LINEAR ALGEBRA & CALCULUS

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
MA1101BS	Basic Sciences	3	1	0	4	30	70	100
ContactClasses: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives: To learn

1. Types of matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
4. Concept of Fourier series.
5. Concept of nature of the series.
6. Geometrical approach to the mean value theorems and their application to the mathematical problems
7. Evaluation of surface areas and volumes of revolutions of curves.
8. Evaluation of improper integrals using Beta and Gamma functions.
9. Partial differentiation, concept of total derivative
10. Finding maxima and minima of function of two and three variables.

Course Outcomes: After learning the contents of this paper the student must be able to

1. Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
2. Find the Eigen values and Eigen vectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Analyse the nature of sequence and series.
5. Solve the applications on the mean value theorems.
6. Evaluate the improper integrals using Beta and Gamma functions
7. Find the extreme values of functions of two variables with/ without constraints.

UNIT-1: Matrices

Matrices: Introduction. 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, **LU Decomposition Method.**

UNIT-2: Eigen values and Eigen vectors

Vectors Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties. Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding the inverse an d power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of Quadratic forms; Reduction of Quadratic form to Canonical form by Orthogonal Transformation.

UNIT-3: Fourier series

Definition of periodic function, Fourier expansion of periodic function in $(0,2\pi) and (-\pi,\pi)$. Determination of Fourier coefficients – Fourier series of even and odd functions – Half – Range Fourier Sine and Cosine expansions.

UNIT-IV: Calculus

Mean value theorems : Rolle's theorem , Lagrange's Mean value theorem with their Geometrical Interpretation and applications , Cauchy's Mean value theorem. Definition of Improper Integral : Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

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.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
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.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010

ENGINEERING PHYSICS

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
PH1102BS	Basic Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives:

1. The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses.
2. Students will be able to demonstrate competency and understanding of the concepts found in Mechanics, Harmonic Oscillations, wave Optics, Lasers, Fiber Optics and a broad base of knowledge in physics.
3. The main purpose of this course is to equip engineering undergraduates with an understanding of the scientific method, so that they may use the training beneficially in their higher pursuits.
4. Today the need is to stress principles rather than specific procedures, to select areas of contemporary interest rather than of past interest, and to condition the student to the atmosphere of change he will encounter during his carrier.

Course outcomes: Upon graduation, the graduates will have:

1. The knowledge of Physics relevant to engineering is critical for converting ideas into technology.
2. An understanding of Physics also helps engineers understand the working and limitations of existing devices and techniques, which eventually leads to new innovations and improvements.
3. In the present course, the students can gain knowledge on the mechanism of physical bodies upon the action of forces on them, the generation, the detection of the waves, Acoustics of a room, Optical Phenomena like Interference, diffraction, the principles of lasers and Fibre Optics.
4. Various chapters establish a strong foundation on the different kinds of characters of several materials and pave a way for them to use in at various technical and engineering applications.

UNIT-I

Introduction to Mechanics : Transformation of scalars and vectors under Rotation transformation, Forces in Nature, Newton's laws and its completeness in describing particle motion, Form invariance of Newton's second law, Solving Newton's equations of motion in polar coordinates, Problems including constraints and friction, Extension to cylindrical and spherical coordinates.

UNIT-II

Harmonic Oscillations : Mechanical and electrical simple harmonic oscillators, Complex number notation and phasor representation of simple harmonic motion, Damped harmonic oscillator: heavy, critical and light damping, Energy decay in a damped harmonic oscillator,

Quality factor, Mechanical and electrical oscillators, Mechanical and electrical impedance, Steady state motion of forced damped harmonic oscillator, Power observed by oscillator.

UNIT-III

Acoustics: Basic requirements of acoustically good hall, Reverberation and Reverberation time, Sabine's formula for Reverberation time (Qualitative), Measurement of absorption coefficient of a material, Factors affecting the architectural acoustics and their remedies.

Ultrasonic: Introduction, Classification of ultrasonic waves: Longitudinal waves, Transverse waves, Production of ultrasonic waves: Piezoelectric method and Magnetostriction method, Properties of ultrasonic waves, Applications of ultrasonic: SONAR and NDT (Pulse echo method).

UNIT-IV

Wave Optics: Interference, Young's double slit experiment, Newton's rings, Interference in Thin films(reflected & transmission), Frunhofer diffraction from a single slit, Diffraction grating- resolving power, Polarisation-Double Refraction, Nicol Prism.

UNIT-V

Lasers: Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, Pumping, Types of Lasers: Ruby laser, He-Ne laser, Applications of laser-Scientific & Medical applications.

Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Absorption & Bending Losses associated with optical fibres, Applications of optical fibres-Sensor & Medical Field.

TEXT BOOKS:

1. Engineering Mechanics, 2nd ed.- MK Harbola, Cengage Learning
2. I. G. Main, "Vibrations and waves in physics', 3rd Edn, Cambridge University Press, 2018.
3. AjoyGhatak, " Optics", McGraw Hill Education, 2012
4. Fundamentals of Acoustics, Kinster and Frey, John Wiley and Sons.

REFERENCES:

1. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006
2. O. Svelto, "Principles of Lasers"
3. "Introduction to Mechanics", M.K.Verma, Universities Press

PROGRAMMINGFORPROBLEM SOLVING

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CS1103ES	Engineering Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

CourseObjectives:

1. Tolearnthefundamentalsofcomputers.
2. Tounderstandthevariousstepsinprogramdevelopment.
3. TolearnthesyntaxandsemanticsofCprogramminglanguage.
4. Tolearntheusageofstructuredprogrammingapproachinsolvingproblems.

CourseOutcomes: Thestudent willlearn

1. Towritealgorithmsandtodrawflowchartsforsolvingproblems.
2. Toconvertthealgorithms/flowchartstoCprograms.
3. TocodeandtestagivenlogicinCprogramminglanguage.
4. Todecomposeaproblemintofunctionsandtodevelopmodularreusablecode.
5. Tousearrays, pointers,stringsandstructurestowriteCprograms.
6. Searchingandsortingproblems.

UNIT-I:Introduction toProgramming

Introductiontocomponentsofacomputersystem:disks,primaryandsecondarymemory,processor,operating system, compilers, creating, compiling and executing a program etc., Number systemsIntroductiontoAlgorithms:stepstosolvelogicalandnumericalproblems.RepresentationofAlgorithm, Flowchart/Pseudo code with examples, Program design and structured programmingIntroduction to C Programming Language: variables (with data types and space requirements), SyntaxandLogicalErrorsincompilation,objectandexecutablecode,Operators,expressionsandprecedence,Expressionevaluation,Storageclasses(auto,extern,staticandregister),typeconversion,Themainmethod and command line arguments
Bitwiseoperations:BitwiseAND,OR,XORandNOToperators
ConditionalBranchingandLoops:Writingandevaluationofconditionalsandconsequentbranchingwithif,if-else,switch-case,ternary operator,goto,Iterationwithfor,while,do-whileloops
I/O:Simpleinputandoutputwithscanf andprintf,formattedI/O,Introductiontostdin,stdoutandstderr.Commandline arguments

UNIT-II:Arrays,Strings,StructuresandPointers:

Arrays: one- and two-dimensional arrays, creating, accessing and manipulating elements of arraysStrings:Introductiontostrings,handlingstrings as arrayofcharacters,basicstringfunctions availableinC(strlen,strcat,strcpy,strstr etc.),arraysofstrings
Structures:Definingstructures,initializingstructures, unions,Arrayofstructures
Pointers:Ideaofpointers,Defining pointers,PointerstoArraysandStructures,Use ofPointersin

self-
referentialstructures,usageofselfreferentialstructuresinlinkedlist(noimplementation)Enum
eration datatype

UNIT-III:PreprocessorandFilehandlinginC:

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndefFiles:TextandBinaryfiles,CreatingandReadingandwritingtextandbinary files,Appendingdatatoexistingfiles,Writingandreadingstructuresusingbinaryfiles,Randomac cessusingfseek,ftellandrewindfunctions.

UNIT-IV:FunctionandDynamicMemoryAllocation:

Functions: Designing structured programs, Declaring a function, Signature of a function, Parametersandreturntypeofafunction,passingparameterstofunctions,callbyvalue,Passingar raystofunctions,passingpointerstofunctions,idea ofcallbyreference,SomeC standardfunctionsandlibraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursivefunctions

Dynamicmemoryallocation:Allocatingandfreeingmemory,Allocatingmemoryforarraysofdiffere ntdata types

UNIT-V:IntroductiontoAlgorithms:

Algorithmsforfindingrootsofaquadraticequations,findingminimumandmaximumnumbersofag ivenset,findingifa numberisprimenumber,etc.

Basicsearchinginanarrayofelements(linear andbinarysearchtechniques),

Basicalgorithmstosort arrayof elements(Bubble,InsertionandSelectionsort algorithms),Basic conceptoforder ofcomplexitythrough theexampleprograms

TEXTBOOKS:

1. ByronGottfried,Schaum'sOutlineofProgrammingwithC,McGraw-Hill
2. B.A. ForouzanandR.F. GilbergCProgrammingandDataStructures,CengageLearning,(3rdEdition)

REFERENCEBOOKS:

1. BrianW.KernighanandDennisM.Ritchie,TheCProgrammingLanguage,Prentice
2. HallofIndia
3. R.G.Dromey,Howtosolveit byComputer, Pearson(16thImpression)
4. Programmingin C,Stephen G.Kochan,FourthEdition,PearsonEducation.
5. HerbertSchildt,C:TheCompleteReference,McGrawHill,4thEdition

ENGINEERING MECHANICS

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
ME1104ES	Engineering Sciences	3	1	0	4	30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives: The objectives of this course are to

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 to translation, rotation and plane motion and the concept of vibrations

Course Outcomes: At the end of the course, students will be able to

1. Determine resultant of forces acting on a body and analyse 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 for translation, fixed axis rotation and plane motion and solve problems of vibration.

UNIT-I:

Introduction to Engineering Mechanics - 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, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy

UNIT-II:

Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack;

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- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Product of Inertia, Parallel Axis Theorem, Perpendicular Axis Theorem

Mass Moment of Inertia: Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia– Mass moment of inertia of composite bodies.

UNIT-IV:

Review of particle dynamics- Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and constrained motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

UNIT-V:

Kinetics of Rigid Bodies -Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation

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", Cengage Learning, 2014.
3. Beer F.P & Johnston E.R Jr. Vector, "Mechanics for Engineers", TMH, 2004.
4. Hibbeler R.C & Ashok Gupta, "Engineering Mechanics", Pearson Education, 2010.
5. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications, 2011.
6. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press, 2008.
7. Meriam. J. L., "Engineering Mechanics", Volume-II Dynamics, John Wiley & Sons, 2008.

ENGINEERING PHYSICS LAB

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
PH1105BS	Basic Sciences	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

List of Experiments:

1. Melde's experiment: 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 lens by forming Newton's rings.
4. Diffraction grating: To determine the number of lines per inch of the grating.
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

PROGRAMMINGFORPROBLEMSOLVINGLAB

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
CS1106ES	Engineering Sciences	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

[Note:TheprogramsmaybeexecutedusinganyavailableOpenSource/FreelyavailableIDESome ofthe Tools availableare:

CodeLite:https://codelite.org/Code::Bl ocks:http://www.codeblocks.org/

DevCpp:http://www.bloodshed.net/devcpp. htmlEclipse:http://www.eclipse.org

ThislistisnotexhaustiveandisNOTinanyorderofpreference]

CourseObjectives: Thestudentswilllearnthefollowing:

1. ToworkwithanIDEtocreate,edit,compile, runanddebugprograms
2. Toanalyzethevariousstepsinprogramdevelopment.
3. Todevelopprogramstosolvebasicproblemsbyunderstandingbasicconceptsin Clike operators, controlstatements etc.
4. Todevelopmodular,reusableandreadableCProgramsusingthe conceptslikefunctions,arrays etc.
5. ToWriteprogramsusingtheDynamicMemoryAllocationconcept.
6. To create,read fromandwriteto textand binaryfiles

CourseOutcomes: Thecandidateisexpectedtobeableto:

1. formulatethealgorithmsforsimpleproblems
2. translategivenalgorithmstoaworkingandcorrectprogram
3. correct syntaxerrorsasreported bythecompilers
4. identifyandcorrectlogicalerrorsencounteredduringexecution
5. representandmanipulatedatawitharrays,stringsandstructures
6. usepointersofdifferenttypes
7. create,readandwritetoandfromsimpletextandbinaryfiles
8. modularizethecodewithfunctionssothattheycanbereused

Practicesessions:

1. Write a simple program that prints the results ofall the operators available in C(including pre/ post increment , bitwise and/or/not , etc.).Read required operandvaluesfromstandardinput.
2. Write a simple program thatconverts one given data type toanother using autoconversionandcasting.Takethevaluesformstandardinput.

Simplenumericproblems:

1. Writeaprogramforfiendthemaxandminfromthethreenumbers.
2. Writetheprogramforthesimple, compoundinterest.
3. Write programthat declares Class awarded for a given percentage of marks,wheremark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >=70%= Distinction.Readpercentagefromstandardinput.
4. Write a program that prints a multiplication table for a given number and the numberofrowsinthetable.Forexample,foranumber5androws=3,theoutputshouldbe:

   5x1=5

   5x2=10

   5x3=15
5. Write aprogramthatshowsthebinaryequivalentofagivenpositivenumberbetween0to255.

ExpressionEvaluation:

1. A building has 10 floors with a floor height of 3 meters each. A ball is dropped fromthe top of the building. Find the time taken by the ball to reach each floor. (Use theformula s = ut+(1/2)at^2where u and a are the initial velocity in m/sec (= 0) andaccelerationinm/sec^2(= 9.8m/s^2)).
2. 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 +,-,*, /, %anduseSwitchStatement)
3. Writeaprogramthatfindsifagivennumberisaprimenumber
4. Write a C program to find the sum of individual digits of a positive integer and testgivennumberis palindrome.
5. A Fibonacci sequence is defined as follows: the first and second terms in the sequenceare 0 and 1. Subsequent terms are found by adding the preceding two terms in thesequence.Write a Cprogramtogeneratethe firstntermsofthe sequence.
6. Write a C program to generate all the prime numbers between 1 and n, where n is avalue suppliedbytheuser.
7. WriteaCprogramtofind the rootsofaQuadraticequation.
8. Write a C program to calculate the following, where x is a fractional value.i.1-x/2+x^2/4-x^3/6
9. Write a C program to read in two numbers, x and n, and then compute the sum of thisgeometricprogression:1+x+x^2+x^3+.....+x^n.Forexample:ifnis3andxis 5,thentheprogramcomputes 1+5+25+125.

ArraysandPointersandFunctions:

1. WriteaCprogramtofindtheminimum,maximumandaverageinanarrayofintegers.
2. Writeafunctionstocomputemean,variance,StandardDeviation,sortingofnelementsi nsingledimensionarray.
3. WriteaCprogramthatusesfunctionstoperformthefollowing:
4. AdditionofTwoMatrices
5. ii.MultiplicationofTwoMatrices

6. iii.Transposeofamatrixwithmemorydynamicallyallocatedforthenewmatrixasrowan dcolumncountsmaynotbe same.
7. WriteCprogramsthatusebothrecursiveandnon-recursivefunctions
8. To find thefactorialofagiveninteger.
9. TofindtheGCD(greatestcommondivisor) oftwogivenintegers.
10. Tofindx^n
11. Writeaprogramforreadingelementsusingpointerintoarrayanddisplaythevalu esusingarray.
12. Writeaprogramfordisplayvaluesreverseorderfromarrayusingpointer.
13. Writeaprogramthroughpointervariabletosumofnelementsfromarray.

