect.com
2 https://www.youtube.com/watch?v=6lrF0xOT7ko

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=15

2. https://www.nptel.ac.in/courses/105101087/11

MOOCS COURSE

1. https://swayam.gov.in/

2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING
HIGHWAY ENGINEERING & CONCRETE TECHNOLOGY LABORATORY

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE507PC	B. Tech	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To learn
1. To learn laboratory tests and their procedures cement, fine aggregate, course aggregates and bitumen
2. To Evaluate fresh concrete properties
3. To Understand the test procedures for characterization of Concrete and bituminous mixes

COURSE OUTCOMES

1. Categorize the test on materials used Civil Engineering Building & Pavement constructions
2. To perform the tests on concrete for it characterization.
3. To Design Concrete Mix Proportioning by Using Indian Standard Method.
4. Examine the tests performed for Bitumen mixes.
5. To prepare a laboratory report

LIST OF EXPERIMENTS

I. Test on Cement
1. Normal Consistency and fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity of cement
4. Soundness of cement
5. Compressive strength of cement
6. Workability test on concrete by compaction factor, slump and Vee-bee

II. Test on Aggregates (Coarse and Fine)
1. Specific gravity (Pycnometer and wire basket), water absorption
2. Shape (Flakiness and elongation indices)
3. Impact and abrasion value tests
4. Crushing resistance and durability tests
5. Sieve Analysis and gradation charts (Job mix formula using Rothfuch's charts)
6. Bulking of sand, Bulk and compact densities of fine and coarse aggregates

III. Test on Fresh Concrete

1. Slump test
2. CF (compact factor stress)
3. Vee-bee Test
4. Flow Table Test

IV. Test on hardened concrete

1. Compression test on cubes & Cylinders
2. Flexure test
3. Split Tension Test
4. Modulus of Elasticity

V. Tests on Bitumen and Bituminous concrete

1. Penetration, softening point and spot test
2. Ductility, Elastic recovery and viscosity
3. Flash and fire points and specific gravity
4. Marshall's Stability (sample preparation and testing for stability and flow values)

TEXT BOOKS

1. Concrete Manual by M.L. Gambhir, Dhanpat Rai & Sons
2. Highway Material Testing manual, Khanna, Justo and Veeraraghavan, Nemchand Brothers

REFERENCE BOOKS

IS CODES:

1. IS 10262 :2009 "Concrete Mix Proportioning – Guidelines"
2. 1S 516:2006 "Methods of Tests on Strength of Concrete"
3. IS 383 :1993 "Specification For Coarse And Fine Aggregates From Natural Sources For Concrete"
4. 1S 1201 -1220 (1978) "Methods for testing tars and bituminous materials"
5. IRC SP 53 -2010 "Guidelines on use of modified bitumen"
6. MS-2 Manual for Marshalls Mix design 2002

WEB REFERENCES

1. https://www.smartzworld.com/notes/concrete-technology-pdf-notes-ct/
2. https://nptel.ac.in/courses/105/102/105102012/
3. https://civilenggforall.com/concrete-technology-study-material-for-ssc-je-by-civilenggforall-free-download-pdf/

E -TEXT BOOKS

1. https://easyengineering.net/concrete-technology-books-collection-new/
2. https://www.constructionplacements.com/books-on-concrete-technology/

MOOCS COURSE

1. https://www.mooc-list.com/tags/concrete
2. https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ce45/

DEPARTMENT OF CIVIL ENGINEERING
GEOTECHNICAL ENGINEERING LABORATORY

III B. TECH- I SEMESTER (R 20)

COURSE	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE508PC	B. TECH	0	0	3	1.5	30	70	100

COURSE OBJECTIVES

To obtain index and engineering properties of locally available soils, and tounderstand the behavior of these soil under various loads.

COURSE OUTCOMES

At the end of the course, the student will be able to Classify and evaluate the behavior of the soils subjected to various loads

LIST OF EXPERIMENTS

1. Atterberg Limits (Liquid Limit, Plastic Limit, and shrinkage limit)
2. a) Field density by core cutter method and
   b) Field density by sand replacement method
3. Determination of Specific gravity of soil Grain size distribution by sieve analysis
4. Permeability of soil by constant and variable head test methods
5. Standard Proctor's Compaction Test
6. Determination of Coefficient of consolidation (square root time fitting method)
7. Unconfined compression test
8. Direct shear test
9. Vane shear test
10. Differential free swell index (DFSI) test

TEXT BOOKS

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt Ltd,
2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
3. Foundation Engineering by P.C. Varghese, PHI

REFERENCE BOOKS

1. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors,Delhi.
2. Principals of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers.
3. Geotechnical Engineering by C. Venkataramiah, New age International Pvt. Ltd, (2002).
4. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
5. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata McGraw-Hill Publishers NewDelhi.
6. Soil Mechanics and Foundation by by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain,Laxmi, publications Pvt. Ltd., New Delhi

WEB REFERENCES

1. https://www.nap. Edu
2. https://www.uvpce.ac.in
3. https://www.nptel.ac.in

E -TEXT BOOKS

1. https://www.hzu.edu.in › engineering
2. https://easyengineering.net

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

DEPARTMENT OF CIVIL ENGINEERING

ADVANCED COMMUNICATION SKILLS LABORATORY

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EN509HS	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES:

To train students

1. To use relevant words through the practice of vocabulary and responding appropriately.
2. To improve Reading Comprehension Skills and Techniques, to read and infer for meanings.
3. To enable to write and improve writing skills to present different types of writing.
4. To enable students to perform presentation skills with the right usage of Body language through seminars, posters, etc.
5. To prepare students for placements by practicing various activates like group discussions, mock interviews, etc.

COURSE OUTCOMES:

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

1. Gather ideas and information to organize ideas relevantly and coherently.
2. Participate in group discussions.
3. Face interviews.
4. Write project/research reports/technical reports.
5. Make oral presentations and written presentations.

LIST OF EXPERIMENTS:

EXERCISE: I

Activities on Fundamentals of Inter-personal Communication and Building Vocabulary
- Starting a conversation – responding appropriately and relevantly –using right body language – Role Play in different situations & Discourse Skills- using visuals – Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

EXERCISE: II

Activities on Reading Comprehension – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.

EXERCISE: III

Activities on Writing Skills – Structure and presentation of different types of writing – letter writing/ Resume writing/ e-correspondence/Technical report writing/ – planning for writing – improving one's writing.

EXERCISE: IV

Activities on Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ emails/ assignments, etc.

EXERCISE: V

Activities on Group Discussion and Interview Skills – Dynamics of group discussion, Intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation - Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video conference and Mock Interviews.

TEXT BOOKS

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd.2nd Edition.
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCE BOOKS

1. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
2. Professional Communication by ArunaKoneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi
5. English Vocabulary in Use series, Cambridge University Press 2008

WEB REFERENCES:

1. http://www.skillsyouneed.com/ips/interpersonal-communication.html#ixzz3Zo3C60Js

2. http://en.wikipedia.org/wiki/Conversation

3. http://www.wikihow.com/Start-a-Conversation-When-You-Have-Nothing-to-Talk-About 10 Sure-Fire Strategies to Improve Your Vocabulary

4. https://litemind.com/top-3-reasons-to-improve-your-vocabulary/

E –TEXTBOOKS:

1. Mc corry Laurie Kelly Mc Corry Jeff Mason, Communication Skills for the st Healthcare Professional, 1 edition,ISBN:1582558140, ISBN-13:9781582558141
2. Robert EOwens, Jr,Language Development, 9th edition, ISBN:0133810364,9780133810363

MOOCS Course:

1. https://www.coursera.org/specializations/improve-english
2. https://www.edx.org/professional-certificate/upvalenciax-upper-intermediate-english

St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF CIVIL ENGINEERING
INTELLECTUAL PROPERTY RIGHTS

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*IP510MC/ *IP609MC	B.Tech	3	0	0	0	100	-	100

OBJECTIVES:

1. To acquaint the learners with the basic concepts of Intellectual Property Rights.

2. To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

OUTCOMES:

Upon successful completion of the course
1. Gain knowledge on Intellectual Property assets and generate economic wealth.
2. Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.
3. Gather knowledge about Intellectual Property Rights which is important for students of engineering in particular as they are tomorrow's technocrats and creator of new technology.
4. Discover how IPR are regarded as a source of national wealth and mark of an economic leadership in context of global market scenario.
5. Study the national & International IP system.
6. Summarize that it is an incentive for further research work and investment in R & D, leading to creation of new and better products and generation of economic and social benefits.

UNIT-I	INTRODUCTION TO INTELLECTUAL	Classes:7

Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT-II	TRADE MARKS	Classes:8

Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT-III	LAW OF COPY RIGHTS	Classes:6

Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

UNIT-IV	TRADE SECRETS	Classes:7

Trade secrete law, determination of trade secretes status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation. Unfair competition: Misappropriation right of publicity, false advertising.

UNIT-V	NEW DEVELOPMENT OF INTELLECTUAL	Classes:6

New developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property, international – trade mark law, copy right law, international patent law and international development in trade secrets law.

TEXTBOOKS

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd.

REFERENCE BOOKS

1. R Radha Krishnan & S Bala subramanian, "Intellectual Property Rights", 1st Edition, Excel Books, 2012.
2. M Ashok Kumar & mohd Iqbal Ali, "Intellectual Property Rights", 2nd Edition, Serial publications, 2011.

WEBREFERENCES

1. http://libgen.rs/book/index.php?md5=C4A6559ECCAEFC767CE71BD91A1BAD41
2. http://libgen.rs/book/index.php?md5=6463CAD16544B347B19335FB19D6917C

E –TEXTBOOKS:

1. http://libgen.rs/book/index.php?md5=13C4B3A45B1C95B4A388F94729CCCFBC
2. https://maklaw.in/intellectual-property-rights/?gclid=EAIaIQobChMIsprsv_WI7QIVilVgCh29HwPzEAAYASAAEgK5YvD_BwE

MOOCSCOURSE:

1. https://nptel.ac.in/courses/110/105/110105139/
2. https://nptel.ac.in/courses/109/106/109106137/

DEPARTMENT OF CIVIL ENGINEERING
STRUCTURAL ENGINEERING – II (STEEL)

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE601PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

To learn

1. Explain the mechanical properties of structural steel, plasticity, yield. Describe the salient features of Limit State Method of design of Steel structures.
2. Identify and explain the codal provisions given in IS. 800.
3. Analyze the behaviour of steel structures under tension, compression and flexure.
4. Design the tension, compression, flexural members and plate girder
5. Design the connection in steel structure, build - up member and (bolted and welded).

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Analyze the tension members, compression members
2. Design the tension members, compression members and column bases and joints and connections
3. Analyze and Design the beams including built-up sections and beam and connections.
4. Identify and Design the various components of welded plate girder including stiffeners.

UNIT-I	INTRODUCTION TO STEEL STRUCTURES AND DESIGN OF CONNECTIONS	Classes: 14

Materials – Types of structural steel – Mechanical properties of steel – Concepts of plasticity – yield strength - Loads and Stresses – Local buckling behavior of steel. Concepts of limit State Design – Different Limit States – Load combinations for different Limit states - Design Strengths - deflection limits serviceability – stability check.

Design of Connections– Different types of connections – Bolted connections – Design strength – efficiency of joint– prying action - Welded connections – Types of welded joints – Design requirements Design of Beam-column connections - Eccentric connections - Type I and Type II connection – Framed connection– stiffened / seated connection.

UNIT-II	**DESIGN OF TENSION MEMBERS AND DESIGN OF COMPRESSION MEMBERS**	**Classes: 14**

Design of tension members –Simple and built up members - Design strength – Design procedure for splicing - lug angle.

Design of compression members – Buckling class – slenderness ratio – Design of simple compression members - laced – battened columns – splice – column base – slab base.

UNIT-III	**PLASTIC ANALYSIS AND DESIGN OF BEAMS**	**Classes: 14**

Plastic Analysis; Plastic moment – Plastic section modulus –Plastic analysis of continuous beams Design of Flexural Members – Laterally supported and unsupported Beams – Design of laterally supported beams - Bending and shear strength/buckling –Built-up sections - Beam splice

UNIT-IV	**DESIGN OF WELDED PLATE GRIDERS**	**Classes: 12**

Design of welded plate girders – elements – economical depth – design of main section – connections between web and flange – design of stiffeners - bearing stiffener– intermediate stiffeners – Design of web splice and flange splice

UNIT-V	**DESIGN OF ROOF TRUSSES**	**Classes: 12**

Design of Industrial Structures; Types of roof trusses –loads on trusses – wind loads - Purlin design – truss design – Design of welded Gantry girder

TEXT BOOKS

1. Design of steel structures by S. K. Duggal, Tata Macgraw hill publishers, 2000, 2nd Edition.
2. Design of steel structures by N. Subramanian, Oxford University press, 2008.
3. Design of steel structures by K. S. Sairam, Pearson Educational India, 2nd Edition, 2013.

REFERENCE BOOKS

1. Design of steel structures by Edwin H. Gayrold and Charles Gayrold, Tata Mac-graw hill publishers, 1972
2. Design of steel structures by L. S .Jaya Gopal, D. Tensing, Vikas Publishing House.