Files:

1. WriteaCprogramto displaythecontentsofafiletostandardoutputdevice.
2. Write a C program which copies one file to another, replacing all lowercase characterswiththeiruppercaseequivalents.
3. WriteaCprogram tocountthenumberoftimesacharacteroccursinatextfile.Thefilename and the characteraresupplied ascommandlinearguments.
4. WriteaCprogramthatdoesthefollowing:

   Itshouldfirstcreate a binary file andstore 10 integers, where the filename and10values are given in the command line. (hint: convert the strings using atoi function)Now the program asksforan index and avaluefrom the userand thevalue atthatindexshould bechanged to thenewvalueinthefile.(hint: usefseekfunction) Theprogramshould thenreadall10valuesand print themback.
5. Write a C program to merge two files into a third file (i.e., the contents of the firs t filefollowedbythoseofthesecondare putinthe thirdfile).

Strings:

1. Write aC program toconverta Roman numeral rangingfrom ItoL toits decimalequivalent.
2. WriteaCprogramthatconvertsanumberranging from1 to50toRomanequivalent
3. WriteaCprogramthatusesfunctionstoperformthefollowingoperations:
4. Toinsertasub-stringintoagivenmainstringfromagivenposition.
5. ii.TodeletenCharactersfromagivenpositioninagivenstring.
6. Write a C program to determine if the given string is a palindrome or not (Spelledsame in both directions with or without a meaning like madam, civic, noon, abcba,etc.)
7. WriteaCprogramthatdisplaysthepositionofacharacterchinthestring Sor–1if Sdoesn‘tcontainch.
8. WriteaCprogramto count thelines,wordsandcharactersinagiventext.

Miscellaneous:

1. WriteamenudrivenCprogramthatallowsausertoenter nnumbersandthenchoosebetweenfindingthesmallest,largest,sum,oraverage.Themen uandallthechoices aretobefunctions.Useaswitchstatementtodeterminewhatactiontotake.Displayanerror messageifaninvalidchoiceis entered.

2. WriteaCprogramtoconstructapyramidofnumbersasfollows:

1	*	1	1	*
12	**	23	22	**
123	***	456	333	***
			4444	**
				*

SortingandSearching:

1. WriteaCprogramthatusesnonrecursivefunctiontosearchforaKeyvalueinagiven
2. listofintegersusinglinear searchmethod.
3. WriteaCprogramthatusesnonrecursivefunctiontosearchforaKeyvalueinagiven
4. sortedlistofintegersusingbinarysearchmethod.
5. WriteaCprogramthatimplementstheBubblesortmethodtosortagivenlistof
6. integersinascendingorder.
7. WriteaCprogramthatsortsthegivenarrayofintegersusingselectionsortindescendingor der
8. WriteaCprogramthatsortsthegivenarrayofintegersusinginsertionsortinascendingor der
9. WriteaCprogramthatsortsagivenarrayofnames

SuggestedReferenceBooksforsolvingtheproblems:

1. ByronGottfried,Schaum'sOutlineofProgrammingwithC,McGraw-Hill
2. B.A.ForouzanandR.F.GilbergCProgrammingandDataStructures,CengageLearning,(3rd Edition)
3. BrianW.KernighanandDennisM.Ritchie,TheCProgrammingLanguage,Prentice HallofIndia
4. R.G.Dromey,Howto solveit byComputer,Pearson(16thImpression)
5. ProgramminginC,StephenG.Kochan,FourthEdition,PearsonEducation.
6. HerbertSchildt,C:TheCompleteReference, McGrawHill,4thEdition

ENVIRONMENTAL SCIENCE
(MANDITORY NON CREDIT COURSE)

B.Tech. I Year I Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
*MC1001ES	Mandatory Course	3	0	0	0	30	70	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:48		

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

Course Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn help in sustainable development

UNIT-I

Ecosystems: 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, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: 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: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and**

Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

ADVANCED CALCULUS

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
MA1201BS	Basic Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course Objectives: To learn

1. Methods of solving the differential equations of first and higher order.
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 to line, surface and volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems
3. Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped
4. Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I: First Order Ordinary Differential Equations

Exact, linear and Bernoulli's equations ; Applications : Newton's law of cooling , Law of natural growth and decay ; Equations not of first degree : equations solvable for p, Applications: LR circuit problems.

UNIT-II: Ordinary Differential Equations of Higher Order

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

UNIT-III: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian 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 (double integrals) and volumes (by double integrals and triple integrals).

UNIT-IV: Vector Differentiation

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

UNIT-V: Vector Integration

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

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
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.

REFERENCES:

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

CHEMISTRY

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CH1202BS	Basic Sciences	L	T	P	4	CIA	SEE	TOTAL
		3	1	0		30	70	100
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				Total Classes:64		

Course objectives:

1. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
2. To develop specialized knowledge in the analysis of water and waste water which are essential for the engineers and in industry.
3. Learn about the fundamentals of electrode reactions and electrochemical cells
4. To provide an understanding of the corrosion principles and engineering methods used to minimize and prevent corrosion.
5. To familiarize students about the characteristics and applications of different polymers and engineering materials in every day life.
6. To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

Course outcomes:

1. The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
2. Apply knowledge and understanding of water treatment process to real world problems.
3. Interpret the knowledge of electrochemical phenomenon involved in developing batteries and understanding fuel cells fundamentals.
4. Ability to determine appropriate method of protection against corrosion for a metal based on its applications in different fields.
5. Classify and characterize different polymers engineering materials and apply its knowledge to select suitable materials for specific applications.
6. The required skills to get clear concepts on basic spectroscopy and applications to medical and other fields.

UNIT - I:

Molecular structure and Theories of Bonding:

Atomic and molecular orbitals. Linear combination of atomic orbitals (LCAO), molecular orbitals of diatomic orbitals, molecular orbital energy level diagrams for N_2, O_2 and F_2 molecules.

Crystal field theory (CFT): Salient features of CFT- Crystal Field Splitting of transition metal ion d-orbitals in Tetrahedral, Octahedral and Square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT-II

Water and its treatment: Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent -expression and units of hardness. Numerical problems. Disadvantages of hard water.

Boiler troubles: Scales and Sludges, caustic embrittlement, boiler corrosion, Softening of water by internal treatment of Boiler feed water and ion- exchange processes. Desalination of water – Reverse osmosis. Sewage water treatment. Potable water treatment - Disinfection of potable water by chlorination and Ozonization.

UNIT-III

Electrochemistry, Batteries and Corrosion:

Electrochemistry: Electrochemical cells- Electrode, electrode potential, standard electrode potential, types of electrodes- Calomel and glass electrodes. Nernst equation, electrochemical series and its applications. Batteries: Cell and battery - Primary (Lithium cell) and secondary batteries (Lead – acid storage battery, Lithium ion battery, advantages and applications of solid state battery). Fuel cells: Hydrogen-oxygen, solid polymer electrolytic fuel cell, Bio chemical fuel cells------- Advantages and Applications. Corrosion and its control –Concept of corrosion, Types of corrosion, mechanism of Chemical & Electro chemical corrosion. Types of electro chemical corrosion (Galvanic corrosion, Pitting, Water line corrosion, stress corrosion). Factors affecting corrosion. Corrosion control methods - Principle of cathodic protection- Sacrificial Anodic Protection (SAP), Impressed Current Cathodic Protection (ICCP). Protective coatings: Metallic coatings- Hot dipping, metal cladding, cementation, electroplating of copper, electro less plating of nickel**,** paints.

UNIT-IV

Engineering materials:

Ceramics: Properties & types of ceramics. Engineering applications of ceramics

Polymers: Defnition, classification, properties of polymers. Plastics-Compounding of plastics, Engineering applications of plastics (PVC, Teflon, Bakelite), Fibres - Applications of Nylon 6. FRP- Types, advantages and applications. Natural rubber and its vulcanization. Elastomers- Applications. Conducting polymers and its applications-Mechanism of conduction and doping in poly acetylene. Applications of bio degradable polymers.

Composites: Classification, Constituents, advantages, applications.

Lubricants: Classification, properties and mechanism of lubrication.

UNIT-V

Spectroscopic techniques and applications:

Principles of Spectroscopy,Selection rules and applications of electronic spectroscopy. Vibrational and rotational spectroscopy. Basic concepts of Nuclear Magnetic resonance spectroscopy, Chemical shift. Introduction to Magnetic Resonance Imaging.

Suggested Text Books:

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain&M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
6. R. V. E. Gadag& A. Nityananda Shetty, Engineering Chemistry, I K International Publishing House Private Limited, New Delhi, 2015 Edition

ENGINEERINGGRAPHICS

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
ME1203ES	Engineering Sciences	1	0	4	3	30	70	100
Contact Classes: 16	Tutorial Classes: Nil	Practical Classes: 64				Total Classes:80		

Courseobjectives:

1. Toprovidebasic conceptsinengineeringdrawing.
2. Toimpartknowledgeabout standardprinciplesoforthographicprojectionofobjects.
3. Todrawsectionalviewsandpictorialviewsofsolids.

CourseOutcomes: Attheendofthecourse,thestudentwillbeableto:

1. Preparing working drawingsto communicatetheideasand information.
2. Read,understandandinterpretengineeringdrawings.

UNIT–I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance,Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid andHypocycloid,Scales– Plain&Diagonal.

UNIT-II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections ofPointsand Lines,ProjectionsofPlaneregulargeometricfigures.AuxiliaryPlanes.

UNIT–III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids –Prism,Cylinder,Pyramid,Cone – Auxiliaryviews– SectionsofSphere

UNIT–IV

Development ofSurfacesofRightRegularSolids–Prism,Cylinder, PyramidandCone,Intersection ofSolids:Intersectionof–PrismvsPrism-CylinderVsCylinder

UNIT–V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – IsometricProjectionofobjectshavingnon-isometriclines.IsometricProjectionof SphericalParts.ConversionofIsometricViewsto OrthographicViewsand Vice-versa– Conventions

IntroductiontoCAD:(ForInternalEvaluationWeightageonly):
IntroductiontoCADSoftwarePackageCommands.-FreeHandSketchesof2D-Creationof2DSketchesbyCAD Package

TEXTBOOKS:

1. EngineeringDrawingN.D.Bhatt/Charotar
2. EngineeringDrawing/N.S.Parthasarathy andVelaMurali/Oxford

REFERENCEBOOKS:

1. EngineeringDrawing/Basant AgrawalandMcAgrawal/McGrawHill
2. EngineeringDrawing/M.B.Shah,B.C.Rane/Pearson.
3. ComputerAidedEngineeringDrawing –KBalaveera Reddyetal–CBSPublishers

ENGLISH

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
EN1204ES	Humanities & Sciences	2	0	0	1	30	70	100
Contact Classes: 32	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:32		

INTRODUCTION In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Learning Objectives: The course will help to a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. b. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. c. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SYLLABUS

UNIT –I 'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press. Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions. **Reading:** Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II 'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms.
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Improving Comprehension Skills – Techniques for Good Comprehension **Writing:** Format of a Formal Letter-

Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III 'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses. **Reading:** Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence

UNIT –IV ' KING LEAR ' a tragedy story by William Shakespeare, play synopsis of Act 1 & 2 published by Bloom, Harold. "King Lear." Shakespeare : The Invention of the Human. New York: Riverhead, 1998.

Vocabulary: Standard Abbreviations in English Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT –V 'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage

Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports

Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing aReport.

Textbook:
1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

2. Nahum Tate's 1681 Adaption of King Lear

References:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

CHEMISTRY LAB

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
CH1205BS	Basic Sciences	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:48		

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as an function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes: The experiments will make the student gain skills on:

1. Determination of parameters like hardness and chloride content in water.
2. Estimation of rate constant of a reaction from concentration – time relationships.
3. Determination of physical properties like adsorption and viscosity.
4. Calculation of Rf values of some organic molecules by TLC technique.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe2+ by Potentiometry using KMnO4
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of Rf values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.

References

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

ENGINEERING WORKSHOP

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
ME1206ES	Engineering Sciences	1	0	3	2.5	30	70	100
Contact Classes: 16	Tutorial Classes: Nil	Practical Classes: 48				Total Classes:64		

Pre-requisites: Practical skill

CourseObjectives:

1. ToStudyofdifferenthandoperatedpowertools, usesandtheirdemonstration.
2. Togainagood basicworkingknowledge requiredforthe production ofvariousengineeringproducts.
3. To provide hands on experience about use of different engineering materials, tools,equipmentsand processesthose are commoninthe engineeringfield.
4. Todeveloparightattitude,teamworking,precisionandsafetyat work place.
5. It explainstheconstruction,function,useandapplicationofdifferentworkingtools, equipmentandmachines.
6. Tostudy commonlyusedcarpentryjoints.
7. Tohavepracticalexposuretovariousweldingandjoining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work toprescribedtolerances.

CourseOutcomes: Attheendofthecourse, thestudentwillbeableto:

1. Study andpracticeonmachinetoolsandtheir operations
2. Practice on manufacturing of components using workshop trades including pluming, fitting,carpentry,foundry,house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes includingdrilling,materialremoving,measuring,chiseling.
4. Applybasic electricalengineeringknowledgeforhousewiringpractice.

1.TRADESFOREXERCISES:

Atleasttwoexercisesfromeachtrade:

1. Carpentry–(T-LapJoint,DovetailJoint,Mortise&TenonJoint)
2. Fitting–(V-Fit,DovetailFit&Semi-circularfit)
3. Tin-Smithy–(Square Tin,RectangularTray&ConicalFunnel)
4. Foundry –(PreparationofGreenSandMouldusingSinglePiece andSplitPattern)
5. WeldingPractice–(ArcWelding&GasWelding)
6. House-wiring–(Parallel&Series,Two-waySwitchandTubeLight)
7. BlackSmithy–(Round toSquare,FanHookandS-Hook)

2. TRADESFORDEMONSTRATION&EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and WoodWorking

TEXTBOOKS:

1. WorkshopPractice/B.L.Juneja/Cengage
2. WorkshopManual/K.Venugopal/Anuradha.

REFERENCEBOOKS:

1. Work shopManual-P.Kannaiah/K.L.Narayana/SciTech
2. WorkshopManual/VenkatReddy/BSP

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

B.Tech. I Year II Semester:

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
EN1207HS	Humanities & Sciences	0	0	2	1	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				Total Classes:32		

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence
5. To train students to use language appropriately for public speaking and interviews

Learning Outcomes: Students will be able to attain

1. Better understanding of nuances of English language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus

English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

Listening Skills

Objectives

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

a. Listening for general content
b. Listening to fill up information

c. Intensive listening
d. Listening for specific information

Speaking Skills

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
    1. Oral practice: Just A Minute (JAM) Sessions
    2. Describing objects/situations/people
    3. Role play – Individual/Group activities

The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)

Exercise – I

CALL Lab: *Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab: *Understand:* Communication at Work Place- Spoken vs. Written language. *Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab: *Understand:* Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab: *Understand:* Features of Good Conversation – Non-verbal Communication. *Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab: *Understand:* Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab: *Understand:* How to make Formal Presentations. *Practice:* Formal Presentations.

Exercise – IV

CALL Lab: *Understand:* Listening for General Details. *Practice:* Listening Comprehension Tests.

ICS Lab: *Understand:* Public Speaking – Exposure to Structured Talks. *Practice:* Making a Short Speech – Extempore.

Exercise – V

CALL Lab: *Understand:* Listening for Specific Details. *Practice:* Listening Comprehension Tests.

ICS Lab: *Understand:* Interview Skills. *Practice:* Mock Interviews.

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Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component): *Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*

i) Computers with Suitable Configuration

ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

SURVEYING AND GEOMATICS

B. Tech . II Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2101PC	Core	L	T	P		CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Classes :45	Tutorial : Nil	Practical classes : Nil				Total Classes : 45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: The object of the course student should have the capability to:

- Know the principle and methods of surveying.
- Measure horizontal and vertical-distances and angles
- Recording of observation accurately
- Perform calculations based on the observation
- Identification of source of error sand rectification methods
- Apply surveying principles to determine area sand volume sand setting out curves
- Use modern surveying equipment's for accurate results

Course Outcomes: Course will enable the student to:

CO-1 Apply the knowledge to calculate angles, distances and levels.
CO-2 Identify data collection method sand prepare field notes.
CO-3 Understand the working principles of survey instruments, measurement error sand corrective measures.
CO-4 Interpret survey data and compute areas and volumes, levels by different types of equipment.
CO-5 Apply the knowledge of modern surveying equipment's for accurate results.