WEB REFERENCES

1. http://ndl.iitkgp.ac.in/document/Z2JzN0ZmU2VhdW5kODBJdWRCTmg3Sld4Z1hCYk81 cEdHU2kzWkM4eVhGd1NNMzlacWhFckEvMTRNd2E4bEtWaTBteWhjT3VOdWFVV 1FHbnBwK3hTYWJTRDhtS2w3Z1E2VTBwUG9nTXlRWWc9
2. http://ndl.iitkgp.ac.in/document/Z2JzN0ZmU2VhdW5kODBJdWRCTmg3Sld4Z1hCYk81 cEdHU2kzWkM4eVhGeUhsVHFRbE4yYYVZPb1ZzSEdBS3Y0Y2lXYXNmQm1BVFhyb WgzNGRvcTc0MHF2bWtYeERkYjjFBUHNTT0lIYkRla3c9
3. http://www.facweb.iitkgp.ac.in/~dmaity/

4. https://nptel.ac.in/noc/individual_course.php?id=noc18-ce21

E -TEXT BOOKS

1. https://freepdf-books.com/design-of-steel-structure/
2. https://easyengineering.net/steel-structures-books-collection/

MOOCS COURSE

1. https://nptel.ac.in/courses/105105162/

2. https://nptel.ac.in/courses/105105163/
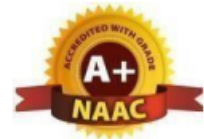
DEPARTMENT OF CIVIL ENGINEERING
HYDROLOGY AND WATER RESOURCE ENGINEERING

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE602PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES
The objectives of the course is,
1. To understand components of hydrological cycle and precipitation.
2. To calculate the various losses of precipitation..
3. To plot Hydrographs and analyze its applications in runoff estimation.
4. To understand the application latest information technology to water resource engineering
5. To calculate the irrigation water requirements

COURSE OUTCOMES
Upon successful completion of the course, the student is able to
1. Understand the importance of hydrology and its components.
2. Measure precipitation and analyze the data and analyze the losses in precipitation.
3. Estimate runoff and develop unit hydrographs.
4. Understand the importance of water resources software.
5. Understand the soil-water- crop relationship.

UNIT-I	HYDROLOGICAL CYCLE AND COMPONENTS	Classes: 12

Introduction: Concepts of Hydrologic cycle, Global Water Budget, Applications in Engineering. Sources of data.
Precipitation Forms of precipitation, characteristics of precipitation in India, measurement of precipitation: Recording and non-recording types, rain gauge network: mean precipitation over an area: Arithmetic, Theissen's and Isohyetal methods, Missing Rainfall Data – Estimation, Consistency of Rainfall records, depth area-duration relationships, maximum intensity/depth-duration-frequency relationship, Probable Maximum Precipitation (PMP), rainfall data in India.

UNIT-II	ABSTRACTIONS FROM PRECIPITATION AND RUN OFFS	Classes: 12

Abstractions from precipitation evaporation process, evaporimeters, analytical methods of evaporation estimation, reservoir evaporation and methods for its reduction, evapotranspiration, measurement of evapotranspiration, evapotranspiration equations: Penman and Blaney & Criddle Methods, potential evapotranspiration over India, actual evapotranspiration, , interception, depression storage, infiltration, infiltration capacity, measurement of infiltration,

modelling infiltration capacity, classification of infiltration capacities, infiltration indices.
Runoff

Components of Runoff, Factors affecting runoff, Basin yield, SCS-CN method of estimating runoff, Flow duration curves, Mass curve of runoff – Analysis.

UNIT-III	HYDROGRAPHS	Classes: 12

Hydrograph –Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow- Base Flow Separation - Direct Runoff Hydrograph Unit pulse and Unit step function - Unit Hydrograph, definition, limitations and applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph. Synthetic Unit Hydrograph.

UNIT-IV	GROUNDWATER HYDROLOGY	Classes: 12

Occurrence, movement and distribution of groundwater, aquifers – types, Specific Yield, Permeability, Storage coefficient, Transmissibility, Darcy's Law. Well Hydraulics - Steady radial flow into well for confined and unconfined aquifers, Recuperation tests. Well constants.

Crop Water Requirements – Water requirement of crops-Crops and crop seasons in India, cropping pattern, duty and delta; Quality of irrigation water; Soil-water relationships, root zone soil water, infiltration, consumptive use, irrigation requirement, frequency of irrigation; Methods of applying water to the fields: surface, sub-surface, sprinkler and trickle / drip irrigation

UNIT-V	CANAL SYSTEMS	Classes: 12

Canal Systems: Canal systems, alignment of canals, canal losses, estimation of design discharge. Design of channels- rigid boundary channels, alluvial channels, Regime channels, Kennedy's and Lacey's theory of regime channels. Canal outlets: non-modular, semi-modular and modular outlets. Water logging: causes, effects and remedial measures. Lining of canals-Types of lining-Advantages and disadvantages. Drainage of irrigated lands- necessity, methods. Introduction to Simulation software in water resources river analysis system models (HEC RAS) and applications.

TEXT BOOKS

1. Subramanya K."Engineering Hydrology", Tata McGraw Hill, 1998.
2. Jaya Rami Reddy, P. "A text book of Hydrology", Laxmi publications,2009
3. Putty, M. R.Y. "Principles of Hydrology", I.K. Int. Publishing House, New Delhi, 2010.
4. Irrigation and Water Resources & Water Power by P. N. Modi, Standard Book House

REFERENCE BOOKS

1. Linsley R K, Kohler and Paulhus. "Hydrology for Engineers", McGraw Hill, NY, USA,1958.
2. Mutreja, K. N. "Applied hydrology", Tata McGraw Hill Pub. Co., New Delhi, India1986.
3. Chow, V.T. "Handbook of Applied hydrology", McGraw Hill, NY, 1964
4. H.M. Raghunath, "Hydrology", Wiley Eastern Publication, New Delhi.
5. Irrigation and water power engineering by Punmia& Lal, Laxmi publications Pvt. Ltd., New Delhi.

WEB REFERENCES

1. https://nptel.ac.in/syllabus/105105110/https://edurev.in/studytube/Water-Resources-

2. https://www.journals.elsevier.com/water-science-and-engineering
3. https://nptel.ac.in/courses/105104103/
4. www.nrcresearchpress.com/doi/abs/10.1139/l11-016

E -TEXT BOOKS

1. https://www.pdfdrive.com/applied-hydrology-e36991195.html

2. https://bookauthority.org/books/best-hydrology-ebooks

3. https://iwaponline.com/ebooks/book/278/HydrologyPrinciples-and-Processes

MOOCS COURSE

1. https://www.mooc-list.com/tags/water-resources

2. https://nptel.ac.in/courses/105/105/105105110/

3. https://nptel.ac.in/courses/105/104/105104103/

4. https://www.coursera.org/courses?languages=en&query=water%20management

DEPARTMENT OF CIVIL ENGINEERING
WATER AND WASTEWATER ENGINEERING

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
CE603PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

This course will enable students to
1. To supply nontoxic and wholesome water in sufficient quantity by learning characteristics of water and estimating the quantity of drinking water and population for designing of distribution system.
2. To select and design the most appropriate treatment systems such as sedimentation tank, clarifiers, etc. for drinking water.
3. To learn about quality and quantity of wastewater and methods to dispose effluents without affecting human health or natural environment.
4. To select and design the sewerage system such as skimming tank, grit chambers, sedimentation tank, trickling filters, etc.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to
1. Analyze characteristics of water and estimate the quantity of drinking water and population for designing of distribution system.
2. Design components of water supply systems such as sedimentation tank, clarifiers, filters, etc.
3. Design and analysis of distribution system and appurtenances in distribution system and estimate the quantity of domestic wastewater generated.
4. Analyze characteristics of wastewater and have knowledge about components that are used in designing sewerage system.
5. Design sewerage system such as skimming tank, grit chambers, sedimentation tank, trickling filters, etc.

UNIT-I	INTRODUCTION	Classes: 12

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – types of water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards: sources of water - Comparison from quality and quantity and other considerations – intakes – infiltration galleries.

UNIT-II	WATER TREATMENT PLANT	Classes: 12

Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants - feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation - comparison of filters – disinfection – theory of chlorination, chlorine demand - other disinfection practices- Miscellaneous treatment methods.

UNIT-III	DISTRIBUTION SYSTEMS	Classes: 12

Distribution systems requirement –method and layouts -Design procedures- Hardy Cross and equivalent pipe methods pipe – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house - Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow. Introduction to Smart Water Network System :EPANET

UNIT-IV	SEWAGE AND ITS CHARACTERISTICS	Classes: 12

Characteristics of sewage – cycles of decay – decomposition of sewage, examination of sewage – B.O.D. Equation – C.O.D. Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing – ultimate disposal of sewage – sewage farming – dilution.

UNIT-V	WASTE WATER TREATMENT PLANT	Classes: 12

Waste water treatment plant – Flow diagram - primary treatment Design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – Biological treatment – trickling filters – standard and high rate – Construction and design of oxidation ponds. Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks working principles and design – soak pits.

TEXT BOOKS

1. Garg, S.K., "Environmental Engineering Vols. I and II", Khanna Publishers, New Delhi,
2. Punmia B C, "Environmental Engineering Vol. I", Laxmi Publication (P) Ltd., Delhi.
3. Water Supply & Environmental Engineering by A. K. Chatterjee.
4. Water Supply and sanitary Engineering by G.S. Bindi, Dhanpat Rai & Sons Publishers.
5. Environmental Pollution and Control Engineering CS Rao, Wiley Publications

REFERENCE BOOKS

1. Water and Waste Water Technology by Steel, Wiley Publications.
2. Wastewater Engineering by Metcalf and Eddy, McGraw Hill, 2015.
3. Water and Waste Water Engineering by Fair Geyer and Okun, Wiley, 2011.
4. Water and Waste Water Technology by Mark J. Hammarand Jr. Wiley, 2007.

WEB REFERENCES

1. https://nptel.ac.in/courses/105/106/105106119/
2. https://nptel.ac.in/courses/105/105/105105048/

3. https://nptel.ac.in/courses/105/105/105105178/
4. https://nptel.ac.in/courses/105/105/105105201/

E -TEXT BOOKS

1. http://site.iugaza.edu.ps/afoul/files/2010/02/Environmental_book.pdf
2. https://books.google.co.in/books?id=yq_Plo8v0KUC&printsec=frontcover&source=gbs_ge _summary_r&cad=0#v=onepage&q&f=false
3. https://sites.google.com/a/mitr.iitm.ac.in/iitmcivil/ce3040

MOOCS COURSES

1. https://www.mooc-list.com/course/environmental-engineering-drinking-water-treatment-edx
2. https://www.mooc-list.com/course/water-and-wastewater-treatment-engineering-physicochemical-technology-edx
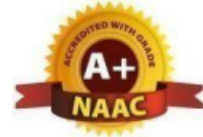3. https://online-learning.tudelft.nl/courses/introduction-to-drinking-water-treatment/
4. https://www.coursera.org/courses?query=water

DEPARTMENT OF CIVIL ENGINEERING
FOUNDATION ENGINEERING

III B. TECH- II SEMESTER

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE604PC	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. To Plan Soil exploration programme for civil Engineering Projects
2. To check the stability of slopes
3. To determine the lateral earth pressures and design retaining walls
4. To determine the Bearing capacity of Soil
5. To design pile group foundation

COURSE OUTCOME: At the end of the course the student will able to

1. understand the principles and methods of Geotechnical Exploration
2. decide the suitability of soils and check the stability of slopes
3. calculate lateral earth pressures and check the stability of retaining walls
4. analyze and design the shallow and deep foundations

UNIT-I	SOIL EXPLORATION	Classes: 12

Need – methods of soil exploration – boring and sampling methods – field tests -penetration tests – plate load test– planning of soil exploration program, Bore logs and preparation of soil investigation report.

UNIT-II	SLOPE STABILITY	Classes: 12

Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes - Stability analysis by Swedish slip circle method, method of slices, Bishop's Simplified method of slices - Taylor's Stability Number- stability of slopes of earth dams under different conditions.

UNIT-III	EARTH PRESSURE THEORIES AND RETAINING WALLS	Classes: 12

Earth pressure theories: Active, Passive and at rest soil pressures Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory.
Retaining walls: Types of retaining walls – stability of gravity and cantilever retaining walls against overturning, sliding and, bearing capacity, filter material for drainage.

UNIT-IV	SHALLOW FOUNDATIONS	Classes: 12

Types - choice of foundation – location and depth - safe bearing capacity, shear criteria Terzaghi's and IS code methods –settlement criteria – allowable bearing pressure based on SPT N value and plate load test – allowable settlements of structures.

UNIT-V	PILE FOUNDATION	Classes: 12

Types of piles – load carrying capacity of piles based on static pile formulae – dynamic pile formulae – Pile Capacity through SPT results - pile load tests - load carrying capacity of pile groups in sands and clays – Settlement of pile groups – negative skin friction

TEXT BOOKS

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi
2. Principals of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers.

REFERENCE BOOKS

1. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
2. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
3. Analysis and Design of Substructures–Swami Saran, Oxford and IBH Publishing company Pvt Ltd
4. Geotechnical Engineering by S K. Gulhati & Manoj Datta –Tata Mc. Graw Hill Publishing company New Delhi.2005
5. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, New york.

WEB REFERENCES
1. https://citationsy.com
2. https://www.sciencedirect.com

E -TEXT BOOKS

1. http://ebooks.wdcb.ru/
2. https://www.accessengineeringlibrary.com/content/book/9781259058462

MOOCS COURSE

1. https://nptel.ac.in/courses/105/105/105105176
2. https://nptel.ac.in

DEPARTMENT OF CIVIL ENGINEERING
COMPUTER AIDED DESIGN LABORATORY

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE607PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

To learn
1. Learn the usage of any fundamental software for design & Analysis of Various Structural Elements for Civil Engineering Applications.

COURSE OUTCOMES

At the end of the course, the student will be able to
1. After the completion of the course student should be able to Model the geometry of real-world structure& Design the structural elements and a system as per IS Codes.

LIST OF EXPERIMENTS

1. Analysis & Design determinate structures using a software
2. Analysis & Design of fixed & continuous beams using a software
3. Analysis & Design of Plane Frames
4. Analysis & Design of space frames subjected to DL & LL
5. Analysis & Design of residential building subjected to all loads (DL,LL,WL,EQL)
6. Analysis & Design of Roof Trusses
7. Design and detailing of built up steel beam
8. Developing a design programme for foundation using EXCEL Spread Sheet
9. Detailing of RCC beam and RCC slab
10. Design & Analysis of Staircase using with Software.

TEXT BOOKS
1. STAAD.Pro : Reference Guide Paperback – 1 January 2010 by by C. S. Changeriya
2. Staad Pro v8i for beginners by T.S Sharma

REFERENCE BOOKS

1. M. L. Gambhir, "Fundamentals of reinforced concrete design", Printice Hall of India Pvt. Ltd, New Delhi.

2. P. Purushotham, "Reinforced concrete structural elements – behaviour, Analysis and design", Tata McGraw Hill, 1994.

WEB REFERENCES

1. http://www.nptel.ac.in/courses/105105105/
2. http://www.nptel.ac.in/courses/105105104/

E -TEXT BOOKS

1. https://communities.bentley.com/products/ram-staad/f/ram-staad-forum/8954/best-book-ebook-to-learn-staad-pro

MOOCS COURSE

1.https://www.youtube.com/playlist?list=PLRm334WTwCCXpTLS9cuwgm4nXz DXm-6Ye

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DEPARTMENT OF CIVIL ENGINEERING

ENVIRONMENTAL ENGINEERING LABORATORY

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE608PC	B. Tech	0	0	2	1	30	70	100

COURSE OBJECTIVES

The objectives of the course are to
1. Create awareness about water and its significance to human endurance.
2. Perform experiments to determine physico-chemical and bacteriological properties of water and wastewater.
3. Determine optimum dosing for various common treatment methods and to measure noise level in the surrounding.
4. Learn about correct usage of instruments for experiments that are correlated to ongoing research in the department.
5. Evaluate the experimental results with standards values for the purpose of analysis.

COURSE OUTCOMES

After the completion of the course student will be able to
1. Understand the importance of water and wastewater treatment.
2. Understand and carry out the experiments used for water and wastewater quality assessment.
3. Develop clear technical laboratories reports.
4. Suggest type and degree of treatment for water and wastewater.
5. Apply laboratorial results to problem identification.

LIST OF EXPERIMENTS

1. Determination of pH
2. Determination of Electrical Conductivity
3. Determination of Total Solids (Organic and inorganic)
4. Determination of Acidity
5. Determination of Alkalinity
6. Determination of Hardness (Total, Calcium and Magnesium Hardness)
7. Determination of Chlorides
8. Determination of optimum coagulant Dosage
9. Determination of Dissolved Oxygen (Winkler Method)
10. Determination of COD
11. Determination of BOD/DO

12. Determination of Residual Chlorine
13. Total count No.
14. Noise level measurement

TEXT BOOKS

1. Clair Sawyer and Perry McCarty and Gene Parkin, "Chemistry for Environmental Engineering and Science", McGraw-Hill Series in Civil and Environmental Engineering.
2. APHA standard methods for the examination of water and wastewater – 20th edition.
3. Water supply engineering, S.K. Garg- 30th Edition.
4. L.G. Rich, ―Environmental Systems Engineeringǁ, Tata McGraw-Hill, 1973.

REFERENCE BOOKS

1. Fair, Geyer, Okum, ―Water and Wastewater Engineering: Water Supply and Wastewater Removalǁ, John Wiley & Sons Canada, Limited, 3rd Edition, 2010.
2. E.D. Schrocder, ―Water and Waste Treatmentǁ, Tata McGraw-Hill Education, 1977.
3. Guide manual: Water & wastewater analysis, Central Pollution Control Board, Govt. of India.
4. Lab Manual, ISO 14001 Environmental Management, Regulatory Standards for Drinking Water and Sewage disposal.

WEB REFERENCES

1. https://ee1-nitk.vlabs.ac.in/
2. https://ee2-nitk.vlabs.ac.in/

E -TEXT BOOKS

1. https://www.slideshare.net/shanubhav/cpcb-water-analysis-manual
2. http://srjcstaff.santarosa.edu/~oraola/Assets/APHA_SM_20.pdf

MOOCS COURSE

1. https://nptel.ac.in/courses/103/107/103107084/

DEPARTMENT OF CIVIL ENGINEERING

ENVIRONMENTAL SCIENCE

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*BS609HS	B. Tech	3	0	0	0	100	-	100

COURSE OBJECTIVES

To learn

1. Analyze the inter relationship between living organism and environment
2. Describe various types of natural resources available on the earth surface
3. Identify the values, threats of biodiversity, endangered and endemic species of India along with the conservation of biodiversity
4. Explain the causes, effects and control measures of various types of environmental pollutions
5. Understand the importance of environment by assessing its impact on the human world

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Differentiate between various biotic and abiotic components of ecosystem
2. Describe the various types of natural resources
3. Examine the values, threats of biodiversity, the methods of conservation, endangered and endemic species of India
4. Illustrate causes, effects and control measures of various types of environmental pollutions
5. Understand technologies on the basis of ecological principles environmental regulations which in turn helps in sustainable development

UNIT-I	ECOSYSTEMS	Classes: 8

Definition, Scope and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bio accumulation, Bio magnification.

UNIT-II	NATURAL RESOURCES	Classes: 8

Classification of Resources: Living and Non-Living resources,
water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefitsand problems.
Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources
Land resources: Forest resources
Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III	BIODIVERSITY AND BIOTIC RESOURCES	Classes: 7

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic, optional values and hotspots of biodiversity. Endangered and endemic species of India, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT-IV	ENVIRONMENTAL POLLUTION	Classes: 9

Types of pollution, Causes, effects and prevention and control measures of air, water, soil, noise and thermal pollution. Solid waste and e-waste management.

UNIT-V	ENVIRONMENTAL POLICY AND SUSTAINABLE DEVELOPEMENT	Classes: 10

Concept of sustainable development: Sustainable development goals. Threats to sustainability: Population explosion- crazy consumerism. Green building concept. Water conservation, Rainwater harvesting, watershed management. Environmental Policies and Legislations: Environment Protection Act, Air (Prevention and Control of Pollution) Act, Forest (conservation) Act, 1980. Wildlife Protection Act.

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi,12 Edition, 2015

REFERENCE BOOKS

1. Environmental Studies by Anubha Kaushik, 4 Edition, New age international publishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition

WEB REFERENCES

1. https://www.britannica.com/science/ecosystem
2. https://ocw.mit.edu/resources/#EnvironmentandSustainability

E -TEXT BOOKS

1. P N Palanisamy Environmental Science ISBN:9788131773253, eISBN:97899332509771 Edition: Secondedition
2. Environmental Studies. Author, Dr. J. P. Sharma. Publisher, Laxmi Publications, 2009 ISBN, 8131806413,9788131806418.

MOOCS COURSE

1. https://nptel.ac.in/courses/122103039/38
2. https://nptel.ac.in/courses/106105151/12

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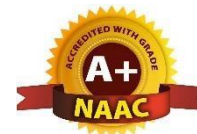
DEPARTMENT OF CIVIL ENGINEERING
ESTIMATION, COSTING AND PROJECT MANAGEMENT

IV B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE701PC	B. Tech	3	1	0	4	30	70	100

COURSE OBJECTIVES

1. The subject provide process of estimations required for various work in construction.
2. To have knowledge of BBS, Steel reinforcement
3. To have knowledge of using SOR & SSR for analysis of rates on various works and basics of planning tools for a construction projects.

COURSE OUTCOMES Upon successful completion of the course, the students be able to:
1. Understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure.
2. Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.
3. Understand how competitive bidding works and how to submit a competitive bid proposal.
4. An idea of how to optimize construction projects based on costs
5. An idea how construction projects are administered with respect to contract structures and issues.
6. An ability to put forward ideas and understandings to others with effective communication processes

UNIT-I	ESTIMATION OF MAIN ITEMS OF A BUILDING WORK	Classes: 12

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Detailed Estimates of Buildings. Introduction to Analysis of estimation by PrimaVera.

UNIT-II	BBS & EARTHWORK OF ROADS,CANALS	Classes: 12

Reinforcement bar bending and bar requirement schedules. Earthwork for roads and canals.

UNIT-III	RATE ANALYSIS	Classes: 12

Rate Analysis – Working out data for various items of work over head and contingent charges. Illustration of Rate analysis in Excel sheets

UNIT-IV	CONTRACTS AND VALUATION	Classes: 12

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation - Standard specifications for different items of building construction.

UNIT-V	**CONSTRUCTION PROJECT PLANNING**	**Classes: 12**

Stages of project planning: pre-tender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of detail. Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data; Techniques of planning- Bar charts, Gantt Charts. Networks: basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths, calendaring networks. PERT-Assumptions underlying PERT analysis, determining three-time estimates, analysis, slack computations, calculation of probability of completion

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie
3. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi Publications
4. Chitkara, K. K. Construction Project Management. Tata McGraw-Hill Education, 2014

REFERENCE BOOKS

1. Standard Schedule of rates and standard data book by public works department.

2. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)

3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.

4. Peurifoy, R.L. Construction Planning, Methods and Equipment, McGraw Hill, 2011

5. Nunnally, S.W. Construction Methods and Management, Prentice Hall, 2006 6. Jha, Kumar Neeraj., Construction Project management, Theory & Practice, Pearson Education India, 2015

WEB REFERENCES

1. https://dlscrib.com/download/estimating-and-costing-in-civil.
2. https://godbolt.me/estimation-costing-by-bn-dutta-48
3. https://handel-sheet-music.info/estimation-and-costing-by-bn-dutta-57
4. https://learncreative.net/estimating-and-costing-in-civil-engineering-by-b-n-dutta/

E -TEXT BOOKS

1. **https://studymaterialz.in/estimation-and-costing-by-b-n-dutta-book/**
2. [PDF] Estimation and Costing By B.N. Dutta Free Downlaod – EasyEngineering

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL
3. **https://www.udemy.com/course/project-estimation-and-cost/**

DEPARTMENT OF CIVIL ENGINEERING

PROFESSIONAL PRACTICE LAW & ETHICS

IV B. TECH- I SEMESTER (R 20)								

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
SM702MS	B. Tech	2	0	0	2	30	70	100

COURSE OBJECTIVES
- To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
- To develop some ideas of the legal and practical aspects of their profession.

COURSE OUTCOMES
The students will understand the importance of Values and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

UNIT-I	PROFESSIONAL PRACTICE AND ETHICS:	Classes: 10

Definition of Ethics, Professional Ethics - Engineering Ethics, Personal Ethics; Code of Ethics - Profession, Professionalism, Professional Responsibility, Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the-art; Vigil Mechanism, Whistle blowing, protected disclosures. Introduction to GST- Various Roles of Various Stake holders.

UNIT-II	LAW OF CONTRACT:	Classes: 12

Nature of Contract and Essential elements of valid contract, Offer and Acceptance, Consideration, Capacity to contract and Free Consent, Legality of Object. Unlawful and illegal agreements, Contingent Contracts, Performance and discharge of Contracts, Remedies for breach of contract. Contracts-II: Indemnity and guarantee, Contract of Agency, Sale of goods Act -1930: General Principles, Conditions & Warranties, Performance of Contract of Sale..

UNIT-III	ARBITRATION, CONCILIATION AND ADR (ALTERNATIVE DISPUTE RESOLUTION) SYSTEM:	Classes: 10

Arbitration – meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law – Arbitration and expert determination; Extent of judicial intervention; International commercial arbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal – appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; Lok Adalats.

UNIT-IV	ENGAGEMENT OF LABOUR AND LABOUR & OTHER CONSTRUCTION-RELATED LAWS:	Classes: 10

Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub- contract, piece rate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923; Building & Other -

Construction Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC 2017.

UNIT-V	LAW RELATING TO INTELLECTUAL PROPERTY:	Classes: 8

Introduction – meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets; Law relating to Copyright in India including Historical evolution of Copy Rights Act, 1957, Meaning of copyright – computer programs, Ownership of copyrights and assignment, Criteria of infringement, Piracy in Internet – Remedies and procedures in India; Law relating to Patents under Patents Act, 1970

TEXT BOOKS

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ravinder Kaur, Legal Aspects of Business, 4e, Cengage Learning, 2016.

REFERENCE BOOKS

1. RERA Act, 2017.
2. Wadhera (2004), Intellectual Property Rights, Universal Law Publishing Co.
3. T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House.
4. O.P. Malhotra, Law of Industrial Disputes, N.M. Tripathi Publishers.

WEB REFERENCES

1. Concepts of Intellectual Property Rights: https://nptel.ac.in/courses/110/105/110105139/
2. Copy rights: https://nptel.ac.in/courses/110/105/110105139/

E -TEXT BOOKS

1. library genesis:
http://libgen.rs/book/index.php?md5=CD6FF866EA24FA5A1AC3F10805EE5B11
2. http://libgen.rs/book/index.php?md5=13C4B3A45B1C95B4A388F94729CCCFBC

MOOCS COURSE

1. https://nptel.ac.in/courses/109/105/109105112/
2. https://nptel.ac.in/courses/109/106/109106148/
3. https://nptel.ac.in/courses/110/105/110105139/

Professional Elective - I

CE511PE	Concrete Technology
CE512PE	Theory of Elasticity
CE513PE	Rock Mechanics

Professional Elective - II

CE611PE	Prestressed Concrete
CE612PE	Elements of Earth Quake Engineering
CE613PE	Advanced Structural Analysis

Professional Elective - III

CE711PE	Remote sensing & GIS
CE712PE	Ground Improvement Techniques.
CE713PE	Advanced Structural Design

Professional Elective - IV

CE721PE	Irrigation and Hydraulic Structures
CE722PE	Pipeline Engineering
CE723PE	Ground Water Hydrology

Professional Elective - V

CE811PE	Solid Waste Management
CE812PE	Environmental Impact Assessment
CE813PE	Air pollution

Professional Elective – VI

CE821PE	Airports, Railways and Waterways
CE822PE	Urban Transportation Planning
CE823PE	Finite Element Methods for Civil Engineering

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DEPARTMENT OF CIVIL ENGINEERING
CONCRETE TECHNOLOGY

III B. TECH- I SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
CE511PE	**B. Tech**	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Know different types of cement as per their properties for different field applications.
2. Understand Design economic concrete mix proportion for different exposure conditions and intended purposes.
3. Know field and laboratory tests on concrete in plastic and hardened stage.