UNIT-I

Introduction and Basic Concepts: 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- Types of levels and leveling staves, temporary adjustments, methods of leveling, 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: Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical leveling when base is accessible and inaccessible.

Traversing: Methods of traversing traverse computations and adjustments, Omitted measurements.

UNIT-IV

Curves: 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,

UNIT– V

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.

Photo Grammetry Surveying: Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photo grammetry, flight planning.

TEXTBOOKS:

1.Chandra A M, "Plane Surveying and higher surveying", New Age International Pvt. Ltd., Publishers, New Delhi.
2.Duggal S K,"Surveying (Vol–1&2), Tata Mc Graw Hill Publishing Co. Ltd. New Delhi.

REFERENCES:

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying,McGrawHill.

2. Surveying and leveling by R.Subramanian,Oxford university press, New Delhi

3. Arora KR"Surveying Vol1,2 &3),Standard Book House, Delhi.

4. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain –Laxmi Publications(P) ltd., New Delhi.

STRENGTH OF MATERIALS–I

B. Tech. II Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2102PC	Core	L	T	P	4	CIE	SEE	Total
		3	1	0		30	70	100
Contact Class:45	Tutorial : 15	Practical classes : Nil				Total Classes : 60		
Prerequisites: Engineering Mechanics is the prerequisites to take this course								

Course Objectives: The objectives of this Course is

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

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

CO-1: Describe the concepts and principles, 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.

CO-2: Understand the various types loads applied on structural components of simple framing geometries and understand the nature of internal stresses that will develop within the Components.

CO-3: Evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.

CO-4: Analyze various situations involving structural members subjected to plane stresses by application of Mohr's circle of stress;

CO-5: Create an idea to design a system, component, or process.

UNIT– I

SIMPLE STRESSES AND STRAINS:

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 .

STRAINENERGY–Resilience– Gradual, sudden, and impact loadings–simple applications.

UNIT– II

SHEAR FORCE AND BENDING MOMENT:

Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported including overhanging beams subjected to point loads, uniformly distributed load, uniformly varying load, couple and combination of these loads – Point of contra flexure–Relation between S.F.,B.M and rate of loading at a section of abeam.

UNIT– III

FLEXURALSTRESSES:

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.

SHEARSTRESSES:

Derivation of formula for shear stress distribution – Shearstressdistributionacrossvariousbeamsectionslikerectangular,circular, triangular, I,T angle and channel sections.

UNIT– IV

DEFLECTION OF BEAMS:

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:

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 Mises Theory).

TEXTBOOKS:

1. Strength of Materials by R. K Rajput, S. Chand &Company Ltd.

2. Mechanics of Materials by Dr.B.CPunmia, Dr.Ashok Kumar Jain and Dr.Arun Kumar Jain

3. Strength of Materials by R.Subramanian, Oxford University Press

REFERENCES:

1. Mechanics of material by R.C.Hibbeler, Prentice Hall publications

2. Engineering Mechanics of Solids by Egor P. Popov, Prentice Hall publications

3. Strength of Materials byT.D. Gunneswara Rao andM. Andal,Cambridge Publishers

4. Strength of Materials by R.K. Bansal, Lakshmi Publications HousePvt.Ltd.

5.Strength of Materials by B.S.Basavarajaiah and P. Mahadevappa, 3rd Edition, Universities Presss

PROBABILITY AND STATISTICS

B.Tech. II Year I Semester

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
MA2103BS	Basic Sciences	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: To learn

1. The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
2. The basic ideas of statistics including measures of central tendency, correlation and regression.
3. The statistical methods of studying data samples.

Course outcomes: After learning the contents of this paper the student must be able to

Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.

UNIT - I: Basic Probability

Probability spaces, conditional probability, independent events, and Bayes' theorem. Random variables: Discrete and continuous random variables, Expectation of Random Variables, Moments, Variance of random variables

UNIT - II: Discrete Probability distributions

Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution

UNIT - III: Continuous Random variable & Distributions

Continuous random variables and their properties, distribution functions and densities, Normal, exponential and gamma distributions, evaluation of statistical parameters for these Distributions

UNIT - IV: Applied Statistics

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves; Correlation and regression – Rank correlation.

UNIT - V: Testing of Hypothesis

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.

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 C Guptha and V.K. Kapoor.

REFERENCES:

1. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations
2. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

FLUID MECHANICS

B.Tech. II Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2104PC	Core	L	T	P		CIE	SEE	Total
		3	1	0	4	30	70	100
Contact Class:45	Tutorial : 15	Practical classes :Nil				Total Classes : 60		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: The objectives of the course are to

- Introduce the concepts of fluid mechanics useful in Civil Engineering applications
- Provide a first level exposure to the students to fluid statics, kinematics and dynamics.
- Learn about the application of mass, energy and momentum conservation laws for fluid flows
- Train and analyze engineering problems involving fluids with a mechanistic perspective is essential for the civil engineering students
- To prepare a student to build a good fundamental background useful in the Application in tensile courses covering hydraulics, hydraulic machinery and hydrology

Course Outcomes: Upon completion of this course, students should be able to:

CO-1: Understand the broad principles of fluid statics, kinematics and dynamics

CO-2: Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow

CO-3: Understand classifications of fluid flow

CO-4: Apply the continuity, momentum and energy principles to the real problems

CO-5: Understand the Boundary Layer theory concepts

UNIT– I

Properties of Fluid: 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; vapor pressure, boiling point, cavitations; surface tension, capillarity, Bulk modulus of elasticity, compressibility.

Fluid Statics: 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, Micro manometers.

pressure gauges. Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT-II

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

Fluid Dynamics: Surface and Body forces-Euler's and Bernoulli's equation ; Energy correction factor; Momentum equation. Vortex flow – Free and Forced. Bernoulli's equation to real fluid flows.

UNIT-III

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

Flow Over Notches & Weirs: Flow through rectangular; triangular and trapezoidal notches and weirs; End contractions; Velocity of approach. Broad crested weir.

UNIT– IV

Flow through Pipes: Reynolds experiment, Reynolds number**,** Loss of head through pipes, Darcy-Wiesbatch equation, minor losses, total energy line, hydraulic gradeline, 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 pipe sand control measures.

UNIT-V

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

Boundary Layer Concepts: 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 Dragand Lift and types drag, magnus effect.

TEXTBOOKS:

1. Fluid Mechanics by Modi and Seth, Standard Book House.
2. Fluid Mechanics and Hydraulic machines by Manish Kumar Goyal, P H I learning Private Limited, 2015.
3. Fluid Mechanics by R.C.Hibbeler, Pearson India Education Services Pvt.Ltd

REFERENCEBOOKS:

1. Theory and Applications of Fluid Mechanics, K.Subramanya, Tata Mc Graw Hill
2. Introduction to Fluid Mechanics and Fluid Machines by SKSom, Gautam Biswas, Suman Chakraborthy, Mc Graw Hill Education (India)Private Limited
3. Fluid Mechanics and Machinery, C.S.P.Ojha, R. Berndtsson and P .N. Chadramouli, Oxford University Press,2010
4. Fluid mechanics & Hydraulic Machines, Domkundwar&DomkundwarDhanpat Rai &Co
5. Fluid Mechanics and Hydraulic Machines, R.K.Bansal, Laxmi Publication PvtLtd.

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

B. Tech. II Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
EE2105ES	Core	L	T	P		CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Class:45	Tutorial : Nil	Practical classes : 0				Total Classes : 45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives:

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement. And the concepts of diodes & transistors.

Course Outcomes:

CO-1: Analyze and solve electrical circuits using network laws and theorems.

CO-2: Understand and analyze basic Electric and Magnetic circuits

CO-3: Understand the working principles of Electrical Machines

CO-4: Describe the components of Low Voltage Electrical Installations

CO-5: To identify and characterize diodes and various types of transistors.

UNIT - I: D.C. CIRCUITS

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation.
A.C. CIRCUITS
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits , Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT - II:

ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations
for energy consumption, power factor improvement and battery backup.

UNIT - III:
ELECTRICAL MACHINES

Working principle of Single-phase transformer, equivalent circuit, losses in transformers, efficiency, Three-phase transformer connections. Construction and working principle of DC generators, EMF equation, working principle of DC motors, Torque equations and Speed control of DC motors,
Construction and working principle of Three-phase Induction motor, Torques equations and Speed control of Three-phase induction motor.
Construction and working principle of synchronous generators.

UNIT - IV:
P-N JUNCTION AND ZENER DIODE: PN materials Principle of Operation Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Zener diode characteristics and applications.

RECTIFIERS AND FILTERS: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor – Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters

UNIT - V:
BIPOLAR JUNCTION TRANSISTOR (BJT): Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations, Comparison of CE, CB and CC configurations. FIELD EFFECT TRANSISTOR (FET): Construction, Principle of Operation, Comparison of BJT and FET, Biasing FET.

TEXT BOOKS:
1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education

REFERENCES:
1. Electronic Devices and Circuits – R. L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH,2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2nd edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford University Press-2004.
5. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.
7. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 201

SURVEYING LAB

B. Tech. II Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2106PC	Core	L	T	P	1.5	CIE	SEE	Total
		0	0	3		30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes : 45				Total Classes : 45		
Prerequisites: Surveying Theory is the prerequisites to take this course								

Course Objectives:

- To impart the practical knowledge in the field-measuring distances, directions, angles,
- To determining R.L.'s area' s and volumes
- To set out Curves and stakeout points
- To traverse the area
- To draw Plans and Maps

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

CO-1: Apply the principle of surveying for civil Engineering Applications
CO-2: Evaluate of areas, Drawing plans and contour maps using different measuring equipments at field level
CO-3: Measurement of Horizontal and vertical angle by Theodolite
CO-4: Determination of height, remote elevation, distance between inaccessible points Using total station
CO-5: Design the curves using total station

List of Experiments

1. Surveying of an area by chain, and compass survey (closed traverse) &plotting.
2. Determine of distance between two in accessible points with compass
3. Radiation method, intersection methods by plane table survey.
4. Leveling – 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. Stakeout using total station

12. Setting out curve using total station.

STRENGTH OF MATERIALS LAB

B. Tech. II Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2107PC	Core	L	T	P		CIE	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial : Nil	Practical classes : 45				Total Classes : 45		
Prerequisites: Strength of materials is prerequisites to take this course								

Course Objectives:

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

Course Outcomes: At the end of the course the student will be able to:

CO-1: Understand the measurements of different strains, stress and elastic properties of materials used in Civil Engineering.
CO-2: Understand the mechanical properties of different solid engineering materials
CO-3: Understand the behavior of various material samples under different loads and equilibrium conditions
CO-4: Understand the stress, strains of behavior of various material subjected to tension, compression, shear, torsion, bending and impact
CO-5: Analyze the material testing data and its interpretation

.

List of Experiments:

1. Tension test
2. Bending test on (Steel/Wood) Cantilever beam.
3. Bending test on simple support beam.
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 gauges

12. Continuous beam –deflection test.

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

B. Tech. II Year I Sem

Course Code	Category	Hours / week			Credits	Maximum Marks		
EE2108ES	Core	L	T	P		CIE	SEE	Total
		0	0	2	1	30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes : 30				Total Classes : 30		
Prerequisites: Basic electrical and electronics is prerequisites to take this course								

Course Objectives:

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement diodes & transistors

Course Outcomes:

CO-1: Analyze and solve electrical circuits using network laws and theorems.

CO-2: Understand and analyze basic Electric and Magnetic circuits

CO-3: Understand the working principles of Electrical Machines

CO-4: Describe the components of Low Voltage Electrical Installations

CO-5: To identify and characterize diodes and various types of transistors.

List of experiments/demonstrations:

PART A: ELECTRICAL

1. Verification of KVL and KCL
2. (i) Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single -Phase Transformer.
(ii) Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta star, Star Star) in a Three Phase Transformer.
3. Measurement of Active and Reactive Power in a balanced Three-phase circuit
4. Performance Characteristics of a Separately Excited DC Shunt Motor
5. Performance Characteristics of a Three-phase Induction Motor
6. No-Load Characteristics of a Three-phase Alternator

PART B: ELECTRONICS

1. Study and operation of

(i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO.

2. PN Junction diode characteristics

3. Zener diode characteristics and Zener as voltage Regulator

4. Input & Output characteristics of Transistor in CB / CE configuration

5. Full Wave Rectifier with & without filters

6. Input and Output characteristics of FET in CS configuration

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University

2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education

REFERENCES:

1. Electronic Devices and Circuits – R. L. Boylestead and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.

2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH,2/e, 1998

CONSTITUTION OF INDIA

B. Tech.II Year ISem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
MC2001	Core	L	T	P		CIE	SEE	Total
		0	0	3	0	30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes : 45				Total Classes : 45		
Prerequisites: There is no prerequisites to take this course								

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects soCIEl, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, soCIEl and economic developments since the year 1950. The Indian judiCIEry and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judiCIEl activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India

3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and finanCIElpowers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, FinanCIEl Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article19
15. Scope of the Right to Life and Personal Liberty under Article21

BUILDING MATERIALS AND CONSTRUCTION PLANNING

B. Tech.II Year II Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2201PC	Core	L	T	P		CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Class:45	Tutorial : Nil	Practical classes : Nil				Total Classes : 45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: The objectives of the course is to

- Explain different construction techniques
- Understand the building bye-laws
- Define the Basic terminology that is used in the industry
- Categorize different building materials, properties and their uses
- Understand the Prevention of damage measures and good workmanship

Course Outcomes: After the completion of the course student should be able to

CO-1: List out the different construction material and Explain different construction techniques

CO-2: Understand the building bye-laws and the smart building materials

CO-3: Categorize different building materials, properties and their uses

CO-4: Understand the Prevention of damage measures and good workmanship

CO-5: Explain different building services

UNIT– I

Stones and Bricks, 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: Ingredients of cement – manufacture – Chemical composition –Hydration-field &lab tests. Admixtures–mineral &chemical admixtures–uses.

UNIT-III

Building Components: Lintels, Arches, walls, vaults –staircases–types of floors, types of roofs – flat, curved, trussed; foundations – types; Damp Proof Course; Joinery – doors –windows– materials – types.

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics–characteristic –absorption– Acousticdesign; Fireprotection–FireHazards-Classification of fire-resistant materials and constructions.

UNIT-IV

Mortars, Masonry and Finishing's Mortars: Lime and Cement Mortars Brick masonry– types of bonds; Stonemasonry–types; Composite masonry–Brick-stone composite; Concrete, Reinforced brick.

Finishers: Plastering, Pointing, Painting ,Claddings –Types–Tiles–ACP.

Formwork: Types: Requirements –Standards–Scaffolding–Design; Shoring, Underpinning.

UNIT– V

Building Planning: Principles of Building Planning, Classification of buildings and Building bylaws.

TEXT BOOKS:

1. Building Materials and Construction–Arora &Bindra ,Dhanpat Roy Publications.
2. Building Materials and Construction by GCSahu, Joygopal Jena McGraw hillPvtLtd2015.
3. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications(P) ltd., New Delhi.

REFERENCE BOOKS:

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

ENGINEERING GEOLOGY

B.Tech. II Year II Sem

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2202PC	Core	L	T	P	2	CIE	SEE	Total
		2	0	0		30	70	100
Contact Class:30	Tutorial : Nil	Practical classes : Nil				Total Classes : 30		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: The objective of this Course is

- To give the basics knowledge of Geology that is required for constructing various Civil Engineering Structures.
- Differentiate basic Geology, Geological Hazardous and Environmental Geology.
- Knowledge on Landslides, Earthquake and their causes and effect; measures to be taken to prevent their occurrence.
- Effects of Tunneling on the ground Role of Geological Considerations.
- 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

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

- Site characterization and how to collect, analyze, and report of geologic data using standards in engineering practice
- The fundamentals of the engineering properties of Earth materials and fluids.
- Rock mass characterization and the mechanics of planar rock slides and topples

UNIT-I

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 drawbacks. 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: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. 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, SandStone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT-III

Structural Geology: Outcrop, strike and dip study of common geological structures associating with the rocks such as folds, faults un conformities, 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 groundwater, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT-IV

Earth Quakes: Causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Landslides, their causes and effect; measures to be taken to prevent their occurrence.

Importance of Geophysical Studies: Principles of geophysical study by Gravity methods.Magneticmethods,Electricalmethods.Seismicmethods,Radiometricmethodsan dgeothermalmethod.SpeCIElimportanceof 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: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of adamsite. Analysis of dam failures of the past. 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.

TEXT BOOKS:

1. Engineering GeologybyN.Chennakesavulu,McMillan,IndiaLtd.2005

2. Engineering MethodsbyD. VenkatReddy; VikasPublishers 2015.

3. Engineering Geology by SK Duggal, HKPandeyMcGraw Hill Education Pvt Ltd2014

4. Principles of Engineering Geology by K.V.G.K.Gokhale–B.Spublications

REFERENCES:

1. F.G.Bell,Fundamentalof EngineeringB.S.Publications,2005.

2. Krynine&Judd,Principles of Engineering Geology& Geotechnics, CBSPublishers&Distribution

3. Engineering Geology by SubinoyGangopadhyay, Oxford university press.

4. Engineering Geology for Civil Engineers – P.C.VarghesePHI

BASIC MECHANICAL ENGINEERING FOR CIVIL ENGINEERS

B.Tech.II Year II Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
ME2203ES	Core	L	T	P	3	CIE	SEE	Total
		3	0	0		30	70	100
Contact Class:45	Tutorial : Nil	Practical classes : Nil				Total Classes : 45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: To familiarize civil engineering Basic machine elements, Sources of Energy and Power Generation,

- Various manufacturing processes,
- Power transmission elements, material handling equipment.

Course Outcomes: At the end of the course Student will able

- Tounderstandthemechanicalequipmentfortheusageatcivilengineeringsystems,
- To familiarize with the general principles and requirement for refrigeration, manufacturing,
- Torealizethetechniquesemployedtoconstructcivilengineeringsystems.

UNIT-I

Introduction to engineering materials-Metals, ceramics, composites-Heat treatment of metals Machine Elements: Cams: Types of cams and followers; Riveted joints- methods offailureofrivetedjoints-strengthequations-efficiencyofrivetedjoints-eccentricallyloadedrivetedjoints.

UNIT-II

Power Transmission Elements: Gears terminology of spur, helical and bevel gears, geartrains. Beltdrives(types).Chaindrives.

Material Handling Equipment: Introduction to Belt conveyors, cranes, industrial trucks, bulldozers.

UNIT-III

Energy:Power Generation External and internal combustion engines(layouts,element/componentdescription,advantages,disadvantages, applications).

Refrigeration: Mechanical Refrigeration and types–units of refrigeration–Air Refrigeration system, details and principle of operation–calculation of COP

Modes and mechanisms of heat transfer–Basic laws of heat transfer–General discussion about applications of heat transfer.

UNIT-IV

Manufacturing Processes: Sheet Metal Work: Introduction–Equipments–Tools and accessories–Various processes (applications, advantages /disadvantages).

Welding: Types–Equipments–Techniques employed–welding positions-defects-applications, advantages/ disadvantages– Gas cutting– Brazing and soldering. **Casting:** Types, equipments, applications

UNIT-V

Machine Tools:Introduction to lathe, drilling machine, milling machine, grinding machine-Operations performed.

TEXT BOOKS:

1.Kumar,T.,LeenusJesuMartinandMurali,G.,BasicMechanicalEngineering, SumaPublications,Chennai,2007

REFERENCE BOOKS:

1. Prabhu,T.J.,JaiGanesh,V.andJebaraj,S.,BasicMechanicalEngineering,ScTechPublications, Chennai, 2000.
2. HajraChoudhary,S.K.andHajraChoudhary,A.K.,ElementsofWorkshopTechnologyVols.I&II,IndianBookDistributingCompanyCalcutta,2007.
3. Nag,P.K.,Power Plant Engineering,TataMcGraw-Hill,NewDelhi,2008.
4. Rattan,S.S.,Theory of Machines,Tata McGraw-Hill,NewDelhi.

STRENGTH OF MATERIALS –II

B. Tech.II Year II Sem

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2204PC	Core	L	T	P		CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Class:45	Tutorial : Nil	Practical classes : Nil				Total Classes : 45		
Prerequisites: Strength of Materials-I prerequisites to take this course								

Course Objectives: The objective of this Course is

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

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

- 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;
- To evaluate the strains and deformation that will result due to the elastic stresses developed with in the materials for simple types of loading
- Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses;
- Understand and evaluate the shear center and unsymmetrical bending.
- Frame an idea to design a system ,component, or process

UNIT– I

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

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

UNIT– II

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

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

UNIT-III

DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and bending moment, coreofasection–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: 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:

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 ofneutralaxis.

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

TEXTBOOKS:

1. Strength of Materials by R.K Rajput,S. Chand &CompanyLtd.

2. Mechanics of Materials by Dr.B. CPunmia,Dr.AshokKumarJain and Dr.ArunKumarJain

3. Strength of Materials by R.Subramanian,OxfordUniversityPress.

REFERENCE BOOKS:

1) Mechanics of Materials by R.C.Hibbeler,PearsonEducation

2) Engineering Mechanics of Solids by PopovE.P.Prentice-HallLtd

3) Strength of Materials by T.D.Gunneswara Rao andM.Andal,Cambridge Publishers

4) Strength of Materials byR.K. Bansal, LakshmiPublicationsHousePvt.Ltd.

5) Fundamentals of Solid Mechanics by M.L. Gambhir,PHILearningPv

HYDRAULICS AND HYDRAULIC MACHINERY

B.Tech. II Year II Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2205PC	Core	L	T	P		CIE	SEE	Total
		3	0	0	3	30	70	100
Contact Class:45	Tutorial : Nil	Practical classes : Nil				Total Classes : 45		
Prerequisites: Fluid Mechanics is the prerequisites to take this course								

Course Objectives: The objective of the course is

- To define the fundamental principles of water conveyance in open channels.
- To Discuss and analyze the open channels in uniform and Non-uniform flow conditions.
- To Study the characteristics of hydroelectric power plant and its components.
- To analyze and design of hydraulic machinery and its modeling

Course Outcomes: At the end of the course the student will able to

- Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.
- Understand and solve problems in uniform, gradually and rapidly varied flows in openchannel in steady state conditions.
- Apply dimensional analysis and to differentiate the model, proto type and similitude conditions for practical problems.
- Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropowerdevelopment and for other practical usages

UNIT-I

Open Channel Flow–I: 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, subcritical and super critical flows-Channel transitions.

UNIT-II

Open Channel Flow – II: 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: 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: Hydro dynamic 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

UNIT-IV

Hydraulic Turbines –I: 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.

HydraulicTurbines –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: 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. Fluid Mechanics by Modi and Seth,Standard Book House.

2. Fluid Mechanics and Hydraulic machines by Manish Kumar Goyal, PHI

learning PrivateLimited,2015
3. Fluid mechanics & Hydraulic Machines, Domkundwar&DomkundwarDhanpat Rai &Co

REFERENC EBOOKS:

1. Fluid Mechanics byR. C.Hibbeler,Pearson India Education ServicesPvt. Ltd

2. Fluid Mechanic & Fluid Power Engineering byD.S. Kumar (Kataria&SonsPublicationsPvt. Ltd.).
3. Open channel flow by V.T.Chow(McGraw HillBookCompany).

4. Introduction to Fluid Mechanics and Fluid Machines by SKSom,GautamBiswas,SumanChakraborthy,McGraw Hill Education (India) Private Limited
5. Hydraulic Machines by Banga & Sharma (Khanna Publishers).

HYDROLOGY & WATER RESOURCES ENGINEERING

B. Tech. II Year II Sem

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2206PC	Core	L	T	P	3	CIE	SEE	Total
		3	0	0		30	70	100
Contact Class:45	Tutorial : Nil	Practical classes : Nil				Total Classes : 45		
Prerequisites: Fluid Mechanics is the prerequisites to take this course								

Course Objectives: This course provides

- The description of hydro logical cycle and derive various formulas used in estimation of different basic components of surface and Ground water cycle and its components.
- Further it will explain the water requirement for irrigation and connectivity of hydrology to the field requirement.

Course Outcomes: At the end of the course the student will be able to

- Understand the different concepts and terms used in engineering hydrology
- To identify and explain various formulae used in estimation of surface and Ground water hydrology components
- Demonstrate their knowledge to connect hydrology to the field requirement

UNIT-I

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 in tensity /depth- duration-frequency relationship, Probable Maximum Precipitation(PMP),rainfall data in India.

UNIT-II

Abstractions from precipitation evaporation process, evaporimeters, analytical methods ofevaporation 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 curveof runoff – Analysis.

UNIT-III

Hydrographs 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

Ground water Hydrology Occurrence, movement and distribution of groundwater, aquifers –types, Specific Yield, Permeability, Storage coefficient, Transmissibility, Darcy's Law. WellHydraulics - Steady radial flow into well for confined and unconfined aquifers, Recuperationtests.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 infiltration, consumptive use, irrigation requirement ,frequency of irrigation; Methods of applying water to the fields: surface, sub-surface, sprinkler and trickle /dripirrigation.

UNIT-V

Canal Systems: Canal systems ,alignment of canals, canal losses,estimation of design discharge.Design of channels- rigid boundary channels, alluvial channels, Regime channels, Kennedy'sand Lacey's theory of regime channels. Canal outlets: non-modular, semi-modular and modularoutlets. Water logging: causes, effects and remedial measures. Lining of canals-Types of lining-Advantages and dis advantages. Drainage of irrigated lands-necessity, methods.

TEXT BOOKS:

1. Hydrology by K. Subramanya (Tata McGraw-Hill)

2. Irrigation Engineering and Hydraulic structures by Santhosh kumar Garg Khanna publishers

3. G L Asawa,IrrigationEngineering,Wiley Eastern

REFERENCE BOOKS:

1. Elements of Engineering Hydrology byV.P.Singh (Tata McGraw-Hill)

2. Engineering Hydrology byJaya Rami Reddy (Laxmi Publications

3. Ground water Hydrology by David KeithTodd, JohnWiley&Son,NewYork.

4. Elements of Water Resources Engineering by K.N.Duggal and J.P.Soni (New Age International)

COMPUTER AIDED CIVIL ENGINEERING DRAWING

B. Tech. II Year II Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2207ES	Core	L	T	P	1.5	CIE	SEE	Total
		0	0	3		30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes : 45				Total Classes : 45		
Prerequisites: There is no prerequisites to take this course								

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

- Use the Auto CAD commands for drawing 2D & 3D building drawings required for different civil engg applications.
- Plan and draw Civil Engineering Buildings as per aspect and orientation.
- Presenting drawings as per user requirements and preparation of technical report

Course Objectives: The objective of this lab is to teach the student usage of Auto cad and basic drawing fundamentals in various civil engineering applications ,espeCIElly in building drawing.

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) multistoried buildings
12. Auto CAD applications in surveying , mechanics etc.

TEXT BOOKS:

1. Computer Aided Design Laboratory by M.N.SeshaPraksh&Dr.G.S. Servesh–Laxmi Publications.

2. Engineering Graphics byP. J. Sha– S. Chand&Co.

ENGINEERING GEOLOGY LAB

B.Tech.II Year II Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2208PC	Core	L	T	P	1.0	CIE	SEE	Total
		0	0	2		30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes :30				Total Classes :30		
Prerequisites: Engineering Geology Theory is the prerequisites to take this course								

Course Objectives: 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:

- Understands the method and ways of investigations required for Civil Eng.projects
- Identify the various rocks ,minerals depending on geological classifications
- Will able to learn to couple geologic expertise with the engineering properties of rock and
- Unconsolidated materials in the characterization of geologicsites for civil work projects and the quantification of processes such as rock slides and settlement.
- 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 ,BrecCIE, Sand stone and its varieties, Laterite, Limestone andits varieties, Shales andits 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)

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals

2. Description and identification of Six (including igneous,sedimentary and metamorphic rocks)

3. Interpretation of a Geological mapalong with a geological section.

4. Simple strike and Dip problems.

5. Microscopic identification of rocks.

HYDRAULICS & HYDRAULIC MACHINERY LAB

B.Tech. II Year II Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE2209PC	Core	L	T	P		CIE	SEE	Total
		0	0	3	1.5	30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes : 45				Total Classes : 45		
Prerequisites: Fluid Mechanics is the prerequisites to take this course								

Course Objectives

- To **identify** the behavior of analytical models introduced in lecture to the actual behavior of real fluid flows.
- To **explain** the standard measurement techniques of fluid mechanics and their applications.
- To **illustrate** the students with the components and working principles of the Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
- To **analyze** the laboratory measurement sand to document the results in an appropriate format.

Course Outcomes: Students who successfully complete this course will have demonstrated ability to:

- **Describe** the basic measurement techniques of fluid mechanics and its appropriate application.
- **Interpre**t the results obtained in the laboratory for various experiments.
- **Discover** the practical working of Hydraulic machines- different types of Turbines, Pumps and other miscellaneous hydraulics machines.
- **Compare** the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.
- Write a technical laboratory report

List of Experiments

1. Verification of Bernoulli's equation

2. Determination of Coefficient of discharge for a small orifice by a constant head method

3. Calibration of Venturimeter /Orifice Meter

4. Calibration of Triangular/Rectangular/Trapezoidal Notch

5. Determination of Minor losses in pipe flow

6. Determination of Friction factor of a pipe line

7. Determination of Energy loss in Hydraulic jump

8. Determination of Manning's and Chezy's constants for Open channel flow.

9. Impact of jet on vanes

10. Performance Characteristics of Pelton wheel turbine

11. Performance Characteristics of Francis turbine

12. Performance characteristics of KaplanTurbine

13. Performance Characteristics of a single stage /multi stage Centrifugal Pump

GENDER SENSITIZATION LAB

(An Activity-based Course)

B.Tech.IIYearIISem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
MC2002	**Core**	**L**	**T**	**P**		**CIE**	**SEE**	**Total**
		0	**0**	**2**	**0**	**30**	**70**	**100**
Contact Class: Nil	**Tutorial : Nil**	**Practical classes : 30**				**Total Classes : 30**		
Prerequisites: There is no prerequisites to take this course								

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other sociel identities. This course also seeks to build an understanding and initiate and strengthen program combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course:

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

Learning Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- 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.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.

- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreCIEtionof women in all walks of life.
- 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

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender- Construction of Gender-SoCIElization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

UNIT – III: GENDER AND LABOUR

Division and Valuation of Labor-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.- Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*

Domestic Violence: Speaking Out Is Home a Safe Place?-When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks- The Brave Heart.

***Note*:Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.**

- ***Classeswillconsistofacombinationofactivities:dialogue-basedlectures,discussions, collaborative learning activities, group work and in-class assignments. Apart from the aboveprescribedbook,Teacherscanmakeuseofanyauthenticmaterialsrelatedtothe topics given in the syllabus on"Gender".***

ESSENTIAL READING:

The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender" written* by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu**published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation:20%
- Project/Assignment:25%
- End Term Exam:50%

STRUCTURAL ANALYSIS – I

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3101PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Strength of Materials & Engineering mechanics								

Course Objectives: The objective of the course is to

Differentiate the statically determinate and indeterminate structures.

To understand the nature of stresses developed in perfect frames and three hinged arches for various types of simple loads

Analyse the statically indeterminate members such as fixed bars, continuous beams and for various types of loading.

Understand the energy methods used to derive the equations to solve engineering problems

Evaluate the Influence on a beam for different static & moving loading positions

Course Outcomes: At the end of the course the student will able to

An ability to apply knowledge of mathematics, science, and engineering

Analyse the statically indeterminate bars and continuous beams

Draw strength behaviour of members for static and dynamic loading.