COURSE OUTCOMES

After the completion of the course student should be able to
1. Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the theology and early age properties of concrete on its long-term behavior.
2. Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties
3. Use advanced laboratory techniques to characterize cement-based materials.
4. Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fibre reinforced concrete.

UNIT-I	**Cement**	**Classes: 12**

Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrated cement – Tests on physical properties – Different grades of cement. Admixtures: Types of admixtures – mineral and chemical admixtures.

UNIT-II	**Aggregates**	**Classes: 12**

Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading

curves – Grading of fine, Manufactured sand and coarse Aggregates – Gap graded aggregate – Maximum aggregate size- Properties Recycled aggregate.

UNIT-III	Fresh Concrete	Classes: 12

Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing, vibration and revibration of concrete – Steps in manufacture of concrete – Quality ofmixing water.

UNIT-IV	Hardened Concrete & Testing of Hardened Concrete	Classes: 12

Water / Cement ratio – Abram's Law – Gel/space ratio – Gain of strength of concrete – Maturity concept – Strength in tension and compression – Factors affecting strength – Relation between compression and tensile strength - Curing.

Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions for NDT.

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Posisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT-V	Mix Design & Special Concretes	Classes: 12

Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

Introduction to Light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete – High performance concrete – Self compacting concrete.

TEXT BOOKS

1. Concrete Technology by M.S. Shetty. – S. Chand & Co.; 2004
2. Concrete Technology by A.R. Santhakumar, 2nd Edition, Oxford university Press, New Delhi
3. Concrete Technology by M. L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi

REFERENCE BOOKS

1. Properties of Concrete by A. M. Neville – Low priced Edition – 4th edition
2. Concrete: Micro structure, Properties and Materials – P.K. Mehta and J.M. Monteiro, Mc- Graw Hill Publisher.

WEB REFERENCES

1. https://www.smartzworld.com/notes/concrete-technology-pdf-notes-ct/

2. https://nptel.ac.in/courses/105/102/105102012/

3. https://civilenggforall.com/concrete-technology-study-material-for-ssc-je-by-civilenggforall-free-download-pdf/

E -TEXT BOOKS

1. https://easyengineering.net/concrete-technology-books-collection-new/
2. https://www.constructionplacements.com/books-on-concrete-technology/

MOOCS COURSE

1. https://www.mooc-list.com/tags/concrete
2. https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ce45/

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DEPARTMENT OF CIVIL ENGINEERING
THEORY OF ELASTICITY

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE512PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To Introduce fundamental elasticity model of deformation in rectangular and polar coordinate.
2. To Give foundation for 2D and 3D study in solid mechanics problems.
3. To Introduce to torsion and warping of prismatic structure

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. The more fundamental elasticity model of deformation should replace elementary strength of material analysis.
2. Able to understand theory, formulate and to present solutions to a wide class of problems in 2D and 3D
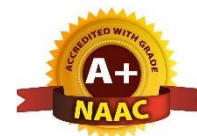3. Acquire the foundation for advanced study in areas of solid mechanics

UNIT-I	INTRODUCTION	Classes: 12

Elasticity - notation for forces and stress - components of stresses - components of strain - Hooks law. Plane stress and plane strain analysis - differential equations of equilibrium -boundary conditions – Strain Displacement Relations - compatibility equations - stress function

UNIT-II	TWO DIMENSIONAL PROBLEMS IN RECTANGULAR COORDINATES	Classes: 12

Two dimensional problems in rectangular coordinates **-** solution by polynomials - Saint-Venants principle - determination of displacements - bending of simple beams – Simple Supported and Cantilever Beam.

UNIT-III	POLAR COORDINATES	Classes: 12

Two dimensional problems in polar coordinates - stress distribution symmetrical about an axis - pure bending of curved bars - strain components in polar coordinates - displacements for symmetrical stress distributions Edge Dislocation - general solution of two-dimensional problem in polar coordinates - application to Plates with Circular Holes – Rotating Disk. Bending of

Prismatic Bars: Stress function - bending of cantilever - circular cross section - elliptical cross section - rectangular cross section.

UNIT-IV	**ANALYSIS OF STRESS AND STRAIN IN THREE DIMENSIONS**	**Classes: 12**

Analysis of stress and strain in three dimensions - principal stress - stress ellipsoid - director surface - determination of principal stresses Stress Invariants - max shear stresses Stress Tensor – Strain Tensor- Homogeneous deformation - principal axes of strain-rotation. General Theorems: Differential equations of equilibrium - conditions of compatibility - determination of displacement - equations of equilibrium in terms of displacements - principle of super position - uniqueness of solution - the reciprocal theorem Strain Energy.

UNIT-V	**TORSION OF CIRCULAR SHAFTS**	**Classes: 12**

Torsion of Circular Shafts - Torsion of Straight Prismatic Bars – Saint Venants Method - torsion of prismatic bars - bars with elliptical cross sections - membrane analogy - torsion of a bar of narrow rectangular bars - solution of torsional problems by energy method - torsion of shafts, tubes, bars etc. Torsion of Rolled Profile Sections.

TEXT BOOKS

1. Theory of Elasticity by Timoshenko, McGraw-Hill Publications.
2. Theory of Plasticity by J. Chakarbarthy, McGraw-Hill Publications.

REFERENCE BOOKS

1. Theory of Elasticity by Y.C.Fung.
2. Theory of Elasticity by Gurucharan Singh.

WEB REFERENCES

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2. https://web.iitd.ac.in/~ajeetk/AML841.html
3. https://nptel.ac.in/course.html

E -TEXT BOOKS

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2. https://easyengineering.net/theory-of-elasticity-by-timoshenko/

MOOCS COURSE

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DEPARTMENT OF CIVIL ENGINEERING
ROCK MECHANICS

III B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE513PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Identify the classification of Rocks as per engineering aspects
2. Explain the basic laboratory in-situ tests, strengths and its responses
3. Understand Rock slopes and its failures, underground and open excavations and its requirements

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Able to determine the required rock properties and classify rock mass
2. Determination of bearing capacity of rocks,
3. Checking the stability of slopes, and design underground and open excavation.
4. The students will be able to predict strength of rock mass with respect to various CivilEngineering applications

UNIT-I	ENGINEERING CLASSIFICATION OF ROCKS	Classes: 12

Classification of intact rocks, Rock mass classifications, Rock Quality Designation (RQD), Rock Structure Rating (RSR), Rock Mass Rating (RMR), Norwegian Geotechnical Classification (Q-system), Strength and modulus from classifications, Classification based on strength & modulus and strength and fracture strain, Geoengineering classification.

UNIT-II	LABORATORY AND IN-SITU TESTING OF ROCKS	Classes: 12

Physical properties, Compressive strength, Tensile strength, Direct shear test, Triaxial shear test, Slake durability test, Schmidt rebound hardness test, Sound velocity test, In-Situ Tests: Seismic

methods, Electrical resistivity method, In situ stresses, Plate loading test, Goodman jack test, Plate jacking test, In-situ shear test, Field permeability test.

UNIT-III	STRENGTH, MODULUS AND STRESSES-STRAIN RESPONSES OF ROCKS	Classes: 12

Factors influencing rock response, Strength criteria for isotropic intact rocks, Modulus of intact rocks, effect of confining pressure, Uniaxial Compressive strength, Strength criteria for intact rocks, Strength due to induced anisotropy in rocks,. Stress Strain Models: Constitutive relationships, Elastic, Elasto-plastic, Visco-elastic, Elasto- viscoplastic stress-strain models.

UNIT-IV	INTRODUCTION TO ROCK SLOPE	Classes: 12

Introduction to Rock slopes, Modes of failure, Rotational failure slope failure, Plane failure, Design charts, Wedge method of analysis, Buckling failure, Toppling failure, Improvement of slope stability and protection.

UNIT-V	UNDERGROUND AND OPEN EXCAVATIONS	Classes: 12

Blasting operational planning, Explosive products, Blast Design, Underground blast design, Controlled blasting techniques, blasting damage and control, Safe practice with explosives and shots.

TEXT BOOKS

1. Goodman – Introduction to Rock mechanics, Willey International
2. Ramamurthy, T. - Engineering in Rocks for slopes, foundations and tunnels, Prentice Hall ofIndia (2007)

REFERENCE BOOKS

1. Jaeger, J. C. and Cook, N. G. W. – Fundamentals of Rock Mechanics, Chapman and Hall,London. (1979)
2. Hoek, E. and Brown, E. T. - Underground Excavation in Rock, Institution of Mining andMetallurgy, 1982.
3. Brady, B. H. G. and Brown, E. T. - Rock Mechanics for Underground Mining, Chapman & Hall,1993.

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MOOCS COURSE

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DEPARTMENT OF CIVIL ENGINEERING
PRESTRESSED CONCRETE

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE611PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Prestressing is the techniques often used in bridges and other structural elements for longer span and hearer loads.

2. This subject covers various aspects of Prestressing and design techniques to give the student an overall exposure in the analysis and design of Prestressed concrete structures.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Able to design prestressed concrete structures

2. Understand the concepts of pre-stressing in concrete structures and identify the Materials for pre-stressing

3. Analysis of sections for flexure and shear

4. Understand the concepts of transfer of prestress in pretensioned members

5. Analysis of composite beams and importance of deflections

UNIT-I	Introduction	Classes: 12

Historic development- General principles of pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics.

UNIT-II	Methods and Systems of Prestressing	Classes: 12

Pretensioning and Post tensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system. Losses of Prestress: Loss of prestress in pretensioned and post-tesnioned members due to various

causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses

UNIT-III	Flexure & Shear	Classes: 12

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC slabs and beams of rectangular and I sections- Kern line – Cable profile and cable layout.

Shear: General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- IS Code provisions.

UNIT-IV	Transfer of Prestress in Pretensioned Members	Classes: 12

Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zienlinski and Rowe's methods – Anchorage zone reinforcement- IS Provisions.

UNIT-V	Composite Beams & Deflections	Classes: 12

Composite Beams : Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long time deflections- IS code requirements.

TEXT BOOKS

1. Prestressed concrete by Krishna Raju, Tata Mc Graw Hill Book – Co. New Delhi.

2. Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York.

REFERENCE BOOKS

1. Prestressed concrete by S. Ramamrutham Dhanpat Rai & Sons, Delhi.

2. Prestressed Concrete by N. Rajagopalan Narosa Publishing House

WEB REFERENCES

1. https://www.youtube.com/watch?v=5gHoqgwv61A

2. https://www.youtube.com/watch?v=4KYPltsNAWs&list=PLB50EF6A79D1F8C14

E -TEXT BOOKS

1. https://books.google.co.in/books?id=O9nNYr-12G4C&printsec=frontcover&redir_esc=y#v=onepage&q&f=false

2. https://books.google.co.in/books?id=pT88BAAAQBAJ&pg=PA2&source=gbs_selected_p

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DEPARTMENT OF CIVIL ENGINEERING
ELEMENTS OF EARTHQUAKE ENGINEERING

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE612PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Understand Engineering Seismology
2. Explain and discuss single degree of freedom systems subjected to free and forced vibrations
3. Acquire the knowledge of the conceptual design and principles of earthquake resistant designs as per IS codes
4. Understand importance of ductile detailing of RC structures concrete structures.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Explain and derive fundamental equations in structural dynamics
2. Discuss and explain causes and Theories on earthquake, seismic waves, measurement of earthquakes
3. Evaluate base shear using IS methods
4. Design and detail the reinforcement for earthquake forces
5. Design &Analysis of finite element structures under earthquake load

UNIT-I	Engineering Seismology -Theory of Vibrations	Classes: 12

Engineering Seismology: Earthquake phenomenon - cause of earthquakes-Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales- Energy Released-Earthquake measuring instruments seismogram - Seism scope, Seismograph, - strong ground motions- Seismic zones of India.
Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom-Continuous system- Lumped mass idealization-Oscillatory Motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system- undammed and damped-critical damping-Logarithmic Decrement-Forced Vibrations-Harmonic Excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT-II	Conceptual design - Introduction to earthquake resistant	Classes: 12

	Design	

Conceptual design: Introduction-Functional Planning-Continuous load path-Overall form simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical Members-Twisting of buildings-Ductility-definition-ductility relationships-flexible buildings framing systems-choice of construction materials-unconfined concrete-confined concrete masonry-reinforcing steel.

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method

UNIT-III	**Reinforced Concrete Buildings**	**Classes: 12**

Reinforced Concrete Buildings: Principles of earthquake resistant deign of RC members-Structural models for frame buildings - Seismic methods of analysis- IS code based methods for seismic design- Vertical irregularities - Plan configuration problems- Lateral load resisting systems- Determination of design lateral forces as per IS 1893 (Part-1):2016- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT-IV	**Masonry Buildings**	**Classes: 12**

Masonry Buildings: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements-Lateral load analysis of masonry buildings.