Calculate the stiffness parameters in beams and pin jointed trusses.

Understand the indeterminacy aspects to consider for a total structural system.

Identify, formulate, and solve engineering problems with real time loading

UNIT – I

ANALYSIS OF PERFECT FRAMES: 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: 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.

THREE HINGED ARCHES – 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 and FIXED BEAMS: 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: 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.

SLOPE DEFLECTION METHOD: 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 and INFLUENCE LINES: 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:

Structural Analysis Vol –I & II by V.N. Vazirani and M.M. Ratwani, Khanna Publishers.

Structural Analysis Vol I & II by G.S.Pandit and S.P. Gupta, Tata McGraw Hill Education Pvt. Ltd.

Structural analysis T. S Thandavamoorthy, Oxford university Press

REFERENCES:

Structural Analysis by R. C. Hibbeler, Pearson Education

Basic Structural Analysis by K.U. Muthu et al., I.K. International Publishing House Pvt. Ltd

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

Basic Structural Analysis by C. S. Reddy., Tata McGraw Hill Education Pvt. Ltd.

CONCRETE TECHNOLOGY

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3102PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Building Materials								

Course Objectives: Concrete is the basic construction material in the advancemans present construction industry Lot of advances are taking place in the concrete technology on par with development taking place in the engineering. The present day industry needs the knowledge of concrete technology thoroughly. The subject is designed to give the basic knowledge as well as latest developments in concrete technology.

- **Course Outcomes:** At the end of the course, the student will be able to:
- Identify Quality Control tests on concrete making materials
- Understand the behaviour of fresh and hardened concrete
- Design concrete mixes as per IS and ACI codes
- Understand the durability requirements of concrete
- Understand the need for special concretes

UNIT - I

Cement: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement. Admixtures: Types of admixtures – mineral and chemical admixtures.

UNIT - II

Aggregates: Classification of aggregate – Particle shape & texture –, 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 & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT - IV

Hardened Concrete: Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compressive & tensile strength - Curing.

Testing Of Hardened Concrete: Compression tests – Tension tests– 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 – Poisson'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: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Acceptance criteria – Proportioning of concrete mix, Nominal Mix Design of design mix as per IS -10262

Special Concretes: Introduction to light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete &**Geo Polymer concrete** – High performance concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A. M. Neville Pearson 5th edition Education ltd 2016.

2. Concrete Technology by M. S. Shetty. – S. Chand & Co. 2004

3. Concrete Technology by Job Thomas -Cengage learning India Pvt Ltd 2015.

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi

2. Concrete: Micro structure, Properties and Materials – P. K. Mehta and J. M.

Monteiro, McGraw Hill Publishers

TRANSPORTATION ENGINEERING

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3103PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Surveying								

Course Objectives: Concrete is the basic construction material in the advancemans present construction industry Lot of advances are taking place in the concrete technology on par with development taking place in the engineering. The present day industry needs the knowledge of concrete technology thoroughly. The subject is designed to give the basic knowledge as well as latest developments in concrete technology.

- **Course Outcomes:** At the end of the course, the student will be able to:
- Identify Quality Control tests on concrete making materials
- Understand the behaviour of fresh and hardened concrete
- Design concrete mixes as per IS and ACI codes
- Understand the durability requirements of concrete
- Understand the need for special concretes

UNIT - I

Cement: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement. Admixtures: Types of admixtures – mineral and chemical admixtures.

UNIT - II

Aggregates: Classification of aggregate – Particle shape & texture –, 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 & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT - IV

Hardened Concrete: Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compressive & tensile strength - Curing.

Testing Of Hardened Concrete: Compression tests – Tension tests– 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 – Poisson'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: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Acceptance criteria – Proportioning of concrete mix, Nominal Mix Design of design mix as per IS -10262

Special Concretes: Introduction to light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete &**Geo Polymer concrete** – High performance concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A. M. Neville Pearson 5th edition Education ltd 2016.

2. Concrete Technology by M. S. Shetty. – S. Chand & Co. 2004

3. Concrete Technology by Job Thomas -Cengage learning India Pvt Ltd 2015.

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi

2. Concrete: Micro structure, Properties and Materials – P. K. Mehta and J. M.

Monteiro, McGraw Hill Publishers

STRUCTURAL ENGINEERING – I (RCC)

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3104PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Strength of materials								

Course Objectives: The objectives of the course are to

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

Course Outcomes: After the completion of the course student should be able to

- Compare and Designthe singly reinforced, doubly reinforced and flanged sections.
- Design the axially loaded, uniaxial and biaxial bending columns.
- Understanding the concepts of RCC Design and Different methods of Design like Working Stress Method and Limit State Method.
- Design for structural members for Shear, Bond and Torsion
- Classify the footings and Design the isolated square, rectangular and circular footings
- Distinguish and Design the one-way and two-way slabs.

UNIT - I

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 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 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 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 foundation **-** Different types of footings – Design of wall footing – Design of flat isolated square, rectangular, circular footings and combined footings for two columns.

TEXT BOOKS:

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

2. Reinforced concrete design by S. UnnikrishnaPillai&DevdasMenon, Tata McGraw Hill.

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

Publishers.

REFERENCES:

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

GEOTECHNICAL ENGINEERING

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3105PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Engineering Geology, Applied Mechanics, Fluid Mechanics								

Course Objectives: the objectives of the course are to

- understand the formation of soil and classification of the soils
- determine the Index & Engineering Properties of Soils
- determine the flow characteristics & stresses due to externally applied loads
- estimate the consolidation properties of soils
- estimate the shear strength and seepage loss

Course Outcomes: At the end of the course the student will able to

CO-1:Understand the Characterization and classify the soils based on Index Properties of Soils
CO-2:Determination of coefficient of permeability of different soils and determination of Effective Stress & Seepage Through Soils
CO-3:Understand the Stress Distribution in Soils and effects of compaction on soil properties
CO-4:Determination of coefficient of consolidation and computation of total settlement and time rate of settlement.
CO-5:Determination of Shear Strength of Soils and knowledge on Importance of shear strength

UNIT – I

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

Effective Stress & Seepage Through Soils: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – Flow nets: Characteristics and Uses.

UNIT –III

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular 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: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation **-** stress history of clay; e-p and e-log(p) curves – normally consolidated soil, over consolidated soil and under consolidated soil – preconsolidation 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: Importance of shear strength **–** Mohr's– Coulomb Failure theories – Types of laboratory 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

REFERENCES:

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 New Delhi.

6. Soil Mechanics and Foundation by by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

IRRIGATION AND HYDRAULIC STRUCTURES

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3109PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Fluid mechanics								

Course Objectives: This course provides the description of hydrological cycle and derive various formulas used in estimation of different basic components of surface and Ground water cycle, and its components. Further it will explain the water requirement for irrigation and connectivity of hydrology to the field requirement.

Course Outcomes: At the end of the course the student will be able to

- Understand the different concepts and terms used in engineering hydrology
- To identify and explain various formulae used in estimation of surface and Ground water
- hydrology components
- Demonstrate their knowledge to connect hydrology to the field requirement

UNIT - I

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

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, 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

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

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: 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.

TEXT BOOKS

1. Hydrology by K. Subramanya (Tata McGraw-Hill)

2. Irrigation Engineering and Hydraulic structures by SanthoshkumarGargKhanna publishers

3. G L Asawa, Irrigation Engineering, Wiley Eastern

REFERENCE BOOKS

1. Elements of Engineering Hydrology by V.P. Singh (Tata McGraw-Hill)

2. Engineering Hydrology by Jaya Rami Reddy (Laxmi Publications

3. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.

4. Elements of Water Resources Engineering by K.N.Duggal and J.P.Soni (New Age International)

ENVIRONMENTAL IMPACT ASSESSMENT

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3110PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Environmental Engineering								

Course Objectives: This subject will cover various aspects of Environment Impact Assessment methodologies, impact of development activities. Impact on surface water, Air and Biological Environment, Environment legislation Environment.

Course Outcomes:

- Identify the environmental attributes to be considered for the EIA study.
- Formulate objectives of the EIA studies.
- Identify the suitable methodology and prepare Rapid EIA.
- Identify and incorporate mitigation measures.

UNIT – I

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters. E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT- II

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT- III

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures.

UNIT – IV

Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocel, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report, Post Audit activities.

UNIT – V

The Environmental Protection Act, The water Act, The Air (Prevention & Control of pollution Act.), Motor Act, Wild life Act. Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:

1.Larry Canter – Environmental Impact Assessment, McGraw-Hill Publications

2. Environmental Impact Assessment, Barthwal, R. R. New Age International Publications

REFERENCES:

1. Environmental Pollution by R.K. Khitoliya S. Chand, 2014.

2. Glynn, J. and Gary, W. H. K. - Environmental Science and Engineering, Prentice Hall

Publishers

3. Suresh K. Dhaneja - Environmental Science and Engineering, S.K. Kataria& Sons

Publication. New Delhi.

REMOTE SENSING AND GIS

B.Tech. III Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3111PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Surveying								

Course Objectives: This course will make the student to understand about the principles of GIS, Remote Sensing, Spatial Systems, and its applications to Engineering Problems.

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

- Retrieve the information content of remotely sensed data
- Analyze the energy interactions in the atmosphere and earth surface features
- Interpret the images for preparation of thematic maps
- Apply problem specific remote sensing data for engineering applications
- Analyze spatial and attribute data for solving spatial problems
- Create GIS and cartographic outputs for presentation

UNIT – I

Introduction to Photogrammetry: Principles& types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

UNIT – II

Remote Sensing: Basic concept of remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process. Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, vegetation), Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

UNIT – III

Geographic Information Systems: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: Spatial Data Input- Attribute data Management –Data display- Data Exploration- Data Analysis. COORDINATE

SYSTEMS: Geographic Coordinate System: Approximation of the Earth, Datum; Map Projections: Types of Map Projections-Map projection parameters- Commonly used Map Projections - Projected coordinate Systems

UNIT – IV

Vector Data Model: Representation of simple features- Topology and its importance; coverage and its data structure, Shape file; Data models for composite features Object Based Vector Data Model; Classes and their Relationship; The geo base data model; Geometric representation of Spatial Feature and data structure, Topology rules

UNIT – V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

Data Input: Metadata, Conversion of Existing data, creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, Data Editing

TEXT BOOKS:

1. Remote Sensing and GIS Lillesand and Kiefer, John Willey 2008.

2. Remote Sensing and GIS B. Bhatta by Oxford Publishers 2015.

3. Introduction to Geographic Information System – Kang-Tsung Chang, McGraw-Hill 2015

REFERENCES:

1. Concepts & Techniques of GIS by C. P. Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.

2. Principals of Geo physical Information Systems – Peter ABurragh and Rachael A. Mc Donnell, Oxford Publishers 2004.

3. Basics of Remote sensing & GIS by S. Kumar, Laxmi Publications

CONCRETE TECHNOLOGY & HIGHWAY ENGINEERING LAB

B.Tech. III Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE3106PC	Core	L	T	P	1.5	CIE	SEE	Total
		0	0	3		30	70	100
Contact Class:45	Tutorial : Nil	Practical classes : Nil				Total Classes : 45		
Prerequisites: Building Materials, Concrete Technology, Highway Materials								

Course Objectives: The objectives of the course are to

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

Course Outcomes: Student shall be able to

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

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 (Course 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, DhanpatRai& Sons

2. Highway Material Testing manual, Khanna, Justo and Veeraraghavan, Nemchand Brothers

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 2

ADVANCED COMMUNICATION SKILLS LAB

B.Tech. III Year I Semester

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	TOTAL
EN3107HS	Humanities & Sciences	0	0	3	1	30	70	100
Contact Class : Nil	Tutorial Class:Nil	Practical Classes: 45				Total Classes:45		

INTRODUCTION:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalized context. The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

1. Gathering ideas and information to organize ideas relevantly and coherently.
2. Engaging in debates.
3. Participating in group discussions.
4. Facing interviews.
5. Writing project/research reports/technical reports.
6. Making oral presentations.
7. Writing formal letters.
8. Transferring information from non-verbal to verbal texts and vice-versa.
9. Taking part in social and professional communication.

OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

1. To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
2. Further, they would be required to communicate their ideas relevantly and coherently in writing.
3. To prepare all the students for their placements.

SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced English

Communication Skills (AECS) Lab:

UNIT – I

Activities on Fundamentals of Inter-personal Communication and Building Vocabulary -Starting a conversation – responding appropriately and relevantly – using the 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.

UNIT – II

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

UNIT – 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.

UNIT – IV

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

UNIT – 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.

MINIMUM REQUIREMENT:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

1. Spacious room with appropriate acoustics.
2. Round Tables with movable chairs
3. Audio-visual aids
4. LCD Projector
5. Public Address system
6. P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
7. T. V, a digital stereo & Camcorder
8. Headphones of High quality

SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used.

1. Oxford Advanced Learner's Compass, 7th Edition
2. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
3. Lingua TOEFL CBT Insider, by Dream tech
4. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS:

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

REFERENCES:

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.
6. Handbook for Technical Communication by David A. McMurrey& Joanne Buckley. 2012. Cengage Learning.
7. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. English for Technical Communication for Engineering Students, AyshaVishwamohan, Tata Mc Graw-Hill 2009.

GEOTECHNICAL ENGINEERING LAB

B.Tech. III Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
CE3108PC	Core	L	T	P	1.5	CIE	SEE	Total
		0	0	3		30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes : 45				Total Classes : 45		
Prerequisites: Soil Mechanics (Co-requisite)								

Course Objectives: To obtain index and engineering properties of locally available soils, and to understand the behaviour of these soil under various loads.

Course Outcomes: At the end of the course, the student will be able to Classify and evaluate the behaviour 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

REFERENCE:

1. Measurement of Engineering Properties of Soils by. E. Saibaba Reddy & K. Rama Sastri, New Age International.

INTELLECTUAL PROPERTY RIGHTS

B.Tech. III Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
MC3001	Core	L	T	P	0	CIE	SEE	Total
		0	0	2		30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes : 30				Total Classes : 30		

UNIT – I

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

UNIT – II

Trade Marks: 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: 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.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets: Trade secrete law, determination of trade secrete 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 property: 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.

TEXT & REFERENCE BOOKS:

1. Intellectual property right, Deborah. E. Bouchoux, Cengagelearning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddhaganguli, Tata McGraw Hill Publishing companyltd.

CYBER SECURITY

B.Tech. III Year I Sem.

Course Code	Category	Hours / week			Credits	Maximum Marks		
MC3002	Core	L	T	P	0	CIE	SEE	Total
		0	0	2		30	70	100
Contact Class: Nil	Tutorial : Nil	Practical classes : 30				Total Classes : 30		
Prerequisites: There is no prerequisites to take this course								

Course objectives:

- Tofamiliarizevarioustypesofcyber-attacksandcyber-crimes
- Togivean overviewofthecyberlaws
- Tostudythedefensivetechniquesagainstthesea attacks

CourseOutcomes : Thestudents will be able to understand cyber-attacks, types of cybercrimes, cyber law and also how to protect them self and ultimately the entire Internet community from such attacks

UNIT-I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability,threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIATriad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks,hardwareattacks,Spectrumofattacks,Taxonomyofvariousattacks,IPspoofing,Methodsofdefense,Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism,Cyber Espionage,etc.,ComprehensiveCyberSecurityPolicy.

UNIT-II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles ofInternationalLaw.TheINDIAN Cyberspace,NationalCyberSecurity Policy.
Introduction,HistoricalbackgroundofCyberforensics,DigitalForensicsScience,TheNeed forComputer Forensics,Cyber Forensics and Digital evidence, Forensics Analysis ofEmail,DigitalForensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special TechniquesforForensicsAuditing.

UNIT-III

Cybercrime:MobileandWirelessDevices: Introduction,ProliferationofMobileandWirelessDevices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, SecurityChallenges Posed by Mobile Devices, Registry Settings for Mobile Devices,

Authentication serviceSecurity, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations,OrganizationalMeasuresforHandlingMobile,OrganizationalSecurityPoliciesandMeasuresinMobileComputingEra,Laptops.

UNIT-IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, webthreats for organizations, security and privacy implications, social media marketing: security risks andperilsfororganizations,socialcomputingand theassociated challengesfor organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethicaldimensionofcybercrimesthepsychology,mindsetandskillsofhackersandother cybercriminals.

UNIT-V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Datalinking and profiling, privacy policies and their specifications, privacy policy languages, privacy indifferentdomains-medical,financial,etc.

Cybercrime:ExamplesandMini-Cases

Examples: OfficialWebsiteofMaharashtraGovernmentHacked,IndianBanksLoseMillionsofRupees,ParliamentAttack,PuneCityPoliceBustNigerianRacket,emailspoofinginstances.

Mini-Cases: TheIndianCaseofonlineGambling,AnIndianCaseofIntellectualPropertyCrime,FinancialFraudsin CyberDomain.

TEXTBOOKS:

1. NinaGodboleandSunitBelpure, CyberSecurity UnderstandingCyberCrimes,ComputerForensicsand LegalPerspectives,Wiley
2. B.B.Gupta,D.P.Agrawal,Haoxiang Wang,ComputerandCyberSecurity:Principles,Algorithm,Applications,andPerspectives,CRC Press,ISBN9780815371335,2018.

REFERENCES:

1. CyberSecurityEssentials, JamesGraham, RichardHowardandRyanOtson, CRCPress.
2. IntroductiontoCyberSecurity,Chwan-Hwa(john)Wu,J.DavidIrwin,CRC PressT&FGroup.

STURCTURAL ANALYSIS- II

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3201PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Engineering mechanics, Structural Analysis- I								

Course Objectives: The objectives of the course are to

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

Course Outcomes: After the completion of the course student should be able to

- **Analyze** the two hinged arches.
- **Solve** statically indeterminate beams and portal frames using classical methods
- **Sketch** the shear force and bending moment diagrams for indeterminate structures.
- **Formulate** the stiffness matrix and analyze the beams by matrix methods.

UNIT – I

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 Storey Portal Frames including side Sway - Analysis of inclined frames - Shear force and Bending moment diagrams, Elastic curve.

UNIT – II

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: 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: 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: 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. Structural Analysis Vol I & II by G.S. Pandit S.P. Gupta Tata McGraw Hill Education Pvt. Ltd.

3. Indeterminate Structural Analysis by K.U. Muthu et al., I.K. International Publishing House Pvt. Ltd

REFERENCES:

1. Structural analysis T. S Thandavamoorthy, 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.

ENVIRONMENTAL ENGINEERING

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CE3202PC	Core	L	T	P	3	CIE	SEE	TOTAL
		3	0	0		30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: This subject provides the knowledge of water sources, water treatment, design of distribution system waste water treatment, and safe disposal methods. The topics of characteristics of waste water, sludge digestion are also included.

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

- Assess characteristics of water and wastewater and their impacts
- Estimate quantities of water and waste water and plan conveyance components
- Design components of water and waste water treatment plants
- Be conversant with issues of air pollution and control

UNIT – I

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

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–Design of distribution systems–pipe appurtenances.

UNIT - III

Characteristics of sewage –waste water collection–Estimation of waste water and storm water – 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 – plumbing requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing **–** ultimate disposal of sewage – sewage farming –self-purification of rivers.

UNIT – IV

Waste water treatment plant – Flow diagram - primary treatment Design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – Biological treatment – trickling filters – ASP– 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.

UNIT – V

Air pollution– classification of air pollution– Effects air pollution–Global effects–Meteorological parameters affecting air pollution–Atmospheric stability–Plume behavior –Control of particulates – Gravity settlers, cyclone filters, ESPs–Control of gaseous pollutants–automobile pollution and control.

TEXT BOOKS:

1. Environmental Engineering by H. S Peavy, D. R. Rowe, G. Tchobanoglous, McGraw Hill Education (India) Pvt Ltd, 2014

2. Environmental Engineering by D. P. Sincero and G.A Sincero, Pearson 2015.

3. Environmental Engineering, I and II by BC Punmia, Std. Publications.

4. Environmental Engineering, I and II by SK Garg, Khanna Publications.

5. Environmental Pollution and Control Engineering CS Rao,Wiley Publications

REFERENCES:

1. Water and Waste Water Technology by Steel, Wiley

2. Waste water 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 Hammar and Mark J. HammarJr.Wiley, 2007.

5. Introduction to Environmental Engineering and Science by Gilbert Masters, PrenticeHall, New Jersey.

6. Introduction to Environmental Engineering by P. AarneVesilind, Susan M. Morgan,Thompson /Brooks/Cole; Second Edition 2008.

FOUNDATION ENGINEERING

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3203PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Geotechnical Engineering								

Course Objectives:

- To Plan Soil exploration programme for civil Engineering Projects
- To check the stability of slopes
- To determine the lateral earth pressures and design retaining walls
- To determine the Bearing capacity of Soil
- To design pile group foundation

Course Outcomes: At the end of the course the student will able to

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

UNIT – I

SOIL EXPLORATION: Need – methods of soil exploration – boring and sampling methods – penetration tests – plate load test– planning of soil exploration programme, Bore logs and preparation of soil investigation report.

UNIT – II

SLOPE STABILITY: 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: 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 - 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: 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.

REFERENCES:

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 (1998).

5. Geotechnical Engineering by S. K.Gulhati& Manoj Datta – Tata Mc.Graw Hill Publishing

company New Delhi. 2005.

6. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.

STRUCTURAL ENGINEERING –II (STEEL)

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3204PC	Core	3	1	0	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes:60		
Prerequisites:RCC								

Course Objectives: The objectives of the course is to

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

Course Outcomes: After the completion of the course student should be able to

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

UNIT – I

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

Note: Design of structural members includes detailed sketches.

TEXT BOOKS:

1. Design of steel structures by S.K.Duggal,TataMacgrawhill 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-grawhill

publishers,1972

3. Design of steel structures by L.S.JayaGopal,D.Tensing,Vikas Publishing House.

PRESTRESSED CONCRETE

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3207PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Reinforced Concrete Design								

Course Objectives: The objectives of the course are to

- Understand the principles & necessity of prestressed concrete structures.
- Know different techniques of prestressing.
- Get the knowledge on various losses of prestress.
- Understand Analysis and design of prestressed concrete members.

Course Outcomes: After the completion of the course student should be able to

- Acquire the knowledge of evolution of process of prestressing.
- Acquire the knowledge of various prestressing techniques.
- Develop skills in analysis design of prestressed structural elements as per the IS codal Provisions

UNIT I:

Introduction: Historic development- General principles of prestressing, 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: Pretensioning and Posttensioning methods and systems of prestressing like Hoyer system, MagnelBlaton 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: 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: 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: 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.

REFERENCES:

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.

3. Prestressed concrete by S. RamamruthamDhanpat Rai & Sons, Delhi.

4. Prestressed Concrete by N. Rajagopalan Narosa Publishing House

GROUND IMPROVEMENT TECHNIQUES

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3208PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Geo-Technical Engineering, Foundation Engineering								

Course Objectives:

- To know the need of ground improvement
- To acquire the knowledge on the various ground improvement techniques available and their applications for different types of soils
- To understand suitable ground improvement technique for given soil conditions.

Course Outcomes: at the end of the course the student able to

- Know the necessity of ground improvement
- Understand the various ground improvement techniques available
- Select & design suitable ground improvement technique for existing soil conditions in the field

UNIT - I:

Introduction to Engineering Ground Modification: 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: Shallow Compaction Techniques- Deep Compaction Techniques- Blasting Vibro compaction- Dynamic Tamping and Compaction piles.

UNIT - III:

Hydraulic Modification: 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 – Modification by admixtures, Modification Grouting, Introduction to Thermal Modification including freezing.

UNIT - V:

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, and 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 Hill publications

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 – Butterworths, 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, Indian edition, 2012

GROUND WATER HYDROLOGY

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3209PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Hydraulics & Fluid Mechanics								

Course objectives: The objectives of the course are:

- **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: On successful completion of this course, students should be 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

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

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

Unsteady flow towards well-Non-Equilibrium equations, Thesis solution, Jocob and Chow's simplifications, Leak aquifers.

UNIT- IV

Surface and sub-surface Investigation

Surface methods of exploration-Electrical resistivity method and Seismic refraction methods. Subsurface methods geophysical logging and resistivity logging. Concept of artificial recharge of groundwater, recharge methods, Applications of GIS and RS in artificial recharge of ground water along with case studies.

UNIT- V

Saline water intrusion in aquifer

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.

BASICS OF CIVIL ENGINEERING

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3209OE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: There is no prerequisites to take this course								

Course objectives: The objectives of the course are:

- To explain the concepts of Civil Engineering.
- To Understand the Building Materials for construction
- To understand the concept of Transportation
- To explain the Soil Characteristics for best foundation
- To know the Drinking water Standards & Water Treatment Units.

Course Outcomes: On successful completion of this course, students should be able to:

- Identify different types of building materials for construction.
- Discuss types of Traffic Flow Characteristics.
- To know the soil classification and its properties.
- Distinguish and understand Drinking water and Waste water properties.

UNIT-I, Building Materials for Construction

Bricks & Cement: qualities of good bricks, types of brick, ingredients of cement, types of cement, Grade of cement.

Concrete & Steel: Properties of cement concrete, types of concrete based on usage & properties and uses of various types of steel, Admixtures.

Building components: lintels, walls, stair cases, types of floors, types of roofs, doors, windows-material-types, Finishers-Plastering, Painting, Tiles.

UNIT- II Transportation Engineering

Highway: History and Importance of Highways, Classification of roads, highway cross section, types of Pavement.

Traffic: Road safety-Traffic signals &its types. Road intersections & its types.

Railway: Permanent way, Components parts its functions.

Airway: Typical Airport layout, Factors for airport site selection.

UNIT – III Geotechnical Engineering

Soil formation and its three phase diagram, I.S. Classification of soils. Permeability & its Factors affecting, capillary rise. Compaction – factors affecting compaction.

Geology- Different types & its properties of Rocks & Minerals.

UNIT - IV Water Resources & Irrigation Engineering

Hydrologic cycle, Forms of precipitation, measurement of precipitation by Symons rain gauge.

Abstractions from precipitation: Infiltration, Evaporation & Runoff & their Factors affecting.

Irrigation: Water requirement of crops, canal & its losses, Types of lining-Advantages and disadvantages.

Types of dams, Factors affecting selection of a dam site. Tunneling- Purposes of tunneling.

UNIT – V Environmental Engineering

Drinking Water: types of water demand – factors affecting water quality and testing – drinking water standards. Layout and general outline of water treatment units.

Waste water: Waste water treatment plant Flow diagram. Waste water collection, manholes & house drainage.

Air & Sound pollution – Effects & Controlling methods.

TEXT BOOKS

1. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) ltd., New Delhi.
2. Transportation Engineering by Khanna & Justo
3. Geotechnical Engineering by Arora
4. Water Resources & Irrigation Engineering by SK Garg
5. Environmental Engineering by Dr.B.C.Punmia

BUILDING MATERIALS AND CONSTRUCTION PLANING

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CE321OE	Core	L	T	P	3	CIE	SEE	TOTAL
		3	0	0		30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: The objectives of the course is to

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

Course Outcomes: After the completion of the course student should be able to

- Define the Basic terminology that is used in the industry
- Categorize different building materials, properties and their uses

Unit- I

Cement: Introduction, ingredients of cement, types of cement, cement mortar uses.

Concrete: Properties of cement concrete, materials, standard concrete mix proportions, curing of concrete, methods-effects of improper curing.

Unit -II

Bricks & Bricks masonry: qualities of good bricks, types of bricks, brick masonry and types of brick masonry

Timber: Structure of a tree, defects in timber, seasoning of timber, qualities of good timber, important Indian timber trees.

Unit -III

Construction Materials: Stone-type of building stones, glass-types based on usage, plastics-advantages and disadvantages, uses, ceramics-types used in building industry.

Structural steel: properties and uses of various types of steel, types. Girders-types & uses

Unit- IV

Building components: lintels, walls, stair cases, types of floors, types of roofs, doors, windows-material-types.

Fire protection: hazards, classification of fire-resistant materials and constructions.

Unit- V

Building planning: principles of building planning, classification of buildings and building bylaws. Building Services: Plumbing-water distribution, sanitary-lines and fittings, ventilations: functional requirements, system of ventilations.

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.

3. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi

Publications (P) ltd., New Delhi.

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.

ENVIRONMENTAL ENGINEERING LAB

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3205PC	Core	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes:45		
Prerequisites: Environmental Engineering								

Course Objectives: the objectives of the course are to

- **Perform** the experiments to determine water and waste water quality
- **Understand** the water & waste water sampling, their quality standards
- **Estimate** quality of water, waste water, Industrial water

Course outcomes: After the completion of the course student should be able to

- Understand about the equipment used to conduct the test procedures
- Perform the experiments in the lab
- Examine and Estimate water, waste water, air and soil Quality
- Compare the water, air quality standards with prescribed standards set by the local
- governments
- Develop a report on the quality aspect of the environment

Practical Work: 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/REFERENCE BOOKS:

1. Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, New Jersey.

2. Introduction to Environmental Engineering by P. AarneVesilind, Susan M. Morgan, Thompson / Brooks/ Cole; Second Edition 2008.

3. Peavy, H.s, Rowe, D.R, Tchobanoglous, G. Environmental Engineering, Mc-Graw – Hill International Editions, New York 1985.

4. MetCalf and Eddy. Wastewater Engineering, Treatment, Disposal and Reuse, Tata McGraw- Hill, New Delhi.

5. Manual on Water Supply and Treatment. Ministry of Urban Development, New Delhi.

6. Plumbing Engineering. Theory, Design and Practice, S.M. Patil, 1999

7. Integrated Solid Waste Management, Tchobanoglous, Theissen& Vigil. McGraw Hill Publication

COMPUTER AIDED DESIGN LAB

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE3206PC	Core	0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes:45		
Prerequisites: Computer Aided Civil Engineering Drawing or AUTO CAD Principles –Excel-Structural Engineering -1 & 2								

Course Objectives: The objectives of the course are to

- Learn the usage of any fundamental software for design
- Create geometries using pre-processor
- Analyse and Interpret the results using post processor
- Design the structural elements

Course Outcomes: After the completion of the course student should be able to

- Model the geometry of real-world structure Represent the physical model of structural
- element/structure
- Perform analysis
- Interpret from the Post processing results
- 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. Detailing of Steel built up compression member

Note: Drafting of all the exercises is to be carried out using commercially available designing Software.

ARTIFICIALINTELLIGENCE

B.Tech. III Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
MC3003	Core	0	0	2	0	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 30				Total Classes:30		

CourseObjectives: To train the students to understand different types of AL agents variousAIsearchalgorithms, fundamentals of knowledge representation, building of simple to knowledge-based systemsand apply knowledge representation, reasoning.Study of Markov Models enable the student readyto step intoapplied AI.

Course Outcomes:

- Able to use search algorithms in AI
- Able to apply learning and reasoning to AI systems

UNIT-I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving AgentsBasicSearchStrategiesProblemSpaces,UninformedSearch(Breadth-First,Depth-FirstSearch,Depth-firstwithIterativeDeepening),HeuristicSearch(HillClimbing,GenericBest-First,A*),ConstraintSatisfaction(Backtracking,Local Search)

UNIT-II

AdvancedSearch:ConstructingSearchTrees,StochasticSearch,A*SearchImplementation,Minimax Search,Alpha-BetaPruning

BasicKnowledgeRepresentationandReasoning:PropositionalLogic,First-OrderLogic,ForwardChainingand Backward Chaining, Introductionto ProbabilisticReasoning,BayesTheorem

UNIT-III

AdvancedKnowledgeRepresentationandReasoning:KnowledgeRepresentationIssues,Non-monotonic Reasoning,Other Knowledge Representation Schemes

ReasoningUnderUncertainty:Basicprobability,ActingUnderUncertainty,Bayes'Rule,RepresentingKnowledge inan Uncertain Domain,Bayesian Networks

UNIT-IV

Learning:WhatIsLearning?RoteLearning,Learningby TakingAdvice,LearninginProblemSolving,LearningfromExamples,Winston'sLearning Program,Decision Trees.