UNIT-V	**Structural Walls and Non-Structural Elements**	**Classes: 12**

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls-sectional shapes- variations in elevation- cantilever walls without openings – Failure mechanism of non- structures- Effects of non-structural elements on structural system-Analysis of nonstructural elements- Prevention of non-structural damage.

Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction-Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920-2016 - Behavior of beams, columns and joints in RC buildings during earthquakes

TEXT BOOKS

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande,

   Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons.
1. Eartquake Resistant Design of Building structures by Vinod Hosur, Wiley India Pvt. Ltd.
2. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd.
3. Masonry and Timber structures including earthquake Resistant Design –Anand S.Arya, Nam Chand & Bros

5. Earthquake Tips – Learning Earthquake Design and Construction, C.V.R. Murthy BIS

Codes: 1. IS 1893(Part-1):2016. 2. IS 13920:2016. 3. IS 4326. 4. IS 456:200

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2. https://ocw.mit.edu/resources/#Mathematics
3. https://www.sosmath.com/
4. 4. https://www.mathworld.wolfram.com/

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MOOCS COURSE

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DEPARTMENT OF CIVIL ENGINEERING
ADVANCED STRUCTURAL ANALYSIS

III B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE613PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

The objectives of the course are to
1. Understand the matrix method of analysis statically indeterminate frames and trusses.
2. Know the transformation of coordinates and assembly of stiffness matrices
3. Differentiate between flexibility and stiffness methods of analysis of beams, frames and plane trusses
4. Understand the structural behavior of large frames with or without shear walls

COURSE OUTCOMES

After the completion of the course student should be able to
1. Analyze the multi-storey building frames by various approximate methods.
2. Solve the continuous beams, portal frames by matrix methods of analysis.
3. Analyze and design of large frames with or without shear wall

UNIT-I	INTRODUCTION TO MATRIX METHODS	Classes: 12

Introduction to matrix methods of analysis statically indeterminacy and kinematics indeterminacy degree of freedom-coordinate system-structure idealization stiffness and flexibility matrices-suitability element stiffness equations-elements flexibility equations-mixed force-displacement equations-for truss element, beam element and tensional element Transformation of coordinates-element stiffness matrix-and load vector-local and global coordinates.

UNIT-II	INTRODUCTION TO DIRECT METHODS	Classes: 12

Assembly of stiffness matrix from element stiffness matrix-direct stiffness method-general procedure bank matrix-semi bandwidth-computer algorithm for assembly by direct stiffness matrix method.

UNIT-III	FLEXIBLE METHOD	Classes: 12

Analysis of plane truss-continuous beam-plane frame and grids by Flexible methods.

UNIT-IV	STIFFNESS METHOD	Classes: 12

Analysis of plane truss-continuous beam-plane frame and grids by stiffness methods		
UNIT-V	**ANALYSIS OF SHEAR WALLS**	**Classes: 12**

Special analysis procedures-static condensation and sub structuring-initial and thermal stresses. Shear Walls Necessity-structural behavior of large frames with and without shear walls-approximate methods of analysis of shear walls.

TEXT BOOKS

1. Matrix methods of structural analysis by Willam Weaver and gere, CBS Publishers.

2. Advanced Structural Analysis by A.K. Jain Nemchand Publishers

REFERENCE BOOKS

1. Advanced Structural Analysis by Devdas Menon, Narosa publishing house.
2. Matrix methods of structural analysis by Pandit and gupta
3. Matrix methods of structural analysis by J Meek
4. Structural Analysis by Ghali and Neyveli

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E -TEXT BOOKS

1. https://civilenglineering.files.wordpress.com/2014/10/advance-method-of-structural-analysis-book.pdf

2. https://dlscrib.com/download/theory-of-structures-by-s-ramamrutham-pdf_59c0e8ff08bbc5e123686fd3_pdf

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2. https://nptel.ac.in/courses/105/105/105105109/

Professional Elective – III

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DEPARTMENT OF CIVIL ENGINEERING
REMOTE SENSING AND GIS

IV B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE711PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Know the concepts of Remote Sensing, its interpreting Techniques and concepts of Digital images
2. Know the concept of Geographical Information System (GIS), coordinate system GIS Data and its types
3. Understand the students managing the spatial Data Using GIS.
4. Understand Implementation of GIS interface for practical usage.

COURSE OUTCOMES

1. Upon successful completion of the course, the student is able to
2. Describe different concepts and terms used in Remote Sensing and its data
3. Understand the Data conversion and Process in different coordinate systems of GIS interface
4. Evaluate the accuracy of Data and implementing a GIS
5. Understand the applicability of RS and GIS for various applications.

UNIT-I	CONCEPTS OF REMOTE SENSING	Classes: 12

Concepts of Remote Sensing Basics of remote sensing, elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology & units, energy resources, energy interactions with earth surface features & atmosphere, atmospheric effects, satellite orbits, Sensor Resolution, types of sensors, Remote Sensing Platforms and Sensors, IRS satellites.

Remote Sensing Data Interpretation Visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of soil, water and vegetation. Concepts of Digital image processing, image enhancements, qualitative & quantitative analysis and pattern recognition, classification techniques and accuracy estimation.

UNIT-II	INTRODUCTION TO GIS	Classes: 12

Introduction to GIS: Introduction, History of GIS, GIS Components, GIS Applications in Real life. The Nature of geographic data, ,Types of maps, Map scale, Types of stale, Map and Globe,

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Co ordinate systems, Map projections, Map transformation, Geo-referencing,

UNIT-III	SPATIAL DATABASE MANAGEMENT SYSTEM	Classes: 12

Spatial Database Management System: Introduction: Spatial DBMS, Data storage, Database structure models, database management system, entity-relationship model, normalization
Data models and data structures: Introduction, GIS Data model, vector data structure, Classes and their Relationship , raster data structure, attribute data, geo-database and metadata

UNIT-IV	SPATIAL DATA INPUT AND EDITING	Classes: 12

Spatial Data input and Editing: Data input methods keyboard entry, digitization, scanning, conversion of existing data, remotely sensed data, errors in data input, Data accuracy, Micro and Macro components of accuracy, sources of error in GIS.
Spatial Analysis: Introduction, topology, spatial analysis, vector data analysis. Network analysis, raster data analysis. Spatial data interpolation techniques.

UNIT-V	IMPLEMENTING A GIS AND APPLICATIONS	Classes: 12

Implementing a GIS and Applications Implementing a GIS: Awareness, developing system requirements, evaluation of alternative systems, decision making using GIS
Applications of GIS: GIS based road network planning, Mineral mapping using GIS, Shortest path detection using GIS, Hazard Zonation using remote sensing and GIS, GIS for solving multi criteria problems, GIS for business applications.

TEXT BOOKS

1. Remote Sensing and GIS by BasudebBhatta, Oxford University Press, 2nd Edition, 2011.
2. Introduction to Geographic Information systems by Kang-tsung Chang, McGraw Hill Education (Indian Edition), 7th Edition, 2015.
3. Fundamentals of Geographic Information systems by Michael N. Demers, 4th Edition, Wiley Publishers, 2012.

REFERENCE BOOKS

1. Remote Sensing and Image Interpretation by Thomas M. Lillesand and Ralph W. Kiefer, Wiley Publishers, 7th Edition, 2015.
2. Geographic Information systems – An Introduction by Tor Bernhardsen, Wiley India Publication, 3rd Edition, 2010.
3. Advanced Surveying: Total Station, GIS and Remote Sensing by SatheeshGopi, R. SathiKumar, N. Madhu, Pearson Education, 1st Edition, 2007.
4. Textbook of Remote Sensing and Geographical Information systems by M. Anji Reddy.

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2. https://www.mdpi.com/journal/remotesensing/special_issues/RS_GIS_resources

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1. https://easyengineering.net/text-book-of-remote-sensing-and-geographical-information-systems-by-anji-reddy/

2. http://gvpce.ac.in/syllabi/Remote%20Sensing%20and%20GIS.pdf

MOOCS COURSE

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DEPARTMENT OF CIVIL ENGINEERING
GROUND IMPROVEMENT TECHNIQUES

IV B. TECH- I SEMESTER (R 20)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
CE712PE	**B. Tech**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To know the need of ground improvement
2. To acquire the knowledge on the various ground improvement techniques available and theirapplications for different types of soils
3. To understand suitable ground improvement technique for given soil conditions.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Know the necessity of ground improvement
2. Understand the various ground improvement techniques available
3. Select & design suitable ground improvement technique for existing soil conditions in thefield

UNIT-I	**INTRODUCTION TO ENGINEERING GROUND MODIFICATION**	**Classes: 12**

Need and objectives, Identification of soil types, In situ and laboratory tests to characterize problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT-II	**MECHANICAL MODIFICATION**	**Classes: 12**

Shallow Compaction Techniques- Deep Compaction Techniques- Blasting- Vibro compaction- Dynamic Tamping and Compaction piles.

UNIT-III	**HYDRAULIC MODIFICATION**	**Classes: 12**

Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering-Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains.

UNIT-IV	PHYSICAL AND CHEMICAL MODIFICATION	Classes: 12

Modification by admixtures, Modification Grouting, Introductionto Thermal Modification including freezing.

UNIT-V	MODIFICATION BY INCLUSIONS AND CONFINEMENT	Classes: 12

Soil reinforcement, reinforcement with strip, grid reinforced soil In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hillpublications
2. M. P. Moseley and K. Krisch (2006) – Ground Improvement, II Edition, Taylor and Francis

REFERENCE BOOKS

1. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey
2. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butter worths, London.
3. Xianthakos, Abreimson and Bruce - Ground Control and Improvement, John Wiley & Sons,1994.
4. K. Krisch & F. Krisch (2010) - Ground Improvement by Deep Vibratory Methods, Spon Press,Taylor and Francis
5. Donald P Coduto – Foundation Design Principles and Practices, 2nd edition, Pearson, Indianedition, 2012.

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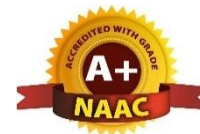2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING
ADVANCE STRUCTURAL DESIGN

IV B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE713PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. **Identify** the Principles& Design of Retaining walls.
2. **Identify** and **tell** the various codal provisions given in IS. 456.
3. **Analyze** the flat slabs and ribbed slabs.
4. **Evaluate** the behaviour of RCC Circular water Tanks.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Enhance the capabilities to design the special structural elements as per Indian standard code Of practice.
2. Analyze, design, draw and detailing of critical structural components with a level of accuracy

UNIT-I	RETAINING WALLS	Classes: 12

Design and Detailing of cantilever type of Retaining walls – Stability Check. Principles & Design of Counter fort Retaining walls.

UNIT-II	FLAT SLABS & RIBBED SLABS	Classes: 14

Flat slabs: Direct design method – Distribution of moments in column strips and middle strip-moment and shear transfer from slabs to columns – Shear in Flat slabs-Check for one way and two way shears

Ribbed slabs: Analysis of the Slabs for Moment and Shears, Ultimate Moment of Resistance, Design for shear, Deflection, Arrangement of Reinforcements.

UNIT-III	DESIGN OF RCC CIRCULAR WATER TANKS.	Classes: 12

Design of RCC Circular Water Tanks.

UNIT-IV	BRIDGES	Classes: 12

Introduction - Definition and basic forms – Components of a bridge - Classification of bridges – IRC Loading Standards and specifications - Design of Reinforced Concrete Slab Bridge decks.

UNIT-V	DESIGN OF GANTRY GRIDERS	Classes: 12

Design procedure of Steel Gantry Girders

TEXT BOOKS

1. 1 Advanced RCC by Krishnam Raju, CBS Publishers & distributors, New Delhi.

2. Advanced RCC by Varghese, PHI Publications, New Delhi.

3. Structural Design and drawing (RCC and steel) by Krishnam Raju, Univ. Press, New Delhi

4. R.C.C Structures by Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications, New Delhi

REFERENCE BOOKS

1 RCC Designs by Sushil Kumar, standard publishing house.

2. Fundamentals of RCC by N.C. Sinha and S.K. Roy, S. Chand Publications, New Delhi.

3. N. Krishna Raju, Design of Bridges, Oxford & IBH Publishing Company Pvt. Ltd, New Delhi. Fourth edition 2009.
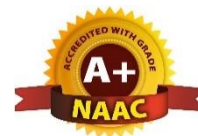
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1. https://youtu.be/0oqEZX_XUKc
2. https://youtu.be/212qpAQHWAo

E -TEXT BOOKS

1. https://nptel.ac.in/courses/105/106/105106113/#
   https://nptel.ac.in/courses/105/105/105105104/

MOOCS COURSE

1. https://youtu.be/0oqEZX_XUKc
2. https://youtu.be/212qpAQHWAo
3. https://nptel.ac.in/courses/105/106/105106113/#

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DEPARTMENT OF CIVIL ENGINEERING
IRRIGATION AND HYDRAULIC STRUCTURES

IV B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE721PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To study various types of storage works and, diversion headwork, their components and design principles for their construction.

COURSE OUTCOMES

At the end of the course, the student will be able to:

• Know types of water retaining structures for multiple purposes and its key parameters considered for planning and designing
• Understand details in any Irrigation System and its requirements
• Know, Analyze and Design of a irrigation system components

UNIT-I	STORAGE WORKS	Classes: 12

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II	GRAVITY DAMS	Classes: 12

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile, and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III	EARTH DAMS AND SPILLWAYS	Classes: 12

Earth dams: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.
Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT-IV	DIVERSION HEAD WORKS AND WEIRS ON	Classes: 12

	PERMEABLE FOUNDATIONS	

 Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations, - Silt Ejectors and Silt Excluders

 Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT-V	**CANAL FALLS AND CROSS DRAINAGE WORKS**	**Classes: 12**

 Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall. Canal regulation works, principles of design of cross and distributary head regulators, types of Canal escapes - types of canal modules, proportionality, sensitivity, setting and flexibility.