UNIT-V

ExpertSystems:RepresentingandUsingDomainKnowledge,Shell,Explanation,KnowledgeAcquisition.

TEXTBOOK:

1.Russell,S.andNorvig,P,ArtificialIntelligence:AModernApproach,ThirdEdition,Prentice-Hall,2010.

REFERENCEBOOKS:

1. ArtificialIntelligence,ElaineRich,KevinKnight,ShivasankarB.Nair,TheMcGrawHillpublications,ThirdEdition,2009.
2. GeorgeF.Luger,ArtificialIntelligence:StructuresandStrategiesforComplexProblemSolving,PearsonEducation,6th ed.,2009.

ENGINEERINGECONOMICS AND ACCOUNTANCY

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
SM4101MS	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		

Course Objective:

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

Course Outcome:

- 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 Engineering Economics - Basic Principles and Methodology of Engineering 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:

Macroeconomic Concepts: 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: 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: 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: 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. Henry Malcom Steinar-Engineering Economics, Principles, McGraw Hill Pub.
2. D.D. Chaturvedi, S.L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
3. Jain and Narang" Accounting, Kalyani Publishers.
4. Arora, M.N." Cost Accounting, Vikas Publication.
5. S. N. Maheshwari, Financial Management, Vikas Publishing House.
6. Zahid A Khan, Arshad N Siddique, et.al, Principles of Engineering Economics with Applications, 2e, Cambridge University Press.

ESTIMATION QUANTITY SURVEYING AND VALUATION

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4101PC	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Concrete Technology, RC Design, Design of Steel Structure								

Course Objectives: The subject provide process of estimations required for various work in

Construction. 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: On completion of the course, the students will be able to:

- Understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure.
- Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.
- Understand how competitive bidding works and how to submit a competitive bid proposal.
- An idea of how to optimize construction projects based on costs
- An idea how construction projects are administered with respect to contract structures and issues.
- An ability to put forward ideas and understandings to others with effective communication processes.

UNIT – I

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.

UNIT – II

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

UNIT – III

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT- IV

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

UNIT- V

Construction project planning- 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

NOTE: NUMBER OF EXERCISES PROPOSED:

1. Three in flat Roof & one in Sloped Roof

2. Exercises on Data – three Nos.

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,2016
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

THEORY OF ELASTICITY

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4107PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Strength of Materials I & II								

Course Objectives:

- To Introduce fundamental elasticity model of deformation in rectangular and polar coordinate.
- To give foundation for 2D and 3D study in solid mechanics problems.
- To Introduce to torsion and warping of prismatic structure

Course Outcomes: At the end of the course the student will able to

- The more fundamental elasticity model of deformation should replace material analysis.
- Able to understand theory, formulate and to present solutions to a wide class of problems in 2D and 3D
- Acquire the foundation for advanced study in areas of solid mechanics

UNIT - I

Introduction: 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 - solution by polynomials - Saint-Venants

principle - determination of displacements - bending of simple beams – Simple Supported and

Cantilever Beam.

UNIT - III

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 - 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 - 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.

BRIDGE ENGINEERING

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4108PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Structural Engineering, Soil Mechanics & Foundation Engineering and WaterResources Engineering								

Course Objectives: To study different types of bridges, forces that act on bridges, Design of bridge

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

- Design the T beam bridge and substructures
- Design the Bridge bearings
- Design the steel bridge

UNIT- I

Introduction: Definition, components of bridge, classification of bridges, selection of site, economical span, aesthetics consideration, necessary investigations and essential design data. Standard Specifications for Roads and Railways Bridges: General, Indian Road Congress Bridge Code, width of carriage way, clearance, various loads to be considered for the design of roads and railway bridges, detailed explanation of IRC standard live loads.

UNIT- II

Design Consideration for R. C. C. Bridges: Various types of R.C.C. bridges (brief description of each type) , design of R.C.C. culvert and T-beam bridges.

UNIT- III

Design Consideration for Steel Bridges: Various types of steel bridges (brief description of each), design of truss and plate girder bridges.

UNIT- IV

Hydraulic & Structural Design: Piers, abutments, wing-wall and approaches. Brief Description: Bearings, joints, articulation and other details.

UNIT - V

Bridge Foundation: Various types, necessary investigations and design criteria of well foundation.

TEXT BOOKS:

1. Essentials of Bridge Engineering, D.J.Victor, Oxford & IBH Pub, N. Delhi.

2. Design of Bridges, N. Krishna Raju, Oxford & IBH, N. Delhi.

3. Bridge Deck Analysis, R. P. Pama& A. R. Cusens, John Wiley & Sons.

4. Design of Bridge Structures, T. R. Jagadish &M.A.Jairam, Prentice Hall of India, N. Delhi.

CONSTRUCTION TECHNOLOGY AND PROJECT MANAGEMENT

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4109PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Building Materials & Building Construction								

Course Objectives:

- This subject deals with overall planning, coordination and control of projects.
- This course gives the students scientific principles involved in construction, and
- Understanding of the behavior of construction materials and fundamentals of structural mechanics.

Course Outcomes: At the end of the course, the student should be able to:

- Understand the roles and responsibilities of a project manager
- Prepare schedule of activities in a construction project
- Identify the equipment used in construction
- Understand safety practices in construction industry
- Prepare tender and contract document for a construction project

UNIT - I

Management -Fundamentals of construction project management: Introduction, Project Initiation and Planning.

UNIT - II

Planning of construction facilities - Earthwork construction - Equipment for construction,

Construction Finances – decision making, Cement concrete construction- Construction of

Piles - Construction of Cofferdams - Construction of Tunnels.

UNIT - III

Development of project activity networks, Precedence Diagram Method, Critical Path

Method (CPM), Program Evaluation and Review Technique (PERT), Line Balance Methods

in scheduling, Time Value of Money, Investment Analysis, Cost-Benefit Analysis.

UNIT - IV

Introduction to Building Information Modelling (BIM), Lean construction, and Integrated

Project Delivery in construction, crashing of project, Cost Optimization, Invoicing,

Preparation of RA bill, Safety in construction, Estimation.

UNIT - V

Contracts: Contracts in construction, fundamentals of delay analysis and claims; Advances in construction management, tender and tender document - Deposits by the contractor -

Arbitration. Negotiation - M. Book - Muster roll –stores.

REFERENCES:

1. Bennett, F. Lawrence., The management of construction: a project life cycle approach. Rutledge, 2003.

2. Oberlender, Garold D., Project management for engineering and construction. Vol. 2.

New York: McGraw-Hill, 1993.

3. Peurifoy, Robert Leroy, Cliff J. Schexnayder and Shapira A. Construction planning,

equipment, and methods. No. 696 pp. McGraw-Hill, 2010.

4. Chitkara, K. K. Construction Project Management. Tata McGraw-Hill Education,

2011

AIRWAYS, RAILWAYS AND WATERWAYS

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4110PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: the objectives of the course are to

- Deal with the characteristics of aircrafts related to airport design; runway and taxiway design, length, and grading.
- Impart basic knowledge of railway track components and their functions
- Introduce geometric design of Railway Track
- Explain the classes of harbors, features, planning and design of port facilities.

Course Outcomes: At the end of this course, the students will be able:

- To describe the different components of airport and aircrafts.
- To analyze the design of runways and taxiways.
- To Apply the knowledge of railway track components, materials and fastenings

- To Know the Carry out geometric design of railway track
- To know the plan of harbors and ports projects including the infrastructure required for new ports and harbors.

UNIT – I Airport Characteristics and Planning: Introduction to Air Transportation - Aircraft Characteristics –Data required for site selection-Factors Affecting Selection of site for Airport – Surveys for site selection-Drawings to be prepared-Estimation of future air traffic Needs.

UNIT – II Run Way and Taxi way Design: Run way orientation-Basic runway length-Correction for Elevation, Temperature and Gradient-Airport Classification-Run way Geometric Design- Factors controlling taxiway layout, Geometric design standards and Exit Taxiways

UNIT – III Introduction to Railway Engineering: Permanent way Components - Cross section of Permanent way- Functions of various components like Rails, sleepers and ballast- Requirements of an ideal rail-Rail Fastenings-Creep of Rails-Theories related to creep-Adzing of sleepers- Sleeper Density

UNIT – IV Geometric design of Railway Track: Necessity of geometric design of Railway track-Gradient and Grade Compensation: Ruling gradient, Momentum gradient, Gradient I station yards, Grade compensation on curves Super Elevation or Can: Objects of providing super elevation and negative super elevation-Cant Deficiency-Types of Curves and their necessity for providing transition curve.

UNIT – V 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, piers, wharves, dolphins, etc., Navigational aids: types, requirements, light house, beacon lights, 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. VenkataramaiahC(2016), "Transportation Engineering Vol II – Railways, Airports, Docks, Harbors, Bridges and Tunnels", Universities Press (India) Private Limited, Hyderabad

2. J S Mundrey, Railway Track Engineering (5th Edition) McGraw Hill Education 2017 R18 B.Tech. Civil Engg. Syllabus JNTU HYDERABAD 117

REFERENCE BOOKS:

1. S.K.Khanna-M.G.Arora-S.S Jain (2012) Airport Planning and Design, Nem Chand &BrosRoorkee.

2. R. Srinivasan (2016), Harbour, Dock and Tunnel Engineering 28th Edition, Charotar Publishing House Pvt. Ltd.

3. Saxena SC and Arora S C (2010) A Text Book of Railway Engineering Paperback – 2010, DhanpatRai Publications (Reprint 2015)

4. Robert Horonjeff, Francis X. McKelvey, Willian J Sproule, Seth B. Young (2010), Planning & Design of Airports, McGraw-Hill Professional.

5. Transportaion Engineering by R. Srinivasa Kumar, University Press India

ADVANCED STRUCTURAL DESIGN

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4111PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Structural Engineering I (RCC) & II (STEEL) and Structural analysis								

Course Objective: To make the student more conversant with the design principles of critical structures using limit state approach

Course Outcomes: At the end of the course the student will able to:

- Enhance the capabilities to design the special structural elements as per Indian standard code of practice.
- Analyze, design, draw and detailing of critical structural components with a level of accuracy

UNIT – I

Design and Detailing of cantilever type of Retaining walls – Stability Check. Principles& Design of Counter fort Retaining walls.

UNIT – II

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.

UNIT – IV

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 Steel Gantry Girders.

TEXT BOOKS:

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. N. Krishna Raju, Design of Bridges, Oxford & IBH Publishing Company Pvt. Ltd, New Delhi. Fourth edition 200

ENVIRONMENTAL IMPACT ASSESSMENT

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4112OE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: The objectives of the course are to

- Define and Classify Environmental Impacts and the terminology
- Understands the environmental Impact assessment procedure
- Explain the EIA methodology
- List and describe environmental audits

Course Outcomes: At the end of the course the student will be able to

- Identify the environmental attributes to be considered for the EIA study
- Formulate objectives of the EIA studies

- Identify the methodology to prepare rapid EIA
- Prepare EIA reports and environmental management plans

UNIT- I

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 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: 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: 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: 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.

INDUSTRIAL WASTE WATER TREATMENT

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
CE4113OE	Core	L	T	P	3	CIE	SEE	TOTAL
		3	0	0		30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: Environmental Engineering								

Course Objectives:

- To present the information of wastewater generation from various industries
- To inform about the conventional treatment processes for specific industrial
- wastewaters
- To explain about the new developments in industrial wastewater treatment

- technologies

Course Outcomes: At the end of the course, the student should be able to:

- Identify the characteristics of industrial wastewaters
- Describe pollution effects of disposal of industrial effluent
- Identify and design treatment options for industrial wastewater
- Formulate environmental management plan

UNIT - I

Introduction: Wastewater Characteristics, Standards of Disposal, Treatment Objective and Strategies, Layouts of Primary, Secondary and Advanced Treatment Units.

UNIT - II

Design of Preliminary and Primary Treatment Operations: Screens, Grit Chambers, Skimming Tank, Primary and Secondary Sedimentation Tanks.

UNIT - III

Biological Treatment Processes: Types, Kinetics of Plug Flow and Completely Mixed Systems. Attached Growth Processes: Trickling Filters (Standard Rate, High Rate), Biofilters, Practices, Features and Design, Operational Difficulties and Remedial Measures, Rotating Biological Contactors. Suspended Growth Processes:

UNIT - IV

Activated Sludge Process, Modifications and Design Equations, Process Design Criteria, Oxygen and Nutrient Requirements - Classification and Design of Oxidation Ponds, Lagoons.

UNIT - V

Sludge Treatment and Disposal: Sludge Thickening, Aerobic and Anaerobic Sludge Digestion Processes, Design of Digester Tank, Sludge Dewatering, Ultimate Disposal, Sludge Drying Beds, Other Methods of Sludge Treatment.

TEXT BOOKS:

1. Wastewater Treatment – Concepts and Design Approach, by G L Karia and R A Christian, Prentice Hall of India, 2006

2. Environmental Engineering by Gerard Kiely, McGraw Hill Education (India) Pvt Ltd, 2013

3. Environmental Engineering – A Design Approach by A. P. Sincero and G ASincero, Prentice Hall of India, 2014

REFERENCES:

1. Wastewater Engineering - Collection, Treatment, Disposal and Reuse by Metcalf and Eddy, , McGraw Hill Education (India) Pvt Ltd, 2013

2. Industrial Waste Treatment by Nelson Leonard Nemerow, Butterworth-Heinemann, 2007.

3. Biological Process Designs for Wastewater Treatment by Benefield L.D. and Randall C.D. Prentice Hall Pub. Co., 1980.

PROFESSIONAL PRACTICE LAW & ETHICS

B.Tech. IV Year I Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
SM4102MS	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites:There is no prerequisites to take this course								

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:

- To familiarize the students to what constitutes professional practice, introduction of various stakeholders and their respective roles; understanding the fundamental ethics governing the profession
- To give a good insight into contracts and contracts management in civil engineering, dispute resolution mechanisms; laws governing engagement of labour
- To give an understanding of Intellectual Property Rights, Patents.
- 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 good ideas of the legal and practical aspects of their profession

UNIT-I

Professional Practice – Respective roles of various stakeholders: Government (constituting regulatory bodies and standardization organizations, prescribing norms to ensure safety of the citizens); Standardization Bodies (ex. BIS, IRC)(formulating standards of practice); professional bodies (ex. Institution of Engineers (India), Indian Roads Congress, IIA/ COA, ECI, Local Bodies/ Planning Authorities) (certifying professionals and offering platforms for interaction); Clients/ owners (role governed by contracts); Developers (role governed by regulations such as RERA); Consultants (role governed by bodies such as CEAI); Contractors (role governed by contracts and regulatory Acts and Standards); Manufacturers/ Vendors/ Service agencies (role governed by contracts and regulatory Acts and Standards).

Professional Ethics – Definition of Ethics, Professional Ethics, Business Ethics, Corporate Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website of Institution of Engineers (India); Profession, Professionalism, Professional Responsibility, Professional Ethics; Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the-art; Vigil Mechanism, Whistleblowing, protected disclosures.

UNIT-II:

General Principles of Contracts Management: Indian Contract Act, 1972 and amendments covering General principles of contracting; Contract Formation & Law; Privacy of contract; Various types of contract and their features; Valid & Voidable Contracts; Prime and sub-contracts; Joint Ventures & Consortium; Complex contract terminology; Tenders, Request For Proposals, Bids & Proposals; Bid Evaluation; Contract Conditions & Specifications; Critical "Red Flag" conditions; Contract award & Notice To Proceed; Variations & Changes in Contracts; Differing site conditions; Cost escalation; Delays, Suspensions & Terminations; Time extensions & Force Majeure; Delay Analysis; Liquidated damages & Penalties; Insurance & Taxation; Performance and Excusable Non-performance; Contract documentation; Contract Notices; Wrong practices in contracting (Bid shopping, Bid fixing, Cartels); Reverse auction; Case Studies; Build-Own-Operate & variations; PublicPrivate Partnerships; International Commercial Terms.