 Cross Drainage works: types, selection of suitable type, various types, design considerations for cross drainage works.

TEXT BOOKS

 1. Irrigation Engineering and Hydraulic structures by Santhosh kumar Garg, Khanna Publishers.
 2. Irrigation engineering by K. R. Arora Standard Publishers.

 3. Irrigation and water power engineering by Punmia & Lal, Laxmi publications Pvt. Ltd., New Delhi.

REFERENCE BOOKS

 1. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta

 2. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers 2015.

 3. Irrigation Theory and Practice by A. M. Micheal Vikas Publishing House 2015.

 4. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers.

WEB REFERENCES

1. https://books.google.co.in/books/about/Irrigation_Engineering_and_Hydraulic_Str.html?id=WkRxDwAAQBAJ&redir_esc=y

2. https://www.sanfoundry.com/best-reference-books-hydraulic-structures/

3. https://civilpddc2013.weebly.com/irrigation-engineering.html

E -TEXT BOOKS

1. https://www.schandpublishing.com/books/tech-professional/civil-engineering/irrigation-engineering-hydraulic-structures/

2. https://www.elsevier.com/books/the-finite-element-method-in-engineering

3. https://byjusexamprep.com/best-books-for-irrigation-engineering-i

MOOCS COURSE

 1. https://swayam.gov.in/

 2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING
PIPELINE ENGINEERING

IV B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE722PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To familiarize the students with the various elements and stages involved in transportation of water.
2. To understand standards and practices in piping design.
3. To know various equipment and their operation in pipeline transportation.
4. To understand technology in transportation of fluids.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Get an understanding of the key steps in a pipeline's lifecycle
2. Design of pipeline construction, installation, asset management and maintenance.
3. Analyse and design structural elements made of cement composites.

UNIT-I	ELEMENTS OF PIPELINE DESIGN	Classes: 12

Types of piping systems; transmission lines, In-plant piping systems, Distribution mains, Service lines. Types of Water distribution networks; serial networks, branched networks and looped networks. Network components and Network model. Basic hydraulic principles; continuity and Energy principle.

Pipeline route selection, survey and geotechnical guidelines: Introduction - Preliminary route selection - Key factors for route selection - Engineering survey - Legal survey - Construction / As-built survey - Geotechnical design.

UNIT-II	FRICTIONAL HEAD LOSS IN PIPES	Classes: 12

Major and Minor losses, Artificially roughened pipes, moody Diagram. Friction coefficient relationships, Empirical formulae, Simple pipe flow problems Equivalent pipes; pipes in series, parallel, series-parallel; problems. Water Hammer and energy transmission through pipes: gradual and Instantaneous closure

UNIT-III	RESERVOIRS, PUMPS AND VALVES	Classes: 12

Types of Reservoirs, Pumps; introduction, system head-dischargepump head and head-discharge relationships, characteristic curves, pump combination. Valves: check valves, flow control valves, Pressure Reducing valves, both Flow control and Pressure Reducing Valves.

Network Parameters and Types of analysis: Network parameters, Parameter interrelationships, Necessity of Analysis, common Assumptions, types of analysis, rules for Solvability of Pipe networks.

UNIT-IV	NETWORK FORMULATION OF EQUATIONS	Classes: 12

Network Formulation of Equations: States of parameters, Single-Source Networks with known pipe Resistances. Multisource Networks with known pipes resistances. Networks with unknown pipe resistances. Inclusion of Pumps, Check Valves, Flow Control Valves and Pressure Reducing Valves – Problems.

Hardy Cross Method: Methods of balancing heads (Loop Method). Method of Balancing Flows (Node Method). Modified Hardy Cross Method. Convergence Problem. Different software for WDN analysis and design.

UNIT-V	PIPELINE QUALITY MANAGEMENT, CONSTRUCTION AND OPERATIONS	Classes: 12

Materials selection and quality management: Elements of design – Materials designation standards – Quality management

Pipeline construction: Construction – Commissioning.

Pipeline protection, Instrumentation, pigging & Operations: Pipeline coating – Cathodic protection – Cathodic protection calculations for land pipelines – Internal corrosion – Flow meters and their calibration – Sensors – Pigs-Pipeline Operations and maintenance.

TEXT BOOKS

1. Analysis of Water Distribution Networks, P.R. Bhave and R. Gupta, Narosa Publishing House Pvt. Ltd.

2. Pipeline Engineering, Henry Liu, Lewis Publishers (CRC Press), 2003.

3. Piping and Pipeline Engineering: Design, Construction, Maintenance Integrity and Repair, George A. Antaki, CRC Press, 2003.

REFERENCE BOOKS

1. Piping Calculation Manual, E. Shashi Menon, McGraw-Hill, 2004.

2. Pipeline Rules of Thumb Handbook, E. W. McAllister, 7th Edition, 2009.

3. Liquid Pipeline Hydraulics, E. Shashi Menon, Mareel Dekker Inc., 2004

WEB REFERENCES

1. https://www.udemy.com/course/fundamentals-of-process-piping-engineering-in-oil-and-

gas/

2. https://www.online.colostate.edu/courses/CIVE/CIVE571.dot

E -TEXT BOOKS

1. https://www.euro-book.net/books/AE-kAgAAQBAJ/a-quick-guide-to-pipeline-engineering/d-alkazraji/elsevier/176/2008-03-26/9781845694913/melb

2. https://www.academia.edu/36478986/Handbook_Pipeline_Engineering_Henry

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL
3. https://www.mooc-list.com/course/data-mining-pipeline-coursera

DEPARTMENT OF CIVIL ENGINEERING

GROUND WATER HYDROLOGY

IV B. TECH- I SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE723PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn
- To explain the concepts of Groundwater Development and Management.
- To demonstrate and derive the basic equations used in Groundwater development and management and the corresponding equations To know the investigations, field studies to conduct basic ground water studies
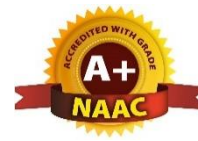
COURSE OUTCOMES

Upon successful completion of the course, the student is able to
- Identify different fundamental equations and concepts as applied in the Groundwater studies
- Discuss and derive differential equation governing groundwater flow in three dimensions
- To solve groundwater mathematical equations and analyze pumping tests in steady and non steady flow cases
- Distinguish and understand the saline water intrusion problem in costal aquifers

UNIT-I	GROUND WATER OCCURRENCE	Classes: 12

Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, Vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as aquifers, types of aquifers, porosity, specific yield and specific retention. Ground Water Movement-Permeability, Darcy's law, storage coefficient, Transmissivity, Differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system, ground water flow contours and their applications.

UNIT-II	ANALYSIS OF PUMPING TEST DATA-I	Classes: 12

Steady flow ground water flow towards a well in confined and unconfined aquifers-Dupit's and Theism's equations, assumptions, formation constants, yield of an open well interface and well tests..

UNIT-III	ANALYSIS OF PUMPING TEST DATA-II	Classes: 12

Unsteady flow towards well-Non-Equilibrium equations, Thesis solution, Jocob and Chow's simplifications, Leak aquifers.

UNIT-IV	SURFACE AND SUB-SURFACE INVESTIGATION	Classes: 12

Surface methods of exploration-Electrical resistivity method and Seismic refraction methods. Subsurface methods geophysical logging and resistivity logging. Concept of artificial recharge of ground water, recharge methods, Applications of GIS and RS in artificial recharge of ground water along with case studies

UNIT-V	SALINE WATER INTRUSION IN AQUIFER	Classes: 12

Occurrence of saline water intrusion, Ghyben-Herzberg relation, Shape of interface, control of water intrusion. Ground water basin management-case studies

TEXT BOOKS

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.

2. Ground water by H.M. Raghunath, Wiley Eastern Ltd.
3. Groundwater System Planning & Management, R. Willes & W.W.G. Yeh, Prentice Hall.

REFERENCE BOOKS

1. Ground water by Bawvwr, John Wiley & Sons.
2. Applied Hydrogeology by C.W. Fetta, CBS Publishers & Distributors.
3. Ground Water Assessment, Development and Management by K R Karanth, McGraw Hill Publications.

WEB REFERENCES

1. https://nptel.ac.in/courses/105/105/105105042/

2. https://nptel.ac.in/courses/105/104/105104183/

E -TEXT BOOKS

1. https://easyengineering.net/ground water hydrology-handbook-by-jack-pinkowski/

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

Professional Elective-V

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DEPARTMENT OF CIVIL ENGINEERING
SOLID WASTE MANAGEMENT

IV B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE811PE	B. Tech	3	0	0	3	30	70	100

Course Objectives:

The objectives of the course are to

1. Define the terms and Understands the necessity of solid waste management
2. Explain the strategies for the collection of solid waste
3. Describe the solid waste disposal methods
4. Categorize Hazardous Waste

Course Outcomes:

At the end of the course, the student will be able to understand solid waste, its collection, process disposal

1. Identify the physical and chemical composition of solid wastes
2. Analyze the functional elements for solid waste management.
3. Understand the techniques and methods used in transformation, conservation, and recovery of materials from solid wastes.
4. Identify and design waste disposal systems

UNIT-I	SOLID WASTE	Classes: 12

Definitions, Types of solid wastes, sources of solid wastes, Characteristics, and perspectives; properties of solid wastes, Sampling of Solid wastes, Elements of solid waste management - Integrated solid waste management; Solid Waste Management Rules 2016.

UNIT-II	ENGINEERING SYSTEMS FOR SOLID WASTE MANAGEMENT	Classes: 12

Engineering Systems for Solid Waste Management: Solid waste generation; on-site handling, storage and processing; collection of solid wastes; Stationary container system and Hauled container systems – Route planning - transfer and transport; processing techniques;

UNIT-III	ENGINEERING SYSTEMS FOR RESOURCE AND	Classes: 12

	ENERGY RECOVERY:	

Engineering Systems for Resource and Energy Recovery: Processing techniques; materials recovery systems; recovery of biological conversion products – Composting, pre and post processing, types of composting, Critical parameters, Problems with composing - recovery of thermal conversion products; Pyrolisis, Gasification, RDF - recovery of energy from conversion products; materials and energy recovery systems.

UNIT-IV	**LANDFILLS**	**Classes: 12**

Landfills: Evolution of landfills – Types and Construction of landfills – Design considerations – Life of landfills- Landfill Problems – Lining of landfills – Types of liners – Leachate pollution and control – Monitoring landfills – Landfills reclamation.

UNIT-V	**HAZARDOUS WASTE MANAGEMENT**	**Classes: 12**

Hazardous waste Management: – Sources and characteristics, Effects on environment, Risk assessment – Disposal of hazardous wastes – Secured landfills, incineration - Monitoring – Biomedical waste disposal, E-waste management, Nuclear Wastes, Industrial waste Management

TEXT BOOKS

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill International.

2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Samuel A. Vigil.

REFERENCE BOOKS

1. Solid waste Engineering by William A. Worrel, and P. Aarne Vesilind Cengage Learning 2012.

2. Criteria for hazardous waste landfills – CPCB guidelines 2000.

3. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.

4. Management of Solid waste in developing countries by Frank Flintoff, WHO regional publications 1976

WEB REFERENCES

https://www.oxfordreference.com
2. https://www.iaia.org

E -TEXT BOOKS

1. https://www.easyengineering.net

2. https://ntpel.ac.in

MOOCS COURSE

1. https://nptel.ac.in/courses/120/108/120108005

2. https://nptel.ac.in/courses/105/103/105103205

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DEPARTMENT OF CIVIL ENGINEERING
ENVIRONMENTAL IMPACT ASSESSMENT

IV B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE812PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Define and Classify Environmental Impacts and the terminology
2. Understands the environmental Impact assessment procedure
3. Explain the EIA methodology
4. List and describe environmental audits

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Identify the environmental attributes to be considered for the EIA study
2. Formulate objectives of the EIA studies
3. Identify the methodology to prepare rapid EIA
4. Prepare EIA reports and environmental management plans

UNIT-I	INTRODUCTION	Classes: 12

The Need for EIA, Indian Policies Requiring EIA, The EIA Cycle and Procedures, Screening, Scoping, Baseline Data, Impact Prediction, Assessment of Alternatives, Delineation of Mitigation Measure and EIA Report, Public Hearing, Decision Making, Monitoring the Clearance Conditions, Components of EIA, Roles in the EIA Process. Government of India Ministry of Environment and Forest Notification (2000), List of projects requiring Environmental clearance, Application form, Composition of Expert Committee, Ecological sensitive places, International agreements.

UNIT-II	EIA METHODOLOGIES	Classes: 12

Environmental attributes-Criteria for the selection of EIA methodology, impact identification, impact measurement, impact interpretation & Evaluation, impact communication, Methods-Adhoc methods, Checklists methods, Matrices methods, Networks methods, Overlays methods. EIA review- Baseline Conditions -Construction Stage Impacts, post project impacts.

UNIT-III	ENVIRONMENTAL MANAGEMENT PLAN	Classes: 12

EMP preparation, Monitoring Environmental Management Plan, Identification of Significant or Unacceptable Impacts Requiring Mitigation, Mitigation Plans and Relief & Rehabilitation, Stipulating the Conditions, Monitoring Methods, Pre- Appraisal and Appraisal.

UNIT-IV	ENVIRONMENTAL LEGISLATION AND LIFE CYCLE ASSESSMENT	Classes: 12

Environmental laws and protection acts, Constitutional provisions-powers and functions of Central and State government, The Environment (Protection) Act 1986, The Water Act 1974, The Air act 1981, Wild Life act 1972, Guidelines for control of noise, loss of biodiversity, solid and Hazardous waste management rules.
Life cycle assessment: Life cycle analysis, Methodology, Management, Flow of materials-cost criteria case studies.

UNIT-V	CASE STUDIES	Classes: 12

Preparation of EIA for developmental projects- Factors to be considered in making assessment decisions, Water Resources Project, Pharmaceutical industry, thermal plant, Nuclear fuel complex, Highway project, Sewage treatment plant, Municipal Solid waste processing plant, Air ports.

TEXT BOOKS

1. Anjaneyulu. Y and Manickam. V., Environmental Impact Assessment Methodologies, B.S. publications, Hyderabad, 2007.
2. Barthwal, R. R., Environmental Impact Assessment, New Age International Publishers, 2002

REFERENCE BOOKS

1. Jain, R.K., Urban, L.V., Stracy, G.S., Environmental Impact Analysis, Van Nostrand Reinhold Co., New York, 1991.
2. Rau, J.G. and Wooten, D.C., Environmental Impact Assessment, McGraw Hill Pub. Co., New York, 1996.

WEB REFERENCES

1. https://www.oxfordreference.com

2. https://www.iaia.org

E -TEXT BOOKS

1. https://www.easyengineering.net

2. https://ntpel.ac.in

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING
AIR POLLUTION

IV B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE813PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

The objectives of the course are to
- Understand the Air pollution Concepts
- Identify the source of air pollution
- Know Air pollution Control devices
- Distinguish the Air quality monitoring devices

COURSE OUTCOMES
At the end of the course the student will be able to
- Identify sampling and analysis techniques for air quality assessment
- Describe the plume behaviour for atmospheric stability conditions
- Apply plume dispersion modelling and assess the concentrations
- Design air pollution controlling devices

UNIT-I	AIR POLLUTION	Classes: 12

Air Pollution: Definition of Air Pollution - Sources & Classification of Air Pollutants - Effects of air pollution - Global effects – Ambient Air Quality and standards – Monitoring air pollution, Sampling and analysis of Pollutants in ambient air - Stack sampling.

UNIT-II	METEOROLOGY AND AIR POLLUTION	Classes: 12

Meteorology and Air Pollution: Factors influencing air pollution, Wind rose, Mixing Depths, Lapse rates and dispersion - Atmospheric stability, Plume behavior, Plume rise and dispersion, Prediction of air quality, Box model - Gaussian model - Dispersion coefficient - Application of tall chimney for Pollutant dispersion.

UNIT-III	CONTROL OF PARTICULATE POLLUTANTS	Classes: 12

Control of Particulate Pollutants: Properties of particulate pollution - Particle size distribution - Control mechanism - Dust removal equipment – Working principles and operation of settling chambers, cyclones, wet dust scrubbers, fabric filters & ESP.

UNIT-IV	CONTROL OF GASEOUS POLLUTANTS	Classes: 12

Control of Gaseous Pollutants: Process and equipment for the removal by chemical methods - Working principles and operation of absorption and adsorption equipment - Combustion and condensation equipment.

UNIT-V	AUTOMOBILE AND INDOOR POLLUTION	Classes: 12

Automobile and Indoor Pollution: Vehicular pollution – Sources and types of emission – Effect of operating conditions-Alternate fuels and emissions-Emission controls and standards, Strategies to control automobile pollution– Causes of indoor air pollution-changes in indoor air quality-control and air cleaning systems-indoor air quality.

TEXT BOOKS

1. M.N. Rao and HVN Rao, Air Pollution, Tata McGraw Hill Publishers

2. Noel, D. N., Air Pollution Control Engineering, Tata McGraw Hill Publishers, 1999.

REFERENCE BOOKS

1. Air Pollution Control Engineering by Nevers, McGraw-Hill, Inc., 2000.

2. Fundamentals of Air Pollution by Dr. B.S.N. Raju, Oxford & I.B.H.

3. Air Pollution and Health by T. Holgate, Hillel S. Koren, Jonathan M. Samet, Robert L. Maynard publisher Academic Press.

WEB REFERENCES

1. https://www.thecleanbreathinginstitute.com/content/dam/cf-consumer-healthcare/tcbi/master/ResourcesLP/PDFs/TCBI_Air_Pollution_Reference_List.pdf

2. https://www.frontiersin.org/articles/10.3389/fpubh.2020.00014/full

3. https://breathe.ersjournals.com/content/breathe/1/2/108.full.pdf

E -TEXT BOOKS

1. https://books.google.co.in/books/about/Air_Pollution.html?id=dJlxyyLX0MoC

2. https://www.routledge.com/Air-Pollution-Health-and-Environmental-Impacts/Gurjar-Molina

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING
AIRPORTS, RAILWAYS AND WATERWAYS

IV B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE821PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Deal with the characteristics of aircrafts related to airport design; runway and taxiway design,runway orientation, length, grading and drainage.
2. Introduce component of railway tracks, train resistance, crossing, signaling, high speed tracksand Metro Rail.
3. Explain the classes of harbors, features, planning and design of port facilities.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. An ability to design of runways and taxiways.
2. An ability to design the infrastructure for large and small airports
3. An ability to design various crossings and signals in Railway Projects.
4. An ability plan the harbors and ports projects including the infrastructure required for newports and harbors.

UNIT-I	INTRODUCTION AIRPORT ENGINEERING	Classes: 12

Airport Engineering: Introduction to Air Transportation - Aircraft Characteristics - Factors Affecting Selection of site for Airport – Aprons – Taxiway – Hanger – Geometric design - Computation of Runway Length, Correction for Runway Length, Orientation of Runway, Wind Rose Diagram

UNIT-II	RAILWAY	Classes: 12

Introduction to Railways: Role of Indian Railways in national development – Railways for Urban Transportation – LRT , Mono Rail, Metro Rail & MRTS. Permanent Way: Components and their Functions: Rails - Types of Rails, Rail Fastenings, Concept of Gauges, Coning of Wheels, Creeps and kinks Sleepers – Functions, Materials, Density – Functions, Materials,

Ballast, Subgrade and Embankments, Ballast less Tracks.

UNIT-III	GEOMETRIC DESIGN OF RAILWAY TRACK	Classes: 12

Geometric Design of Railway Track: Gradients and Grade Compensation, Super-Elevation, Widening of Gauges in Curves, Transition Curves, Horizontal/Vertical Curves.

UNIT-IV	TRACK MAINTENANCE AND OPERATION	Classes: 12

Track maintenance and Operation: Points and Crossings - Turnouts, Stations and Yards - Level Crossings. Signaling and Interlocking - Track Circuiting - Track Maintenance.

UNIT-V	DOCK & HARBOUR ENGINEERING:	Classes: 12

Dock & Harbour Engineering: Water Transportation: Ports and Harbours - Types of water transportation, water transportation in India, Ports and harbours: requirements, classification. Harbour works: breakwaters, jetties, fenders, piers, wharves, dolphins, etc., Navigational aids: types, requirements, light house, beacon lights, buoys, Port facilities: general layout, development, planning, facilities, terminals. Docks and repair facilities: design, dry docks, wet docks, slipways, Locks and lock gates: materials, size, Dredging: classification, dredgers, uses of dredged materials.

TEXT BOOKS

1. Railway Engineering ,Sathish Chandra, M.M Agarwal.

2. Aiport Engineering ,Sc Rangwala, Ketki B Dalal.

REFERENCE BOOKS

1. Satish Chandra and M.M. Agrawal, "Railway Engineering", Oxford University Press, New Delhi

2. S.C. Saxena and S. P. Arora, "A Text Book of Railway Engineering", Dhanpat Rai & Sons, New Delhi

3. S.C. Rangwala, K.S. Rangwala and P.S. Rangwala, "Principles of Railway Engineering", Charotar Publishing House, Anand.

4. Dr. S. K. Khanna, M.G.Arora and S.S. Jain, "Airport Planning & Design", Nem Chand & Bros., Roorkee

5. Robert Horonief, Francis X. McKelvey, William J. Sproule, Seth B. Young, "Planning & Design of Airports", Mc Graw Hill Publication.

6. Richard de Neufville, Amedeo Odoni, "Airport System: Planning, Design and Management", Mc Graw Hill Education.

WEB REFERENCES

1. https://citationsy.com
2. https://www.sciencedirect.com

E -TEXT BOOKS

1. https://civilenggforall.com/airport-engineering-textbook-by-civilenggforall-free-download-pdf/
2. https://dlscrid.com/railway-engineering-by-n-l-arora.

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING
URBAN TRANSPORTATION PLANNING

IV B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE822PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To know the importance of transportation planning
2. To acquire the knowledge on the various factors governing the trip generation
3. To understand the assignment of shortest route according to the traffic analysis.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Know the process of transportation planning according to survey
2. Understand the trip generation and distribution analysis.
3. Select & assign a suitable shortest route according to the trip analysis.

UNIT-I	TRANSPORT PLANNING PROCESS	Classes: 12

Scope – interdependence of land use and traffic – systems approach to transport planning – Transport surveys – definition of study area – zoning survey - types and methods – inventory on transport facilities - inventory of land use and economic activities.

UNIT-II	TRIP GENERATION:	Classes: 12

Factors governing trip generation and attraction rates – multiple linear regression analysis – category analysis – critical appraisal of techniques.

UNIT-III	TRIP DISTRIBUTION METHODS	Classes: 12

Presentation of trip distribution data - PA matrix to OD matrix – Growth factor methods - gravity model and its calibration – opportunity model

UNIT-IV	MODAL SPLIT ANALYSIS	Classes: 12

Influencing factors – Earlier modal split models: Trip end type and trip interchange type – limitations – Disaggregate mode choice model – Logit model - binary choice situations –

multinomial logit model – model calibration

UNIT-V	ROUTE ASSIGNMENT	Classes: 12

Description of highway network – route choice behaviour – shortest path algorithm - assignment techniques – all nothing assignment – multi path assignment – capacity restrained assignment – diversion curves

TEXT BOOKS

1. Kadiyali, LR (1987), Traffic Engineering and Transportation Planning, Khanna Publishers, New Delhi.
2. Hutchinson, B.G. (1974). Principles of Urban Transport Systems Planning. McGraw Hill Book Company, New York.

REFERENCE BOOKS

1. Papacostas, C. S., and Prevedouros, P.D. (2002). Transportation Engineering and Planning. 3rd Edition, Prentice - Hall of India Pvt Ltd.
2. NPTEL videos on Urban Transportation Planning, Dr. V. Tamizh Arasan, IIT Madras
3. Paul.H. Wright (1995), Transportation Engineering – Planning & Design, John Wiley & Sons, New york.
4. John W Dickey (1995), Metropolitan Transportation Planning, Tata McGraw-Hill publishing company Ltd, New Delhi.

WEB REFERENCES

1. https://www.researchgate.net
2. https://www.routledge.com
3. https://www.iadc-dredging.com ›

E -TEXT BOOKS

1. https://www.academia.edu/40656481/Urban_Transportation_planning
2. https://ebooks.schandpublishing.com/

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF CIVIL ENGINEERING
FINITE ELEMENT METHODS FOR CIVIL ENGINEERING

IV B. TECH- II SEMESTER (R 20)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE823PE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

The subject provides introduction to finite element methods to analyze structural elements.

COURSE OUTCOMES

At the end of the course the student will able to Analyze simple structural elements using Finite Element approach.

UNIT-I	INTRODUCTION TO FINITE ELEMENT METHOD	Classes: 12

Introduction to Finite Element Method – Basic Equations in Elasticity Stress – Strain equation – concept of plane stress – plane strain advantages and disadvantages of FEM. Element shapes – nodes – nodal degree of freedom Displacement function – Natural Coordinates – strain displacement relations.

UNIT-II	LAGRANGIAN-SERENDIPITY ELEMENTS	Classes: 12

Lagrangian – Serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element –shape functions up to quadratic formulation.
Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix – stress – strain relation

UNIT-III	FEA BEAM ELEMENTS	Classes: 12

FEA Beam elements – stiffness matrix - shape function– Analysis of continuous beams.

UNIT-IV	FEA TWO- DIMENSIONAL PROBELM	Classes: 12

FEA Two-dimensional problem – CST – LST element – shape function – stress – strain.
Isoparametric formulation – Concepts of, isoparametric elements for 2D analysis -formulation of CST Element.

UNIT-V	SOLUTION TECHNIQUES	Classes: 12

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS

1. A first course in Finite Element Method by Daryl L. Logan, 5th Edition, Cengage Learning India Pvt. Ltd.
2. Introduction to finite Elements in Engineering by Tirupathi R. Chandrupatla, and Ashok D.

   Belegundu, Prentice Hall of India.

REFERENCE BOOKS

1. Finite Element Aanalysis by P. Seshu, PHI Learning Private Limited
2. Concepts and applications of Finite Element Analysis by Robert D. Cook *et al.*, Wiley India Pvt. Ltd.
3. 3. Applied Finite Element Analysis by G. Ramamurty, I.K. International Publishing House Pvt. Ltd.