UNIT-III:

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system: 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; Award including Form and content, Grounds for setting aside an award, Enforcement, Appeal and Revision; Enforcement of foreign awards – New York and Geneva Convention Awards; 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: 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: 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 including Concept and historical perspective of patents law in India, Patentable inventions with special reference to biotechnology products, Patent protection for computer programs, Process of obtaining patent application, examination, opposition and sealing of patents, Patent cooperation treaty and grounds for opposition, Rights and obligations of patentee, Duration of patents – law and policy considerations, Infringement and related remedie.

Text/Reference Books:

1. B.S. Patil, Legal Aspects of Building and Engineering Contracts, 1974.
2. The National Building Code, BIS, 2017
3. RERA Act, 2017
4. Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset.
5. Neelima Chandiramani (2000), The Law of Contract: An Outline, 2nd Edn. Avinash

Publications Mumbai

6. Avtarsingh (2002), Law of Contract, Eastern Book Co.
7. Dutt (1994), Indian Contract Act, Eastern Law House
8. Anson W.R. (1979), Law of Contract, Oxford University Press
9. Kwatra G.K. (2005), The Arbitration & Conciliation of Law in India with case law on UNCITRAL Model Law on Arbitration, Indian Council of Arbitration

10. Wadhera (2004), Intellectual Property Rights, Universal Law Publishing Co.

11. T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House

12. Bare text (2005), Right to Information Act

REHABILITATION AND RETROFITTING OF STRUCTURES

B.Tech. IV Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4202PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites: There is no prerequisites to take this course								

Course Objectives: To understand the various concepts of rehabilitation and retrofitting of structures

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

- Develop various maintenance and repair strategies.

- Evaluate the existing buildings through field investigations.
- Understand and use the different techniques for structural retrofitting

UNIT – I

Introduction – Deterioration of Structures – Distress in Structures – Causes andPrevention. Mechanism of Damage – Types of Damage

UNIT – II

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage ofStructures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment –NDT.

UNIT – IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures –Repairs in Under Water Structures – Guniting – Shot Create – Underpinning.Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – V

Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

1. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta,Standard Publications.

2. Concrete Technology by A.R. Santa kumar, Oxford University press

REFERENCES:

1.Defects and Deterioration in Buildings, EF & N Spon, London

2. Non-Destructive Evaluation of Concrete Structures by Bungey – Surrey

University Press

3. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W.H.

Ranso, (1981)

4. Building Failures: Diagnosis and Avoidance, EF & N Spon, London, B.A.

Richardson, (1991).

STOCHASTIC HYDROLOGY

B.Tech. IV Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4203PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites :Water Resources Engineering								

Course Objectives: Understanding probabilities interventions of dynamics characteristic of water

Course Outcomes: At the end of the course, the student will be able to understand methods

of Hydrology, flood frequency modeling of hydrologic etc

UNIT - I

Deterministic and Stochastic Hydrology, Need for statistical methods in hydrology, Continuous, and Discrete distributions.

UNIT - II

Moments and expectations, Parameter estimation, Probability plotting, Regional floodfrequency analysis.

UNIT - III

Hypothesis Testing, linear regression, Hydrologic Time Series Analysis - Modeling of Hydrology.

UNIT - IV

Time Series - Data generation techniques, Autoregressive processes.

UNIT - V

Models for operational hydrology.

TEXTBOOKS:

1. Charles T. Haan, Statistical Methods in Hydrology, East West Publishers, 1998.

2. Jaya Rami Reddy, Stochastic Hydrology, Laxmi Publications, 1997.

3. Stochastic Process in Hydrology Kottegoda Prentice Hall International

SOIL DYNAMICS AND MACHINE FOUNDATIONS

B.Tech. IV Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4204PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites :Soil Dynamics								

Course Objectives: To understand the wave propagation in soils, determine dynamic properties of soil for analyzing and designing foundations subjected to vibratory loading.

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

- Understanding the fundamentals of vibration wave progression and dynamic soil properties
- Design machine foundations resting on soils

UNIT - I

Fundamentals of Vibration: Definitions, Simple harmonic motion, Response of SDOF systems of Free and Forced vibrations with and without viscous damping, Frequency dependent excitation, Systems under transient loads, Rayleigh's method of fundamental frequency, Logarithmic decrement, Determination of viscous damping, Transmissibility, Systems with Two and Multiple degrees of freedom, Vibration measuring instruments.

UNIT - II

Wave Propagation and Dynamic Soil Properties: Propagation of seismic waves in soil deposits - Attenuation of stress waves, Stress-strain behavior of cyclically loaded soils, Strength of cyclically loaded soils, Dynamic soil properties - Laboratory and field testing techniques, Elastic constants of soils, Correlations for shear modulus and damping ratio in sand, gravels, clays and lightly cemented sand. Liquefaction of soils: An introduction and evaluation using simple methods.

UNIT - III

Vibration Analyses: Types, General Requirements, Permissible amplitude, Allowable soil pressure, Modes of vibration of a rigid foundation block, Methods of analysis, Lumped Mass models, elastic half space method, elasto-dynamics, effect of footing shape on vibratory response, dynamic response of embedded block foundation, Vibration isolation.

UNIT - IV

Design of Machine Foundations: Analysis and design of block foundations for reciprocating engines, Dynamic analysis and design procedure for a hammer foundation, IS code of practice design procedure for foundations of reciprocating and impact type machines.Vibration isolation and absorption techniques.

UNIT - V

Machine Foundations on Piles: Introduction, Analysis of piles under vertical vibrations,

Analysis of piles under translation and rocking, Analysis of piles under torsion, Design

procedure for a pile supported machine foundation.

TEXT BOOKS:

1. Swami Saran – Soil Dynamics and Machine Foundations, Galgotia Publications Pvt.Ltd.

2. Principles of Soil Dynamics, Das, Braja M., and Ramana G.V. 2nd Edition, Cengage

Learning Engineering Publishers, 2010

3. Kameswara Rao, N.S.V. – Vibration Analysis and Foundation Dynamics, Wheeler

Publication Ltd. 1998.

REFERENCES:

1. Prakash, S. and Puri, V. K. - Foundation for Machines: Analysis and Design, John Wiley & Sons, 1998.

2. Prakash, S. - Soil Dynamics, McGraw Hill, 1981.

TRAFFIC ENGINEERING

B.Tech. IV Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4205PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites :Transportation Engineering.								

Course Objectives: To provide engineering techniques to achieve the safe and efficient movement of people and goods on roadways.

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

- Understand basics principles of Traffic Engineering
- Analyze parking data and model accidents
- Determine capacity and LOS.
- To provide engineering techniques to achieve Safe and efficient movement of people and goods on roadways

UNIT - I

Traffic Studies (Part- I) : Basic principles of Traffic, Volume, Speed and Density; Definitions and their interrelationships; Traffic Volume studies - Objectives, Methods of Volume counts, Presentation of Volume Data; Speed studies- Types of Speeds, Objectives, Methods of speed studies, Statistical Methods for speed data Analysis, Presentation of speed data. Delay Studies; Head ways and Gap Studies - Headway and Gap acceptance, Origin and Destination Studies.

UNIT - II

Traffic Studies (Part-II) : Parking Studies: parameters of parking, definitions, Parking inventory study, Parking survey by Patrolling method; Analysis of Parking Survey data; Accident studies- Causative factors of Road accidents, Accident data collection: Accident analysis and modeling;, Road Safety Auditing, Measures to increase Road safety.

UNIT - III

Capacity and LOS Analysis: Introduction to Traffic capacity, Analysis concepts, Level of Service, Basic definitions, Factors affecting Capacity and LOS, Capacity of Urban/Rural Highway, With or without access control, Basic freeway segments - Service flow rate of LOS, Lane width or Lateral clearance adjustment; Heavy vehicle adjustment; Driver population adjustment.

UNIT – IV Signal Designing – Fixed Time signals, Determination of Optimum Cycle length and Signal setting for Fixed Time signals, Warrants for Signals, Time Plan Design for Pre-Timed Control- Lane group analysis, Saturation flow rate, and Adjustment factors, Uniform and Incremental Delay, Vehicle Actuated Signals, Signal Coordination.

UNIT - V

Transportation System Management - Measures for Improving vehicular flow – one way Streets, Signal Improvement, Transit Stop Relocation, Parking Management, Reversible lanes- Reducing Peak Period Traffic - Strategies for working hours, Congestion Pricing, Differential Toll Policies.

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. Parthachakroborty 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

INDUSTRIAL WASTE WATER TREATMENT

B.Tech. IV Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4206PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites :Environmental Engineering								

Course Objectives:

- To present the information of wastewater generation from various industries
- To inform about the conventional treatment processes for specific industrial wastewaters
- To explain about the new developments in industrial wastewater treatment technologies

Course Outcomes: At the end of the course, the student should be able to:

- Identify the characteristics of industrial wastewaters
- Describe pollution effects of disposal of industrial effluent
- Identify and design treatment options for industrial wastewater
- Formulate environmental management plan

UNIT - I

Introduction: Wastewater Characteristics, Standards of Disposal, Treatment Objective and Strategies, Layouts of Primary, Secondary and Advanced Treatment Units.

UNIT - II

Design of Preliminary and Primary Treatment Operations: Screens, Grit Chambers, Skimming Tank, Primary and Secondary Sedimentation Tanks.

UNIT - III

Biological Treatment Processes: Types, Kinetics of Plug Flow and Completely Mixed Systems. Attached Growth Processes: Trickling Filters (Standard Rate, High Rate), Biofilters, Practices, Features and Design, Operational Difficulties and Remedial Measures, Rotating Biological Contactors. Suspended Growth Processes:

UNIT - IV

Activated Sludge Process, Modifications and Design Equations, Process Design Criteria, Oxygen and Nutrient Requirements - Classification and Design of Oxidation Ponds, Lagoons.

UNIT – V

Sludge Treatment and Disposal: Sludge Thickening, Aerobic and Anaerobic Sludge Digestion Processes, Design of Digester Tank, Sludge Dewatering, Ultimate Disposal, Sludge Drying Beds, Other Methods of Sludge Treatment.

TEXT BOOKS:

1. Wastewater Treatment – Concepts and Design Approach, by G L Karia and R A Christian, Prentice Hall of India, 2006
2. Environmental Engineering by Gerard Kiely, McGraw Hill Education (India) Pvt Ltd, 2013
3. Environmental Engineering – A Design Approach by A. P. Sincero and G ASincero, Prentice Hall of India, 2014

REFERENCES:

1. Wastewater Engineering - Collection, Treatment, Disposal and Reuse by Metcalf and Eddy, , McGraw Hill Education (India) Pvt Ltd, 2013

2. Industrial Waste Treatment by Nelson Leonard Nemerow, Butterworth-Heinemann, 2007.

3. Biological Process Designs for Wastewater Treatment by Benefield L.D. and Randall C.D. Prentice Hall Pub. Co., 1980.

PIPELINE ENGINEERING

B.Tech. IV Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4207PE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites :Fluid Mechanics, Hydraulics and Hydraulic machinery								

Course Objectives:

- To familiarize the students with the various elements and stages involved in transportation of water.
- To understand standards and practices in piping design.
- To know various equipment and their operation in pipeline transportation.• To understand technology in transportation of fluids.

Course Outcome: At the end of the course the student will able to:

- Get an understanding of the key steps in a pipeline's lifecycle: design, construction, installation, asset management and maintenance.

UNIT - I Elements of pipeline design: 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: 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: Types of Reservoirs, Pumps; introduction, system head-discharge pump 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: 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 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.

REMOTE SENSING AND GIS

B.Tech. IV Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4208OE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites : Surveying								

Course Objectives: This course will make the student to understand about the principles of GIS, Remote Sensing, Spatial Systems, and its applications to Engineering Problems.

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

- Retrieve the information content of remotely sensed data
- Analyze the energy interactions in the atmosphere and earth surface features
- Interpret the images for preparation of thematic maps
- Apply problem specific remote sensing data for engineering applications
- Analyze spatial and attribute data for solving spatial problems
- Create GIS and cartographic outputs for presentation

UNIT – I

Introduction to Photogrammetry: Principles& types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

UNIT – II

Remote Sensing: Basic concept of remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process.Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surfacefeatures (soil, water, vegetation), Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

UNIT – III

Geographic Information Systems: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: Spatial Data Input- Attribute data Management –Data display- Data Exploration- Data Analysis. COORDINATE SYSTEMS: Geographic Coordinate System: Approximation of the Earth, Datum; Map Projections: Types of Map Projections-Map projection parameters- Commonly used Map Projections - Projected coordinate Systems

UNIT – IV

Vector Data Model: Representation of simple features- Topology and its importance; coverage and its data structure, Shape file; Data models for composite features Object BasedVector Data Model; Classes and their Relationship; The geobase data model; Geometric representation of Spatial Feature and data structure, Topology rules

UNIT – V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

Data Input: Metadata, Conversion of Existing data, creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, Data Editing

TEXT BOOKS:

1. Remote Sensing and GIS Lillesand and Kiefer, John Willey 2008.

2. Remote Sensing and GIS B. Bhatta by Oxford Publishers 2015.

3. Introduction to Geographic Information System – Kang-Tsung Chang, McGraw-Hill 2015

REFERENCES:

1. Concepts & Techniques of GIS by C. P. Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.

2. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.

3. Basics of Remote sensing & GIS by S. Kumar, Laxmi Publications.

DISASTER MANAGEMENT

B.Tech. IV Year II Sem.

Course Code	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		CIE	SEE	TOTAL
CE4209OE	Core	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		
Prerequisites :There is no prerequisites to take this course								

Course Objectives: The subject provides different disasters, tools and methods for disaster management.

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

- Understanding Disasters, man-made Hazards and Vulnerabilities
- Understanding disaster management mechanism
- Understanding capacity building concepts and planning of disaster managements

UNIT - I

Understanding Disaster: Concept of Disaster - Different approaches- Concept of Risk - Levels of Disasters - Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerabilities: Natural and man-made hazards; response time, frequency and forewarning levels of different hazards - Characteristics and damage potential or natural hazards; hazard assessment - Dimensions of vulnerability factors; vulnerability assessment - Vulnerability and disaster risk - Vulnerabilities to flood and earthquake hazards

UNIT - II

Disaster Management Mechanism: Concepts of risk management and crisis managements - Disaster Management Cycle - Response and Recovery - Development, Prevention, Mitigation and Preparedness - Planning for Relief

UNIT - III

Capacity Building: Capacity Building: Concept - Structural and Nonstructural Measures Capacity Assessment; Strengthening Capacity for Reducing Risk - Counter-Disaster Resources and their utility in Disaster Management - Legislative Support at the state and national levels

UNIT - IV

Coping with Disaster: Coping Strategies; alternative adjustment processes – Changing Concepts of disaster management - Industrial Safety Plan; Safety norms and survival kits - Mass media and disaster management

UNIT - V

Planning for disaster management: Strategies for disaster management planning - Steps for formulating a disaster risk reduction plan - Disaster management Act and Policy in India - Organizational structure for disaster management in India - Preparation of state and district disaster management plans

TEXT BOOKS:

1. Manual on Disaster Management, National Disaster Management, Agency Govt of India.

2. Disaster Management by Mrinalini Pandey Wiley 2014.

3. Disaster Science and Management by T. Bhattacharya, McGraw Hill Education (India) Pvt Ltd Wiley 2015

REFERENCES:

1. Earth and Atmospheric Disasters Management, N. Pandharinath, CK Rajan, BS Publications 2009.

2. National Disaster Management Plan, Ministry of Home affairs, Government of India (http://www.ndma.gov.in/images/policyplan/dmplan/draftndmp.pdf)