WEB REFERENCES

1. https://www.researchgate.net/publication/345151780_Introduction_to_Finite_Element_Methods_in_Engineering
2. https://www.sciencedirect.com/topics/engineering/finite-element-method
3. https://www.routledge.com/Finite-Element-Methods-in-Civil-and-Mechanical-Engineering-A-Mathematical/Angoshtari-Matin/p/book

E -TEXT BOOKS

1. https://easyengineering.net/textbook-of-finite-element-analysis-by-seshu/
2. https://www.elsevier.com/books/the-finite-element-method-in-engineering

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

DEPARTMENT OF CIVIL ENGINEERING

S.No.	Open Elective-I		
	Course Code	**Course**	**Department**
1	CE605OE	Disaster Preparedness & Planning Management	Civil Engineering
2	EE612OE	Non-Conventional Power Generation	Electrical and Electronics Engineering
	EE613OE	Nanotechnology	
	EE614OE	Electrical Engineering Materials	
3	ME611OE	Optimization Techniques	Mechanical Engineering
	ME612OE	Introduction To Mechatronics	
	ME613OE	Fundamentals Of Mechanical Engineering	
4	EC611OE	Principles of Electronic Communications	Electronics and Communication Engineering
	EC612OE	Low Power VLSI	
	EC613OE	Introduction to MEMS	
5	CS610OE	OOPS through C++	Computer Science and Engineering
	CS611OE	Software Engineering	
	CS612OE	Web Services and Service Oriented Architecture	
6	IT611OE	Software Engineering Principles	Information Technology
	IT612OE	Fundamentals of Databases	
	IT613OE	Computer Organization and Operating Systems	
7	HS001OE	Number Theory	Science and Humanities
	HS002OE	Linear and Nonlinear Optimization	
	HS003OE	Industrial Polymer Chemistry	
	HS004OE	Advanced Entrepreneurship	
	HS005OE	Advanced Nano Science and Technology	

DEPARTMENT OF CIVIL ENGINEERING

S.No.	Open Elective-II		
	Course Code	**Course**	**Department**
1	CE703OE	Remote Sensing and GIS	Civil Engineering
2	EE714OE	Design Estimation and Costing of Electrical Systems	Electrical and Electronics Engineering
	EE715OE	Energy Storage system	
	EE716OE	Introduction to Mechatronics	
3	ME721OE	Manufacturing Systems Engineering	Mechanical Engineering
	ME722OE	Fundamental of Robotics	
	ME723OE	Intelligent manufacturing System	
4	EC711OE	Principles of Computer Communications and Networks	Electronics and Communication Engineering
	EC712OE	Microprocessors and Microcontrollers	
	EC713OE	Fundamentals of Image Processing	
5	CS714OE	Core Java Programming	Computer Science and Engineering
	CS715OE	Database Management Systems	
	CS716OE	Data Warehousing and Data Mining	
6	IT721OE	Introduction to Linux Programming	Information Technology
	IT722OE	Fundamentals of Artificial Intelligence	
	IT723OE	Object Oriented Programming Using Java	

DEPARTMENT OF CIVIL ENGINEERING

S.No.	Open Elective-III		
	Course Code	Course	Department
1	CE801OE	Environmental Impact Assessment	Civil Engineering
2	EE808OE	Entrepreneur Resource Planning	Electrical and Electronics Engineering
	EE809OE	Management Information system	
	EE810OE	Organizational Behaviour	
3	ME821OE	Advanced CAD	Mechanical Engineering
	ME822OE	Additive Manufacturing Technology	
	ME823OE	IOT in Manufacturing	
4	EC811OE	Electronic Measuring Instruments	Electronics and Communication Engineering
	EC812OE	Embedded System Design	
	EC813OE	Satellite Communications	
5	CS802OE	Introduction to Python Programming	Computer Science and Engineering
	CS803OE	Operating Systems	
	CS804OE	Cryptography and Network Security	
6	IT831OE	Introduction to Cloud Computing	Information Technology
	IT833OE	Soft Computing	
	IT834OE	Human Computer Interaction	

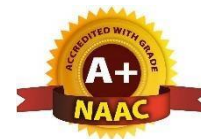**Open Elective-I**

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DEPARTMENT OF CIVIL ENGINEERING
DISASTER PREPAREDNESS & PLANNING MANAGEMENT

III B. TECH- II SEMESTER (R 20)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE605OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. To Understand basic concepts in Disaster Management
2. To Understand Definitions and Terminologies used in Disaster Management
3. To Understand Types and Categories of Disasters
4. To Understand the Challenges posed by Disasters
5. To understand Impacts of Disasters Key Skills

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. the application of Disaster Concepts to Management
2. Analyzing Relationship between Development and Disasters
3. Ability to understand Categories of Disasters and realization of the responsibilities to society

UNIT-I	INTRODUCTION	Classes: 12

Introduction - Concepts and definitions: disaster, hazard, vulnerability, resilience, risks severity, frequency and details, capacity, impact, prevention, mitigation.

UNIT-II	DISASTERS	Classes: 12

Disasters - Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

UNIT-III	DISASTER IMPACTS	Classes: 12

Disaster Impacts - Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

UNIT-IV	DISASTER RISK REDUCTION	Classes: 12

Disaster Risk Reduction (DRR) - Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post disaster environmental response (water, sanitation, food safety, waste management, disease control, security, communications); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT-V	DISASTERS, ENVIRONMENT AND DEVELOPMENT	Classes: 12

Disasters, Environment and Development - Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

TEXT BOOKS

1. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.

2. Singh B.K., 2008, Handbook of Disaster Management: Techniques & Guidelines, Rajat Publication.

3. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation

REFERENCE BOOKS

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority)

2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).

3. Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California, EMSA no.214, June 2003

4. Inter-Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC

WEB REFERENCES

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority)

2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).

3. https://nptel.ac.in/courses/105/104/105104183/

E -TEXT BOOKS

1. https://easyengineering.net/disaster-management-handbook-by-jack-pinkowski/

2. https://think-asia.org/bitstream/handle/11540/5035/disaster-management-handbook.pdf?sequence=1

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

Open Elective-II

DEPARTMENT OF CIVIL ENGINEERING

REMOTE SENSING AND GIS

IV B. TECH- I SEMESTER (R 20)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE703OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

5. Know the concepts of Remote Sensing, its interpreting Techniques and concepts of Digital images
6. Know the concept of Geographical Information System (GIS), coordinate system GIS Data and its types
7. Understand the students managing the spatial Data Using GIS.
8. Understand Implementation of GIS interface for practical usage.

COURSE OUTCOMES

6. Upon successful completion of the course, the student is able to

7. Describe different concepts and terms used in Remote Sensing and its data
8. Understand the Data conversion and Process in different coordinate systems of GIS interface
9. Evaluate the accuracy of Data and implementing a GIS
10. Understand the applicability of RS and GIS for various applications.

UNIT-I	CONCEPTS OF REMOTE SENSING	Classes: 12

Concepts of Remote Sensing Basics of remote sensing, elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology & units, energy resources, energy interactions with earth surface features & atmosphere, atmospheric effects, satellite orbits, Sensor Resolution, types of sensors, Remote Sensing Platforms and Sensors, IRS satellites.

Remote Sensing Data Interpretation Visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of soil, water and vegetation. Concepts of Digital image processing, image enhancements, qualitative & quantitative analysis and pattern recognition, classification techniques and accuracy estimation.

UNIT-II	INTRODUCTION TO GIS	Classes: 12

Introduction to GIS: Introduction, History of GIS, GIS Components, GIS Applications in Real life. The Nature of geographic data, ,Types of maps, Map scale, Types of stale, Map and Globe,

Co ordinate systems, Map projections, Map transformation, Geo-referencing,

UNIT-III	SPATIAL DATABASE MANAGEMENT SYSTEM	Classes: 12

Spatial Database Management System: Introduction: Spatial DBMS, Data storage, Database structure models, database management system, entity-relationship model, normalization
Data models and data structures: Introduction, GIS Data model, vector data structure, Classes and their Relationship , raster data structure, attribute data, geo-database and metadata

UNIT-IV	SPATIAL DATA INPUT AND EDITING	Classes: 12

Spatial Data input and Editing: Data input methods keyboard entry, digitization, scanning, conversion of existing data, remotely sensed data, errors in data input, Data accuracy, Micro and Macro components of accuracy, sources of error in GIS.
Spatial Analysis: Introduction, topology, spatial analysis, vector data analysis. Network analysis, raster data analysis. Spatial data interpolation techniques.

UNIT-V	IMPLEMENTING A GIS AND APPLICATIONS	Classes: 12

Implementing a GIS and Applications Implementing a GIS: Awareness, developing system requirements, evaluation of alternative systems, decision making using GIS
Applications of GIS: GIS based road network planning, Mineral mapping using GIS, Shortest path detection using GIS, Hazard Zonation using remote sensing and GIS, GIS for solving multi criteria problems, GIS for business applications.

TEXT BOOKS

4. Remote Sensing and GIS by BasudebBhatta, Oxford University Press, 2nd Edition, 2011.
5. Introduction to Geographic Information systems by Kang-tsung Chang, McGraw Hill Education (Indian Edition), 7th Edition, 2015.
6. Fundamentals of Geographic Information systems by Michael N. Demers, 4th Edition, Wiley Publishers, 2012.

REFERENCE BOOKS

5. Remote Sensing and Image Interpretation by Thomas M. Lillesand and Ralph W. Kiefer, Wiley Publishers, 7th Edition, 2015.
6. Geographic Information systems – An Introduction by Tor Bernhardsen, Wiley India Publication, 3rd Edition, 2010.
7. Advanced Surveying: Total Station, GIS and Remote Sensing by SatheeshGopi, R. SathiKumar, N. Madhu, Pearson Education, 1st Edition, 2007.
8. Textbook of Remote Sensing and Geographical Information systems by M. Anji Reddy.

WEB REFERENCES

3. https://www.nic.in/servicecontents/remote-sensing-gis
4. https://www.mdpi.com/journal/remotesensing/special_issues/RS_GIS_resources

E -TEXT BOOKS

1. https://easyengineering.net/text-book-of-remote-sensing-and-geographical-information-systems-by-anji-reddy/

2. http://gvpce.ac.in/syllabi/Remote%20Sensing%20and%20GIS.pdf

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3. https://swayam.gov.in/
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Open Elective-III

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DEPARTMENT OF CIVIL ENGINEERING
ENVIRONMENTAL IMPACT ASSESSMENT

IV B. TECH- II SEMESTER (R20)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CE801OE	B. Tech	3	0	0	3	30	70	100

COURSE OBJECTIVES

To learn

1. Define and Classify Environmental Impacts and the terminology
2. Understands the environmental Impact assessment procedure
3. Explain the EIA methodology
4. List and describe environmental audits

COURSE OUTCOMES
1. Identify the environmental attributes to be considered for the EIA study
2. Formulate objectives of the EIA studies
3. Identify the methodology to prepare rapid EIA
4. Prepare EIA reports and environmental management plans

UNIT-I	INTRODUCTION TO EIA	Classes: 12

Introduction: The Need for EIA, Indian Policies Requiring EIA, The EIA Cycle and Procedures, Screening, Scoping, Baseline Data, Impact Prediction, Assessment of Alternatives, Delineation of Mitigation Measure and EIA Report, Public Hearing, Decision Making, Monitoring the Clearance Conditions, Components of EIA, Roles in the EIA Process. Government of India Ministry of Environment and Forest Notification (2000), List of projects requiring Environmental clearance, Application form, Composition of Expert Committee, Ecological sensitive places, International agreements.

UNIT-II	EIA METHODOLOGY	Classes: 12

EIA Methodologies: Environmental attributes-Criteria for the selection of EIA methodology, impact identification, impact measurement, impact interpretation & Evaluation, impact communication, Methods-Adhoc methods, Checklists methods, Matrices methods, Networks methods, Overlays methods. EIA review- Baseline Conditions -Construction Stage Impacts, post project impacts.

UNIT-III	ENVIRONMENTAL MANAGEMENT PLAN	Classes: 12

Environmental Management Plan: EMP preparation, Monitoring Environmental Management Plan, Identification of Significant or Unacceptable Impacts Requiring Mitigation, Mitigation Plans and Relief &Rehabilitation, Stipulating the Conditions, Monitoring Methods, Pre- Appraisal and Appraisal.

UNIT-IV	ENVIRONMENTAL LEGISLATION AND LIFE CYCLE ASSESSMENT	Classes: 12

Environmental Legislation and Life cycle Assessment: Environmental laws and protection acts, Constitutional provisions-powers and functions of Central and State government, The Environment (Protection) Act 1986, The Water Act 1974, The Air act 1981, Wild Life act 1972, Guidelines for control of noise, of biodiversity, solid and Hazardous waste management rules.
Life cycle assessment: Life cycle analysis, Methodology, Management, Flow of materials-cost criteria case studies.

UNIT-V	CASE STUDIES	Classes: 12

Case Studies: Preparation of EIA for developmental projects- Factors to be considered in making assessment decisions, Water Resources Project, Pharmaceutical industry, thermal plant, Nuclear fuel complex, Highway project, Sewage treatment plant, Municipal Solid waste processing plant, Air ports.

TEXT BOOKS

1. Anjaneyulu. Y and Manickam.V., Environmental Impact Assessment Methodologies, B.S. Publications, Hyderabad, 2007
2. Barthwal, R. R., Environmental Impact Assessment, New Age International Publishers, 2002

REFERENCE BOOKS

1. Jain, R.K., Urban, L.V., Stracy, G.S., Environmental Impact Analysis, Van Nostrand Reinhold Co., New York, 1991.
2. Rau, J.G. and Wooten, D.C., Environmental Impact Assessment, McGraw Hill Pub. Co., New York, 1996.

WEB REFERENCES

1. https://www.drishtiias.com/to-the-points/paper3/environmental-impact-assessment-1
2. https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-impact-assessment

E -TEXT BOOKS

1. https://www.iitr.ac.in/wfw/web_ua_water_for_welfare/education/Teachers_Manual/Teacher_manual_master_EIA.pdf
2. http://dl.mozh.org/up/Environmental_Impact_Assessment.pdf

MOOCS COURSE

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL