SRI KRISHNADEVARAYA UNIVERSITY :: ANANTAPUR
College of Engineering & Technology
Academic Regulations 2015 (R15) for
B. Tech (Regular-Full time)
(With effect from the Academic Year 2015-16 for the students admitted into I year I semester)

1. Award of B.Tech. Degree

A student will be declared eligible for the award of the B.Tech. Degree if he/she fulfils the following academic regulations:

i. Pursue a course of study for not less than four academic years and in not more than eight academic years. However, for the students of availing Gap year facility this period shall be extended up to 2 year at the most and these two years would not be counted for the maximum time for graduation.

ii. Register for 228 credits and secure all 228 credits.

iii. Students, who fail to fulfill all the academic requirements for the award of the degree within Eight (Ten for GAP year students) academic years from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled.

2. Courses of study

The following courses of study are offered at present under B. Tech. program with effect from the academic year 2015-16.

S. No.	Branch
01.	Civil Engineering
02.	Computer Science & Engineering
03.	Electrical and Electronics Engineering
04.	Electronics and Communication Engineering
05.	Mechanical Engineering

and any other course as approved by the authorities of the University from time to time.

The entire course of study is of four academic years in semester pattern (for regular students) and of three academic years in semester pattern (for lateral entry students).

3. Credits

	Semester	
	Periods/Week	Credits
Theory	04	04
Practical	03	02
Drawing	03	02
	06	04
Online examination	-	02
Project	12	8

4. Course pattern:

i. The entire course of study is of four academic years on semester pattern.

ii. A student eligible to appear for the end examination in a subject, but absent in it or has failed in the end examination may appear for that subject at the next supplementary examination offered.

iii. When a student is detained due to lack of credits / shortage of attendance, he may be re-admitted when the semester / year is offered next after fulfillment of academic regulations.

5. Distribution and Weightage of Marks

i. The performance of a student in each semester for academic year I, II, III, IV shall be evaluated subject wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition Mini Project, Seminar, Comprehensive Viva Voce and Project Work shall be evaluated for 50, 50, 100 and 150 marks respectively.

ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation (25 marks for internal test and 05 marks for assignments) and 70 marks for the External Examination.

iii. For theory subjects, during the semester there shall be 2 midterm examinations. Each midterm examination consists of subjective paper for 25 marks with duration of 1hour 30 minutes.

First midterm examination shall be conducted for the first half of the syllabus in the middle of the semester and second midterm examination shall be conducted for the second half of the syllabus towards the end of the semester. A weightage of 0.75 for better score and 0.25 for the other score will be considered for awarding the sessional marks in both the midterm examinations. There shall be two assignments in each semester for award of 05marks so that midterm component will be 30marks (25 for midterm examinations + 05 marks for assignments).

iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Day-to-day work in the laboratory shall be evaluated for 25 marks by the concerned laboratory teacher based on the report of experiments/jobs. The end examination shall be conducted by the laboratory teacher and another internal examiner.

v. The Engineering Drawing/Graphics course, offered is to be treated as a Theory Course. Evaluation method adopted shall be same as for any other Theory Course. The Internal evaluation for sessionals will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two mid term exams in a semester for a duration of 2 hrs each, evenly distributed over the syllabi, for 15 marks giving a weightage of 0.75 for the better score and 0.25 for the other score will be considered. The sum of day to day evaluation and the internal tests will be the final sessionals for the subject.

vi. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department before presentation. The report and the presentation shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar shall be evaluated for 50 marks. There shall be no external examination for seminar.

vii. There shall be two comprehensive online examinations conducted internally, one in II-II and another in III-II. A student is supposed to secure minimum of 35% marks to secure 2 credits.

viii. There shall be two choice based credit courses (for other branch students), one in II- I and another in III-II. Each department shall offer a minimum of 3 subjects in such courses. A student shall be given a choice to select any one subject from the list of subjects offered by all faculties under choice based credit courses.

ix. There shall be two choice based credit courses (same branch students) in IV- I semester. A minimum of six courses must be offered, out of which 2 courses shall be selected by the students.

x. Massive Open Online Courses (MOOCs) are to be introduced. There shall be 2 MOOCs in the entire course duration.

xi. A minimum of six online courses (MOOCs) must be offered, out of which 2 courses shall be selected by the students in any each semester as stated above. The students shall register for the opted online courses at the college or offered by authorized institutions/Agencies. The Certificate issued by the college/institution/agency after successful completion of the course shall be considered for the award of credits by the College.

xii. Out of a total of 150 marks for the project work, 50 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by Board of Examiners consisting of Project Supervisor, Head of Department and an External Examiner. The evaluation of project work shall be conducted at the end of the IV year II Semester. The Internal Evaluation shall be on the basis of two seminars of each 25 marks, one will be presented to the project supervisor and another will be presented to the Department committee compromising Head of the Department, Project Supervisor, and one senior faculty of the Department.

xiii. Comprehensive Viva Voce will be conducted by the Board of Examiners at the time of evaluation of the Project Work, to test the overall subject knowledge of the entire course.

6. Attendance Requirements:

  i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester/ I year.

  ii. Shortage of Attendance below 62% in aggregate shall in NO case be condoned.

  iii. Shortage of attendance in aggregate up to 13% (62% and above and below 75%) in each semester may be granted by the College Academic Committee valid on Genuine grounds with supporting evidence.

  iv. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.

  v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester, as applicable. They may seek re-admission for that semester when offered next.

  vi. A stipulated fee shall be payable towards condonation of shortage of attendance to the University.

7. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.**6**

  i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. For the Seminar he should secure 40% in the internal evaluation.

  ii. A student shall be promoted from II to III year only if he fulfills the academic requirement of securing **40** credits from the preceding regular and supplementary examinations.

  iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing **68 c**redits from the preceding regular and supplementary examinations.

  iv. Lateral Entry students shall be promoted from third year to fourth year only if he fulfills the academic requirements of securing **40 credits** from the preceding regular and supplementary examinations.

  v. Students who fail to earn 228 credits as indicated in the course structure within eight academic years (10 years for Gap year students) from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 1.1.

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, and they will be in the academic regulations into which the candidate is presently readmitted.

Candidate who were permitted with GAP year shall be eligible for rejoining into the succeeding year of their B.Tech from the commencement of class work and they will be in the academic regulations into which the candidate is presently rejoining.

9.   With–holding of results:
If the candidate has any dues not paid to the College or if any case of indiscipline or malpractice is pending against him/her, the result of the candidate shall be withheld and he/she will not be allowed / promoted into the next higher semester. The issue of awarding degree is liable to be withheld in such cases.

10. GAP Year: Concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after II year to pursue entrepreneurship full time. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. The Head of the respective department shall forward such proposals submitted by the students to the College. An evaluation committee shall be constituted by the College to evaluate the proposal submitted by the student and the committee shall decide whether or not to permit student(s) to avail the Gap Year.

11. Award of Class:
After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured
First Class with Distinction	70% and above
First Class	Below 70% but not less than 60%
Second Class	Below 60% but not less than 50%
Pass Class	Below 50% but not less than 40%

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum). If any candidate passes through supplementary examinations beyond the duration of the course, he/she may be awarded class based on the % of marks secured as above, except distinction.

i. Grading System is to be introduced. After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Table – Conversion into Grades and Grade Points assigned

Range in which the marks in the subject fall	Grade	Grade points Assigned
≥ 90	S (Superior)	10
80-89	A+ (Excellent)	9
70-79	A (Very Good)	8
60-69	B (Good)	7
50-59	C(Average)	6
40-49	D (Satisfactory)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

12. The minimum instruction days including exams for each semester shall be 90 days.

13. There shall be no branch transfers after the completion of admission process.

14. The academic regulations should be read as a whole for purpose of any interpretation.

15. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the University is final.

16. The University may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on roles with effect from the dates notified..

B.Tech   I Year   I Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week		Credits
			L	P	
1.		Functional English	4	-	4
2.		Mathematics	4	-	4
3.		Engineering Chemistry	4	-	4
4.		Problem Solving and Programming	4	-	4
5.		Engineering Mechanics	4	-	4
6.		Chemistry Lab	-	3	2
7.		Programming Lab	-	3	2
8.		Fundamentals of Engineering Drawing	-	3	2
					26

L – Lecture, P – Practical

B.Tech   I Year   II Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week		Credits
			L	P	
1.		Communicative English	4	-	4
2.		Mathematical Methods	4	-	4
3.		Engineering Physics	4	-	4
4.		Environmental Science	4	-	4
5.		Engineering Drawing	2	3	4
6.		Communication Skills Lab	-	3	2
7.		Physics Lab	-	3	2
8.		Engineering Workshop & IT Workshop	-	3	2
					26

L – Lecture, P – Practical

B.Tech   II Year I Semester   Course Structure

S.No.	Abbrev iation	Subject	Periods / Week			Credits
			L	T	P	
1.		Probability & Statistics	4	1	-	4
2.		Strength of Materials- I	4	1	-	4
3.		Surveying	4	1	-	4
4.		Fluid Mechanics	4	1	-	4
5.		Building Materials and Construction	4	1	-	4
6.		Choice Based Credit Courses (For Non Civil Students) 1. Engineering Materials 2. Surveying 3. Environmental Pollution and Control	4	1	-	4
7.		Surveying Lab	-	-	3	2
8.		Strength of Materials Lab	-	-	3	2
9.		Human Values and Professional Ethics	2			
		TOTAL	26	6	6	28

L – Lecture, T – Tutorial, P - Practical

B.Tech   II Year II Semester   Course Structure

S.No.	Abbrev iation	Subject	Periods / Week			Credits
			L	T	P	
1.		Concrete Technology	4	1	-	4
2.		Electrical & Mechanical Technology	4	1	-	4
3.		Strength of Materials- II	4	1	-	4
4.		Hydraulics and Hydraulic Machinery	4	1	-	4
5.		Structural Analysis - I	4	1	-	4
6.		Building Planning and Drawing	3	-	3	4
7.		Fluid Mechanics and Hydraulic Machinery Lab	-	-	3	2
8.		Concrete Technology Lab	-	-	3	2
9.		Comprehensive Online Examination				2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P - Practical

B.Tech   III Year I Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Managerial Economics and Financial Accounting	4	1	-	4
2.		Design of Reinforced Concrete Structures	4	1	-	4
3.		Environmental Pollution and Control	4	1	-	4
4.		Water Resources Engineering	4	1	-	4
5.		Structural Analysis- II	4	1	-	4
6.		Engineering Geology	4	1	-	4
7.		Engineering Geology Lab	-	-	3	2
8.		Survey Camp*	-	-	3	2
9.		Advanced Communication Skills			3	
		TOTAL	24	6	9	28

L – Lecture, T – Tutorial, P – Practical

B.Tech   III Year II Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Water & Waste Water Treatment	4	1	-	4
2.		Soil Mechanics	4	1	-	4
3.		Design of Steel Structures	4	1	-	4
4.		Design of Irrigation Structures	4	1	-	4
5.		Highway Engineering	4	1	-	4
6.		Choice Based Credit Courses (For Non Civil Students) 1. Geo Informatics 2. Disaster Mitigation and Management 3. Environmental Impact Assessment	4	1	-	4
7.		Highway Engineering Lab	-	-	3	2
8.		Environmental Engineering Lab	-	-	3	2
9.		Comprehensive Online Examination				2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P - Practical

B.Tech   IV Year I Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Foundation Engineering	4	1	-	4
2.		Estimation, Costing & Valuation	4	1	-	4
3.		Advanced Structural Design	4	1	-	4
4.		Pre-stressed Concrete	4	1	-	4
5.		**Choice Based Credit Courses;: (for Civil students)** 1. Geoinformatics 2. Water Resources System Planning and Management 3. Bridge Engineering 4. Disaster Mitigation & Management	4	1	-	4
6.		**Choice Based Credit Courses;: (for Civil students)** 1. Traffic Engineering 2. Construction Planning and Project Management 3. Ground Improvement Techniques 4. Earthquake Resistant Design	4	1	-	4
7.		CAD Lab	-	-	3	2
8.		Geotechnical Engineering Lab	-	-	3	2
		Mini Project	-	-	-	2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P – Practical

B.Tech   IV Year II Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Environmental Impact Assessment	4	1		4
2.		Ground Water Development and Management	4	1		4
3.	MOOCs-I	**Massive Open Online Courses-I** 1. Finite Element Methods in Civil Engineering 2. Railways and Airport Engineering 3. Experimental Stress Analysis	4	1	-	4
4.	MOOCs-II	**Massive Open Online Courses-II** 1. Advanced Structural Analysis 2. Tunneling Engineering 3. Offshore Engineering	4	1	-	4
5.		Project Work	-	-	-	8
6.		Seminar	-	-	-	2
7.		Comprehensive Viva-Voce	-	-	-	4
		TOTAL	8	2	-	30

L – Lecture, T – Tutorial, P – Practical

B.Tech   I Year   I Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week		Credits
			L	P	
1.		Functional English	4	-	4
2.		Mathematics	4	-	4
3.		Engineering Chemistry	4	-	4
4.		Problem Solving and Programming	4	-	4
5.		Engineering Mechanics	4	-	4
6.		Chemistry Lab	-	3	2
7.		Programming Lab	-	3	2
8.		Fundamentals of Engineering Drawing	-	3	2
					26

L – Lecture, P – Practical

B.Tech I Year I Sem FUNCTIONAL ENGLISH T C
(Common for CSE, ECE, EEE, Civil & Mechanical) 4 4

UNIT – I
Environmental Consciousness
Green Cover, Pollution
Tenses, Prepositions, Prepositional Phrases, Writing Letters

UNIT – II
Emerging Technologies
Solar Thermal Power, Cloud Computing
Subject-Verb Agreement, Prefixes and Suffixes, Compound Nouns, Imperatives

UNIT – III
Global Issues
Child Labour, Food Crisis
Synonyms & Antonyms, Verbs: Regular & Irregular, Homonyms, Homophones and Homographs, Direct and Indirect Speech

UNIT – IV
Global Issues
E-Waste, Assistive Technology
Articles, Collocations, Conjunctions, Note-Making, Making Recommendations, If Conditional

UNIT – V
Space Trek
Hubble Telescope, A Home in the Sky
Degrees of Comparisons, Voice, Question Tags

UNIT – VI
Media Matters
The Evolution of Media, Ten Developments in Media, Advertisements
Paragraph Writing, Effective Writing, Writing Reports, Expansion of Proverbs and Idioms, Commonly Confused Words

TEXT BOOKS:
1. Mindscapes: English for Technologists and Engineers, Paper Back 2012 by Anna University.

B.Tech I Year I Sem   **MATHEMATICS**   **T**   **C**
                      (Common for CSE, ECE, EEE, Civil & Mechanical)   **4**   **4**

Unit-I
Exact,linear and Bernoullis equations,Orthogonal trajectories.Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax},Sinax,Cosax,polynomials in x, $e^{ax}V(x)$,$xV(x)$.Method of variation of parameters.

Unit-II
Taylor's and Maclaurin's series-Functions of several variables-Jacobian-Maxima and Minima of functions of two variables,Lagranges method of undetermined multipliers with three variables only.Radius of curvature.

Unit-III
Multiple integral-Double and triple integrals-Change of variables-Change of order of integration.

Unit-IV
Vector Calculus:Gradient-Divergence-Curl.Vector Integration-Line integral-Area-Surface and Volume integrals.Vector integral theorems: Green's theorem-Stoke's theorem-Gauss Divergence theorem (With out proofs).Applications of Green's, Stoke's and Gauss Divergence theorems.

Unit-V
Laplace Transforms:Definition-Transform of elementary functions-Properties of Laplace Transforms-Transform of derivatives-Transform of integrals-Unit step fuction-multiplication by t^n –Division by t-Evaluation of integrals by Laplace Transforms-Laplace Transform of periodic functions.

Unit-VI
Inverse Laplace Transforms-Partial fractions-Other methods of finding inverse transforms-Convolution theorem-Applications of Laplace transforms to Ordinary differential equations of first and second order.

TEXT BOOKS:
1. A Text Book of Engineering Mathematics,Vol.1,T.K.V.Iyengar,B.Krishna Gandhi and   others, S.Chand and Company.
2.Higher Engineering Mathematics,B.S.Grewal,Khanna publishers.
3.Engineerin Mathematics-I,E.Rukmangadachari & E.Keshava Reddy,Pearson Publisher.

REFERENCES:
1.Advanced Engineering Mathematics, by Erwin Kreyszig,Wiley India.
2. Higher Engineering Mathematics, by B.V.Ramana,Mc Graw Hill Publishers.
3.Advanced Engineering Mathematics,by Alan Jeffrey,Elsevier.

B.Tech I Year II Sem   ENGINEERING CHEMISTRY   T   C
                          (Common for CSE, ECE, EEE, Civil & Mechanical)   4   4

Unit –I :- Water

Types Of Impurities In Water, Hardness Of Water And Its Units, Disadvantages Of Hard Water. Estimation Of Hardness By Edta Method. Analysis Of Water- Dissolved Oxygen. Problems On Hardness Of Water. Water Treatment For Domestic Purpose. Sterilisation:- Chlorination, Bleaching Powder, Ozonization. Water For Industrial Purpose:-For Steam Generation, Boilen Troubles – Carry Over (Priming & Foaming) Boiler Coreriosion – Scales And Sludges, Caustic Emfrittlement. Water Treatment :-Internal Treatment :- Colloidal Phospatc, Calgon, Carlronatic, Sodium Aluminates Treatment. External Treatment :- Ion – Exchange And Permutit Process Demineralisation Of Brakish Water – Reverse Osmosis And Electrodialysis.

Unit –II :- Polymers

Basic Concepts Of Polymerisation, Types Of Polymerisation Addition And Condensation Polymerisation.
Plastomers :- Thermosetting And Therimoplastics Compasiti On Properties And Engineering Applications Of Pvc, Teflon, Bakelite And Nylons. Rubber – Processing Of Natural Rubber And Compounding Elastomers – Unas, Buna N, Polynmethane Rubber, Polysulphide Rubber. Conducting Polymers; Synthesis And Applications Of Polyacetylenc And Polyaniline. Liquid Crystals Definition, Properties, Suitable Examples And Engineering Applications.

Unit – III :-Electrochemistry

Electrochemical Cells :- Measurement Of Emf, Standard Electrode Potential, Concentration Cells, Batteries (Ni-Cell), Lithium Batteries. Fuel Cells: (Hydrogen Oxygen Fuel Cell Adn Methanol Fuel Cell. Insulators :- Definition, Properties And Characteristics Of Insulating Materials, Engineering Applications. Corrosion:- Introduction, Type Of Corrosion (Dry Corrosion (Direct Chemical Attack), Hlet Corrosion, Theorics Of Corresion. And Mechanism, Electrochemical Theory Of Corrosion. Galranic Series, Galronic Corrosion Concentration Cell Corrosion, Oxygen Absorption Type. Factors Influencing Corrision – Control Of Corrosion- Cathodic Protection. (Sacrificial Anode And Impressed Current), Inhilitors (Anodic And Cathodic), Electroplating And Electrolese Plating.

Unit – IV:- Nano Materials

Definition, Properities And Applications; Explosives And Propellants : Explosives, Classification, Precantions During Storage, Blasting Fuses, Important Explosives Rocket Propellants, Classification Of Propellants. Lubricants : - Principlesa And Function Of Lubricants – Classification And Properties Of Lubricants – Viscosity, Flash And Fire Points, Cloud And Pour Points, Aniline Point, Neutralisation Number And Mechanical Strength.

Unit –V:- Fuels And Combustion

Definition And Classification Of Fuels. Solid Liquid And Gaseous Fuels, Characteristics Of A Good Fuel.
Metallergical Coke – Characteristics And Manifacture (Otto – Halfmann). Petroleum: Refining Of Petroleum, Gasoline – Octane Number, Diesel -Cetane Number. Petroleum – Refining – Synthetic Petrol. Calorific Value And Its Determination (Bomb Calorimeter – Junkers Gas Calorimeter. Combustion: Flue Gas Analysis By Orsats Apparatus.

Unit –VI:- Chemistry Of Engineering Meterials

Cement : Composition Of Portland Cement, Classification, Preparation (Dry And Wet Processes), Setting And Handling Refractorics :- Definition, Classification With Examples Criteria Of A Good Refractory Material; Causes For The Failure Of A Refractory Material Carbon Clusters: - Fullerenes And Carbon Nano Tubes.

B.Tech I Year I Sem   **PROBLEM SOLVING AND PROGRAMMING**   T   C
                                 (Common for CSE, ECE, EEE, Civil & Mechanical)   4   4

Unit I- Overview of Computers and Programming - Electronic Computers then and Now, Computer Hardware, Computer Software, Algorithm, Flowcharts, Software Development Method, Applying the Software Development Method.

Unit II- Introduction to C Language - C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Arithmetic Expressions, Formatting Numbers in Program Out, Interactive Mode, Batch Mode and Data Files.

Unit III- Selection Structures : Control Structures, Conditions, The if Statement, if Statements with Compound Statements, Decision Steps in Algorithms, Nested if Statements and Multiple-Alternative Decisions, The switch Statement. Repetition and Loop Statements: Repetition in Programs, Counting Loops and the while Statement, Computing a Sum or a Product in a Loop, The for Statement, Conditional Loops, Loop Design, Nested Loops, The do-while Statement and Flag-Controlled Loops.Simple Data Types: Representation and Conversion of Numeric Types, Representation and Conversion of Type char, Enumerated Types, Iterative Approximations

Unit IV- Top Down Design with Functions: Building Programs from Existing Information, Library Functions, Top-Down Design and Structure Charts, Functions without Arguments, Functions with Input Argument. Modular Programming (Functions): Functions with Simple Output Parameters, Multiple Calls to a Function with Input/Output Parameters, Scope of Names, Formal Output Parameters as Actual Arguments, A Program with Multiple Functions. Arrays: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Array Arguments, Searching and Sorting an Array, Multidimensional Arrays.

Unit V- Pointers - Introduction, Features of Pointers, Pointer Declaration, Arithmetic Operations With Pointers, Pointers and Arrays, Pointers and Two-Dimensional Arrays, Array of Pointers, Pointers to Pointers, Void Pointers, Memory Allocation Functions, Programming Applications, Pointer to Functions, Command- Line Arguments.Strings: String Basics, String Library Functions: Assignment and Substrings, Longer Strings: Concatenation and Whole-Line Input, String Comparison, Arrays of Pointers, Character Operations, String-to-Number and Number-to-String Conversions.

Unit VI- Recursion: The Nature of Recursion, Tracing a Recursive Function, Recursive Mathematical Functions, Recursive Functions with Array and String Parameters, Problem Solving with Recursion, A Classic Case Study in Recursion: Towers of Hanoi. Structure and Union: User-Defined Structure Types, Structure Type Data as Input and Output Parameters, Functions Whose Result Values Are Structured, Problem Solving with Structure Types, Parallel Arrays and Arrays of Structures, Union Types.

Unit VII- Files - Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write, Other File function, Searching Errors in Reading/Writing of Files, Low Level Disk I/O, Command Line Arguments, Application of Command Line Arguments, File Status functions (error handling).

Unit VIII- Dynamic Memory Allocation, Introduction to Data Structures: Linear and Non Linear Data Structures, Searching and Sorting: Bubble Sort, Selection Sort, Linear Search, Binary Search.

.TEXT BOOKS :

1. Problem Solving and Programming Design in C, J.R.Hanly & ElliotB..Koffman 5th Edition, Pearson Addison Wessley.

REFERENCES :

2. Programming in C and DataStructures, J.R.Hanly, Ashok.N.Kamthane & A.AnandaRao, Pearson Education.
3. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
4. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
5. C and Data Structures, a snapshot oriented treatise with live engineering examples, Dr.N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand
6. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill
7. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning

ENGINEERING MECHANICS   T   C
                                                (Common for CE & ME)   3+1*   4

UNIT I
Basic Concepts - System of forces– Moment of forces and its Application – Couples and Resultant of Force System
Equilibrium of System of Forces : Free body diagrams –Types of Supports – Support reactions for beams with different types of loading – concentrated, uniformly distributed and uniformly varying loading.
UNIT II
Analysis of Perfect Frames : Types of frames – cantilever frames and simply supported frames – Analysis of frames using method of joints and methods of sections for vertical loads, horizontal loads and inclined loads.
UNIT III
Friction : Types of friction– laws of Friction–Limiting friction–Cone of limiting friction– static and Dynamic Frictions – Motion of bodies.
UNIT IV
Centroid and Center of Gravity : Centroids of simple figures – Centroids of Composite figures – Centre of Gravity of bodies – Centre of Gravity of Composite figures.
(Simple problems only).
UNIT V
Area of Moment of Inertia - Parallel axis and perpendicular axis theorems - Moments of Inertia of Composite Figures
Mass Moment of Inertia : Moment of Inertia of Simple solids, Moment of Inertia of composite masses.(Simple problems only)
UNIT VI
Mechanical Vibrations : Definitions, Concepts. Simple harmonic motion. Free vibrations. Simple, Compound and Torsional pendulums- Numerical problems

TEXT BOOKS:
1. Engineering Mechanics, Shames & Rao – Pearson Education.
2. Engineering Mechanics, Fedrinand L.Singer – B.S. Publishers.
3. Engineering Mechanics, Bhavikatti and Rajasekharappa.
REFERENCES:
1. Engineering Mechanics-Statics and dynamics, A.Nelson, Tata MCGraw-Hill Company.
2. Mechanics of Materials by Timoshenko & Gere, CBS.
3. Engineering Mechanics – B. Bhathacharya- Oxford University Publications

B.Tech   I Year   II Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week		Credits
			L	P	
1.		Communicative English	4	-	4
2.		Mathematical Methods	4	-	4
3.		Engineering Physics	4	-	4
4.		Environmental Science	4	-	4
5.		Engineering Drawing	2	3	4
6.		Communication Skills Lab	-	3	2
7.		Physics Lab	-	3	2
8.		Engineering Workshop & IT Workshop	-	3	2
					26

L – Lecture, P – Practical

B.Tech I Year II Sem   **COMMUNICATIVE ENGLISH**   T   C
                                  (Common for CSE, ECE, EEE, Civil & Mechanical)   **4**   **4**

UNIT – I
Lessons from the Past
The Importance of History, The Mother of Modern Corporatism
Pure Vowels, Just-A-Minute, Designing Posters

UNIT – II
Energy
In Search of Our Energy Solutions, Wind Energy
Diphthongs, Role Play, Making Conversation/Situational Dialogues

UNIT – III
Engineering Ethics
Learning from Disasters, Biotechnology: Ethical Questions
Consonant Sounds, Debate, Blog Making

UNIT – IV
Travel and Tourism
Ten Reasons Why Travel is a Waste of Time, Atithi Devo Bhava
Syllables, Word Stress Rules, Group Discussion

UNIT – V
Getting Job Ready
Boeing, Arvind Mills
Presentation Skills, Writing Emails, Creativity: Thinking and Writing

UNIT – VI
Getting Job Ready
Toyota Production System, Preparing for the Interviews
Types of Interviews, Mock Interviews, Personality Development.

TEXT BOOKS:
1. Mindscapes: English for Technologists and Engineers, Paper Back 2012 by Anna University.

UNIT -I

Matrices: Elementary row transformations – Rank – Echelon from, normal – Solution of Liner System of Homogenous and Non Homogeneous equations –Eigen values, Eigen vectors – (Excluding proofs of Properties). Cayley – Hamilton Therorem(Excluding proof) – Inverse and powers of a matrices by Cayley-Hamilton therem – Diagonolization of matrix. Calculation of powers of matrix.

UNIT-2

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta method - Milne's Predictor-Corrector Method.

UNIT-3

Fourier series:Determination of Fourier coefficients- Fourier series of Even and odd functions- Fourier series in an arbitrary interval-Even and odd periodic continuation- Half range Fourier sine and cosine expansions.

UNIT-4

Fourier integral thorem (statement only) – Fourier sine and cosine integrals. Fourier transform- Fourier sine and cosine transforms- Properties- Inverse transforms- Finite Fourier transforms.

UNIT-5

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions-Method of separation of variables-Solutions of one dinesional wave equation, heat equation and two-dimensionsal Laplace equation under initial and boundary conditions.

UNIT-6

z-transform –inverse z-transform-Properties-Damping rule –shifting rule- Initial and final value theorems. Convolution theorem-Solution of difference equations by transforms.

TEXT BOOKS:
1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.
3. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
4. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
5. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

REFERNCES:
1. Numerical Methods for Scientific and Engineering Communication, M.K.Jain,S.R.K. Iyengar& R.K.Jain, New Age international Publishers.
2. Mathematical Methods –Pal –Oxford.
3. Introduction to Numerical Analysis –S.S.Sastry Printice Hall of India
4. Mathematical Methods, S.K.V.S.Sri Ramachary, M. Bhujanga Rao, P.B.Bhaskar Rao & P.S.Subramanyam, BS Publications..

B.Tech I Year I Sem **ENGINEERING PHYSICS** **T** **C**
(Common for CSE, ECE, EEE, Civil & Mechanical) **4** **4**

UNIT I

OPTICS: Interference- Interference in thin film by reflection-Newton's rings-Diffraction-Fraunhofer diffraction due to single slit-Fraunhofer diffraction due to double slit and diffraction grating.

UNIT II

CRYSTALLOGRAPHY: Introduction-Space lattice- Unit cell-Lattice parameters –Bravias lattice-Crystal system-Packing fraction of SC, BCC and FCC –Directions and planes in crystals-Miller indices-Interplanar spacing in cubic crystals-X-ray diffraction–Bragg's law.

UNIT III

QUANTUM MECHANICS: Matter waves-de Broglie hypothesis and properties-Heisenberg's uncertainty principle-Schrödinger's time dependent and independent wave equations-Physical significance of wave function-Particle in one dimensional infinite potential well.

UNIT IV

SEMICONDUCTORS: Intrinsic and Extrinsic semiconductors-Drift and Diffusion currents and Einstein's equation-Hall effect-Formation of p-n junction.

MAGNETIC MATERIALS: Basic definitions- Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials-Hysteresis- Soft and Hard magnetic materials.

UNIT V

SUPERCONDUCTIVITY: Introduction-General properties-Meissner effect-Penetration depth-Effect of magnetic field-Type I and Type II superconductors-Flux quantization-Josephson effects-Application of superconductors.

UNIT VI

LASERS: Introduction- Spontaneous and stimulated emission of radiation-Einstein's coefficients-Population inversion-Ruby laser-He-Ne laser-Application of lasers.

FIBER OPTICS: Introduction-Principle of optical fiber-Acceptance angle and Acceptance cone-Numerical aperture-Types of Optical fibers-Application of optical fibers.

Text Books:

1. Engineering Physics-K. Thyagarajan, MacGraw Hill Education (India) Private Limited, New Delhi, 2015.
2. Engineering Physics- K. Vijay Kumar, S. Chand & Co. Ltd.

References:

1. Engineering Physics-P.K. Paliniswamy, 2nd Edition, SciTech Publications
2. Engineering Physics-S. Maninaidu-Pearson Education Private Ltd.
3. Physics for Engineers-N.K. Verma, 1st Edition, PHI Learning Private Ltd.

UNIT-I

Introduction of Environmental Studies-Natural Resources: Definition, The Global environment and its segments; Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere Scope and Importance of Environmental Studies – Need for Public Awareness. Renewable and non-renewable resources – Natural resources and associated problems – Forest resources: Introduction –deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources :Introduction– Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Introduction, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT – II

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: 1. Forest ecosystem.   2. Grassland ecosystem.   3. Desert ecosystem. 4. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT – III

Biodiversity and its conservation: Introduction - Definition: genetic, species and ecosystem diversity. – Biogeographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – IV

Environmental Pollution: Definition, Cause, effects and control measures of :1. Air pollution. 2. Water pollution 3. Soil pollution 4. Marine pollution 5. Noise pollution   6.Thermal pollution 7 Nuclear hazards
Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT–V

Social Issues and the Environment: From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management –Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. –Consumerism and waste products. –Environment Protection Act. –Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT–VI

Human Population and the Environment: Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. ,Infectious deseases,-Tuber colossi,cancer,Water Borne Deseases-Malaria,Diheria -Women and Child Welfare. - Role of information Technology in Environment and human health. -Case Studies.

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.
3. A Basic Course in environmental Studies by S.Deswal and A.Deswal ,Dhanpat Rai & Co.

UNIT – I
Projection of points and Lines : Principles of Orthographic Projection – Conventions – First and Third Angle Projections. Projections of Points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces only.
UNIT – II
Projections of Planes : Projections of regular Plane surfaces – plane surfaces inclined to both planes.
UNIT – III
Projections of Solids : Projections of Regular Solids inclined to one plane.
UNIT – IV
Sections & Developments of Solids: Section Planes and Sectional views of Right Regular Solids–Prism, Cylinder, Pyramid and Cone – True shapes of sections.
Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their Sectional parts.
UNIT – V
Isometric & Orthographic Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.
Conversion of Isometric Views to Orthographic Views – Conventions.
UNIT – VI
Interpenetration of Right Regular Solids : Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Square Prism Vs Square Prism.

TEXT BOOKS:
1.Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing, Johle /Tata McGraw-Hill
3.Engineering Drawing, Shah and Rana, 2/e Pearson education
REFERENCES:
1. Engineering Drawing and Graphics, Venugopal/ New age
2. Engineering Drawing, B.V.R. Guptha, J.K. Publishesrs

B.Tech   II Year I Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Probability & Statistics	4	1	-	4
2.		Strength of Materials- I	4	1	-	4
3.		Surveying	4	1	-	4
4.		Fluid Mechanics	4	1	-	4
5.		Building Materials and Construction	4	1	-	4
6.		Choice Based Credit Courses (For Non Civil Students) 1. Engineering Materials 2. Surveying 3. Environmental Pollution and Control	4	1	-	4
7.		Surveying Lab	-	-	3	2
8.		Strength of Materials Lab	-	-	3	2
9.		Human Values and Professional Ethics	2			
		TOTAL	26	6	6	28

L – Lecture, T – Tutorial, P – Practical

B.Tech II Year I Sem   **PROBABILITY AND STATISTICS**   **T   C**
                                                                   4+1* 4

UNIT – I

Probability: Sample Space and events – Probability – The axioms of Probability – Some Elementary theorems – Conditional Probability – Baye's theorem.

UNIT – II

Random Variables: Discrete and continuous - Distribution function and its Properties – Density and its properties. Theoretical distributions: Binomial, poisson and Normal distributions – Related properties – Fitting distributions.

UNIT – III

Sampling distributions : Population and samples – Sampling distribution of mean (known and unknown) Estimation: Point estimation – Interval estimation – Bayesian estimation.

UNIT – IV

Tests of Hypothesis – Hypothesis concerning Means and Proportions – One tail and two tail tests – Type I and Type II errors. Tests of significance – Student's t –test, F – test, Ψ^2 test – Goodness of fit – Contingency test.

UNIT – V

Analysis & Variance : Some general principles – Completely Randomized Design (CRD), Latin Square Design (LSD) and their applications – ANOVA for one way and two way classification.

UNIT – VI

Statistical Quality Control: Concept of quality of manufacturers product – Defects & defectives, causes of variation – Random & assignable – The principle of Sheward Control Chart – Control charts for measurements & attributes P -Chart, C-Chart, X- Chart and R-Chart.

TEXT BOOKS:
1) Probability and Statistics for Engineers by Richard A Johnson
2) Probability & Statistics for Engineers by R.A.Johnson & C.B.Gupta, Pearson Education 2006.
3) Probability & Statistics by T.K.V. Iyengar, B. Krishna Gandhi and others, S.Chand and company.

REFERENCES:
1) A Text book of Probability and Statistics by Dr. Shahnaz Bathul.
2) Fundamental Mathematical Statistics by S.C. Guptha and V.K. Kapoor – S. Chand Co

UNIT – I
SIMPLE STRESSES AND STRAINS: Elasticity and plasticity, Types of stresses and strains, Hook's law, stress – strain diagram for mild steel, Working stress, Factor of safety, Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them, Bars of varying section, composite bars, Temperature stresses.

UNIT – II
SHEAR FORCE AND BENDING MOMENT: Definition of beam, Types of beams, Concept of shear force and bending moment, S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads ,Point of contra flexure, Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III
FLEXURAL STRESSES: Theory of simple bending, Assumptions, Derivation of bending equation, Neutral axis, Determination bending stresses, section modulus of rectangular, circular, (Solid and Hollow) I, & T sections, Design of simple beam sections.
SHEAR STRESSES IN BEAMS: Derivation of formula, Distribution of Transverse Shear Stresses over Rectangular, circular, Triangular, I & T Sections.

UNIT – IV
DEFLECTION OF BEAMS: Bending into a circular arc – 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.Mohr's theorems, Moment area method – application to simple cases including overhanging beams.

UNIT – V
TORSION : Theory of pure torsion, Derivation of Torsion equations, Assumptions made in the theory of pure torsion, Torsion moment of resistance, Polar section modulus, Power transmitted by shafts

UNIT – VI
COLUMNS AND STRUTS: Introduction, Types of columns – Short, medium and long columns, Axially loaded compression members , Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

TEXT BOOKS:
1. Strength of Materials by S. Ramamrutham
2. Strength of Materials by B.C. Punmia
3. Mechanics of Materials by Gere & Thimoshenko
REFERENCES:
1. Strength of materials by R.K.Rajput, S.Chand & Co, New Delhi.
2. Strength of Materials by Schaum's out line series – Mc. Graw hill International Editions.
3. Strength of Materials by S. Ramakrishna and R.Narayan – Dhanpat Rai publications.
4. Strength of Materials by A.R.Basu, Dhanpat Rai & Co, Nai Sarah, New Delhi.
5. Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Delhi.
6. Mechanics of Solid, by Ferdinandp Beer and others – Tata Mc.Grawhill Publications 2000.
7. Mechanics of Structures, by S.B. Junnarkar, Charotar Publishing House, Anand, Gujrat

B.Tech II Year I Sem   **SURVEYING**   **T   C**
                                           4+1*   4

UNIT – I
INTRODUCTION: Definition of surveying, Importance of surveying to civil Engineers, objectives of surveying , classification of surveying, principles of surveying
CHAIN SURVEYING: Methods of measuring distance-Types of chains-chaining on plane and sloping ground Field work-Booking of field notes-Basic problems in chaining-Determination of area by chain survey

UNIT – II
COMPASS SURVEYING: Working of prismatic & surveyor compass-Temporary & permanent adjustments-Designation of bearing-Reduced bearing-Fore and back bearing-Determination of included angles from measured bearings.
PLANE TABLE SURVEY: Description of plane table-Temporary Adjustments-Setting up the plane table-Methods of plane table surveying.

UNIT – III
LEVELING: Concept and Terminology, Temporary and permanent adjustments method of leveling.
CONTOURING: Characteristics and Uses of contours, methods of conducting contour surveys and their plotting.

UNIT – IV
COMPUTATION OF AREAS AND VOLUMES: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT - V
THEODOLITE: Theodolite, description, uses and adjustments, temporary and permanent, measurement of horizontal and vertical angles, Trigonometrical leveling.
TACHEOMETRIC SURVEYING: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

UNIT – VI
Curves: Types of curves, design and setting out, simple and compound curves
Total station survey: Features of Total station-setting up and orienting a Total station-Electronic Data Recording.

TEXT BOOKS:
1. "Surveying (Vol – 1, 2 & 3), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) ltd., New Delhi
2. Surveying and leveling by R. Subramanian, Oxford university press, New Delhi

REFERENCES:
1. Arthur R Benton and Philip J Taety, Elements of Plane Surying, McGraw Hill – 2000
2. Arror K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004
3. Chandra A M, "Plane Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
4. Chandra A M, "Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
5. Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.

B.Tech II Year I Sem   **FLUID MECHANICS**   **T   C**
                                                                                 4+1* 4

UNIT – I

INTRODUCTION: Units and dimensions, Physical properties of fluids and their influences on fluid motion. Pressure and Measurements, manometers.

FLUIDSTATICS: Pascal's law, Hydrostatic law, Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces, Center of pressure, Derivations and problems.

UNTI – II

FLUID KINEMATICS: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows, stream and velocity potential functions, flow net, Vortex Flow.

FLUID DYNAMICS: Surface and body forces, Euler's and Bernoulli's equations and its applications, Momentum equation and its application, forces on pipe bend.

UNIT – III

BOUNDARY LAYER THEORY: Boundary layer,concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation

FLOW AROUND SUBMERGED OBJECTS: Drag and Lift- Magnus effect.

UNIT – IV

LAMINAR & TURBULENT FLOWS: Reynold's experiment, Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

UNIT - V

CLOSED CONDUIT FLOW: Laws of Fluid friction, Darcy's equation, Minor losses (types), equation for head loss due to sudden expansion, pipes in series, pipes in parallel – Total energy line and hydraulic gradient line, variation of friction factor with Reynold's number.

UNIT – VI

MEASUREMENT OF FLOW: Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and stepped notches,Broad crested weirs.

TEXT BOOKS:
1. Fluid Mechanics by Modi and Seth, Standard book house.
2. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi

REFERENCES:
1. Fluid Mechanics by J.F.Douglas, J.M. Gaserek and J.A.Swaffirld (Longman)
2. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
3. Fluid Mehanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
4. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
5. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer, Oxford University Press, New Delhi.

BULDING MATERIALS AND CONSTRUCTION   **T**   **C**
                                                                         4+1*   **4**

UNIT - I
STONES & BRICKS: Discussion of different types of rocks formations, properties & classification of good building stones, stone quarrying, precautions in blasting and dressing of stones. Composition of good brick earth, various methods of manufacture of bricks. Comparison of clamp and kiln burning, Qualities of good bricks.
LIME &TILES: Various ingredients of lime, constituents of lime stone, classification of lime. Types of tiles, manufacturing method.

UNIT - II
Wood: Structure, properties, seasoning of timber, Defects in timber, Preservation of wood, various types of woods used in buildings.

UNIT - III
CEMENT: Manufacturing of cement and various types of cements. Discussion on various tests for cement.
AGGREGATES: Fine & coarse aggregate and their importance, characteristics as per code of practice.

UNIT -IV
CONCRETE: Various ingredients of cement concrete, preparation of concrete, discussion of different types of grades of concrete. Different types of Mortars, Preparation of Mortar.
MASONARY: Types of masonry, Types of bonds and their discussions.

UNIT -V
FOUNDATIONS: Shallow foundations. Spread, combined, strap and mat footings.
BUILDING COMPENENTS: Lintels, arches, staircase types. Different types of floors-concrete, mosaic, terrazzo floors, pitched, flat and curved roofs. Lean to roof, coupled roofs, trussed roofs-king and queen post trusses.

UNIT – VI
Building finishing: Discussion on damp proofing and water proofing materials used. Plastering, pointing, white washing and distempering – panting- constituents of paint –types of paints – panting of new and old woodvarnish- formwork and scaffolding.

TEXT BOOKS:
1. S.C. Rangwala, Engineering Materials, 41/e, Charotar Publishing House, 2014.
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P)ltd., New Delhi
3. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi

REFERENCES:
1. R.Chudly "Construction Technology "– Volumes I and II" 2nd Edition, Longman, UK, 1987.
2. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi
3. Building material by S K Duggal – New Age International Publishers; Second Edition

B.Tech II Year I Sem　　　　**ENGINEERING MATERIALS**　　　**T**　　**C**
　　　　　　　　　　　(Choise Based Credit Course For Non Civil)　　4+1*　　4

UNIT -I
STONES & LIME: Properties & classification of good building stones, stone quarrying, precautions in blasting of stones. Impurities in limestone, classification, slaking and hydration, hardening, testing, storage, handling.

UNIT-II BRICKS: Classification, characteristics of good bricks, ingredients of good brick earth, manufacture of bricks, types (clay bricks, fly ash, cellular light weight concrete brick, aerated cement concrete brick or autoclave brick) and properties, different forms of bricks, testing of bricks as per BIS, and defects of bricks
GLASS: Uses, types and properties.

UNIT – III
CEMENTS: Manufacturing of cement and various types of cements. Discussion on various tests for cement .Different grades of cement.
AGGREGATES: Classification of (fine and coarse) aggregates, Mechanical properties of aggregates**.**

UNIT - IV
Lintel: Necessity, materials: Wood, stone, brick, steel, R.C.C. and reinforced brick lintels.
Doors and windows: Classification, teak wood paneled door, flush door, aluminum glazed doors, and steel doors. Windows: Classification, teak wood glazed windows, aluminum glazed window, steel windows. **Stairs:** Technical terms, requirements of good stair, dimension of steps, Classification.

UNIT -V
Flooring: Components of a floor, selection of flooring materials, brick flooring, cement concrete flooring, mosaic, marble, terrazzo flooring, and tiled roofing.
Plastering and Pointing: Plastering with cement mortar, defects in plastering, pointing, white washing, colour washing, distempering,

UNIT- VI
PAINTS: Composition of oil paint, characteristic of an ideal paint, preparation of paint, painting plastered surfaces, painting wood surfaces, painting metal surfaces, defects, effect of weather, distemper.
ROOFS: Types, pitched roofs and their sketches, lean – to roof, king post ,truss, queen post truss and simple steel truss, roof covering materials: AC sheets

TextBook(s)
1. S.C. Rangwala, Engineering Materials, 41/e, Charotar Publishing House, 2014.
2. B.C. Punmia Building Construction 10/e, Laxmi Publication, 2012
Reference Books
1. P.C. Varghese, A Text Book Building Materials, 1/e, Prentice-Hall,
Publication, 2005.
2. Mohan Rai and M.P. Jain Singh, Advances in Building Materials and Construction by – publication by CBRI,1985.

B.Tech II Year I Sem   **SURVEYING**   **T**   **C**
                (Choise Based Credit Course Non Civil)   **4+1***   **4**

UNIT – I INTRODUCTION: Definition of surveying, Importance of surveying to civil Engineers, objectives of surveying , classification of surveying, principles of surveying

UNIT – II CHAIN SURVEYING: Methods of measuring distance-Types of chains-chaining on plane and sloping ground Field work-Booking of field notes-Basic problems in chaining

UNIT – III COMPASS SURVEYING: Working of prismatic & surveyor compass-Temporary & permanent adjustments- Designation of bearing-Reduced bearing-Fore and back bearing-Determination of included angles from measured bearings. (Simple Problems)
PLANE TABLE SURVEY: Description of plane table-Temporary Adjustments-Setting up the plane table

UNIT – IV
LEVELING: Concept and Terminology, Temporary and permanent adjustments method of leveling.
CONTOURING: Characteristics and Uses of contours, methods of conducting contour surveys.

UNIT – V
COMPUTATION OF AREAS: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries.
VOLUMES: Embankments and cutting for a level section (Simple Problems)

UNIT - VI
THEODOLITE: Theodolite, description, uses and adjustments, temporary and permanent, measurement of horizontal and vertical angles.
CURVES: Types of curves, design of simple and compound curves.

TEXT BOOKS:
1. "Surveying (Vol – 1, 2 & 3), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) ltd., New Delhi
2. Surveying and leveling by R. Subramanian, Oxford university press, New Delhi

REFERENCES:
1. Arthur R Benton and Philip J Taety, Elements of Plane Surying, McGraw Hill – 2000
2. Arror K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004
3. Chandra A M, "Plane Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
4. Chandra A M, "Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
5. Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.

UNIT – I

Environmental Pollution: Definition, Cause, effects and control measures of :1. Air pollution. 2. Water pollution 3. Soil pollution 4. Marine pollution 5. Noise pollution   6.Thermal pollution 7 Nuclear hazards.
SOLID WASTE MANAGEMENT: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - II AIR POLLUTION:

Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, effects on human health, animals and plants, effect on various structures, automobile pollution, effect of automobile pollution and its control.

UNIT – III NOISE POLLUTION:

Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.

UNIT – IV SOLID WATE MANAGEMENT:

Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

UNIT -V ENVIRNOMENTAL PROTECTION:

Introduction, Environment Protection Act. –Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. Public awareness. Water conservation, rain water harvesting, and watershed management**.**

UNIT – VI HUMAN POPULATION & THE ENVIRNOMENT:

Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. ,Infectious deseases,-Tuber colossi,cancer,Water Borne Deseases-Malaria,Diheria -Women and Child Welfare. - Role of information Technology in Environment and human health. -Case Studies.

TEXT BOOKS:
1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers.
2.Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for
   University Grants commission.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.
4. A Basic Course in environmental Studies by S.Deswal and A.Deswal ,Dhanpat Rai & Co
REFERENCS :
 1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
 2. Water and Waste Water Technology by Steel
 3. Environmental Science and Engineering by J.G.Henry and G.W.Heinke – Person Education..
 4. Waste water Engineering by Metcalf and Edd

B.Tech   II Year II Semester   Course Structure

S.No.	Abbrev iation	Subject	Periods / Week			Credits
			L	T	P	
1.		Concrete Technology	4	1	-	4
2.		Electrical & Mechanical Technology	4	1	-	4
3.		Strength of Materials- II	4	1	-	4
4.		Hydraulics and Hydraulic Machinery	4	1	-	4
5.		Structural Analysis - I	4	1	-	4
6.		Building Planning and Drawing	3	-	3	4
7.		Fluid Mechanics and Hydraulic Machinery Lab	-	-	3	2
8.		Concrete Technology Lab	-	-	3	2
9.		Comprehensive Online Examination				2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P – Practical

B.Tech II Year II Sem   **CONCRETE TECHNOLOGY**   T   C

                                                                          4+1*   4

UNIT- I
CEMENTS: Portland cement, chemical composition, Test`s on physical properties, Different grades of cement
ADMIXTURES: Admixtures – Mineral and chemical admixtures.

UNIT – II
AGGREGATES: Classification of aggregate, Particle shape & texture, Bond, strength , Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate,Bulking of sand, Grading of fine & coarse Aggregates

UNIT – III
FRESH CONCRETE: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT – IV
STRENGTH OF CONCRETE: Water / Cement ratio, Nature of strength of concrete, Strength in tension & compression, Factors affecting strength
TESTING OF HARDENED CONCRETE: Compression tests, Tension tests, Factors affecting strength, Flexure tests, Splitting tests, methods of non destructive test of concrete, rebound hammer test, ultrasonic pulse velocity test.

UNIT – V
MIX DESIGN: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete Proportioning of concrete mixes by various methods – ACI method & IS 10262 method

UNIT – VI
SPECIAL CONCRETES: Light weight aggregate concrete, Fibre reinforced concrete, types of fibres, Factors affecting properties of F.R.C, No fines Concrete, High Performance Concrete.

TEXT BOOKS:
1. Concrete Technology by M.S.Shetty. – S.Chand & Co.; 2004

REFERENCES:
1. A.M. Neville and J.J. Brooks, Concrete Technology,2/e,Prentice Hall, 2010.
2. A.R. Santhakumar, "Concrete Technology", Oxford University Press India,2006.
3. M.L. Gambhir, Concrete Technology, 5/e, Tata McGraw-Hill Education, 2013.

B.Tech II Year II Sem   ELECTRICAL AND MECHANICAL TECHNOLOGY   T   C
4+1*   4

UNIT – I
DC machines: Principles of operation of DC Generator - emf equation – types – DC motor types – torque equation – applications – three starter.

UNIT – II
Transformers: Principles of operation of single phase transformers – emf equation – losses – efficiency and regulation.
AC Machines: Principles of operation of alternators – regulation by synchronous impedance method – principle of operation of induction motor slip – torque characteristics – applications.

UNIT III
Instruments : Basic Principles of indicating instruments – permanent magnet moving coil and moving iron instruments, Data acquisition system.

UNIT IV
Welding Processes : Introduction to welding classification of welding processes, Oxyacetylene Welding – equipment, welding fluxes and filler rods, Gas cutting, Introduction to arc welding – Manual metal arc welding. Submerged arc welding, TIG and MIG processes, soldering and brazing importance, comparison and applications.

UNIT V
 Description and working of steam engines and steam turbines (Prime Movers) – Impulse and reaction turbines. Description and working of I.C. Engines – 4 stroke and 2 stroke engines – Comparison – Gas turbines – Closed and open type Gas Turbines.

UNIT VI
Reciprocating Air compressors, transmission of power : Belt, Rope, Chain and gear drive – simple problems. Basic principles of refrigeration and air-conditioning. Earth moving machinery and Mechanical handling equipment – bull dozers – power showels- Excavators- concrete mixer – Belt and bucket conveyers.

Text books:
Electrical Technology by BL Thereja, S.Chand Publishers
Introduction to Electrical Engineering- MS Naidu & S.Kamakshaiah, TMH
Mechanical Technology by Khurmi
Mechanical Technology by Kodandaraman C.P
Construction Planning: Equipment and Methods-Purify

B.Tech II Year II Sem   **STRENGTH OF MATERIALS - II**   T   C
                                                                                                                    4+1*   4

UNIT – I
PRINCIPAL STRESSES AND STRAINS: Introduction – Stresses on an inclined section 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, Mohr's circle of stresses – Principal stresses and strains, Combined bending and torsion and end thrust

UNIT – II
THEORIES OF FAILURES: Introduction, Various Theories of failures like Maximum Principal stress theory, Maximum Principal strain theory, Maximum shear stress theory, Maximum strain energy theory, Maximum shear strain energy theory. Design of shafts according to theories of failure.
SPRINGS: Introduction, Types of springs, deflection of close and open coiled helical springs under axial pull and axial couple, springs in series and parallel.

UNIT – III
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, Thick spherical shells.

UNIT – IV
DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and B.M,. core of a section, determination of stresses in the case of chimneys, retaining walls and dams, conditions for stability, stresses due to direct loading and B.M. about both axis.

UNIT – V
UNSYMETRICAL BENDING: Introduction – centroidal principal axes of section, Graphical method for locating principal axes, Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid, Location of neutral axis Deflection of beams under unsymmetrical bending.

UNIT – VI
BEAMS CURVED IN PLAN: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.

TEXT BOOKS:
1. Strength of Materials by S. Ramamrutham
2. A Text book of Strength of materials by R.K.Bansal –Laxmi Publications (P) ltd., New Delhi
3. Strength of Materials by B.C. Punmia
4. Strength of materials by R.K.Rajput, S.Chand & Co, New Delhi.
REFERENCES:
1. Mechanics of Solid, by Ferdinandp Beer and others – Tata Mc.Grawhill Publications 2000.
2. Strength of Materials by Schaum's out line series – Mc. Graw hill International Editions.
3. Mechanics of Materials by Gere & Thimoshenko
4. Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Delhi.
5. Mechanics of Solids by Poppov
6. Strength of materials by R. Subramanian, Oxford university press, New Delhi

UNIT – I
OPEN CHANNEL FLOW: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's and Manning's for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows. Dynamic equation for G.V.F, Slopes, surface profiles, R.V.F – Hydraulic jump, energy dissipation.

UNIT – II
 NON – UNIFORM FLOW: Concept of specific energy; Specific energy curves; Critical flow; Critical flow in a rectangular channel; Critical slope
WATER HAMMER IN PIPES: Definition - Equation for pressure rise due to gradual closure of valves – Equation for pressure due to sudden closure of valves in rigid & elastic pipes, problems – Surge tanks, their functions and types.

UNIT - III
HYDRAULIC SIMILITUDE: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT – IV
BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines.

UNIT - V
HYDRAULIC TURBINES: Layout 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 - draft tube – theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitations'. (Basic concepts only)

UNIT – VI
CENTRAIFUGAL-PUMPS: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel- performance of pumpscharacteristic curves- NPSH-cavitation.

TEXT BOOKS:
1. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi
2. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.

REFERENCES :
1. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
2. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
3. Open Channel flow by V.T.Chow, Mc.Graw Hill book company.
4. Hydraulic Machines by Banga & Sharma Khanna Publishers.
5. Open Channel flow by K,Subramanya . Tata Mc.Grawhill Publishers
6. Fluid Mechanics & Fluid Power Engineering by D.S. Kumar Kataria & Sons.
7. Hydraulics, Fluid Mechanics and Fluid Machines by S Ramamrutham, Dhanapat Rai Publishing Company

UNIT – I
FIXED BEAMS – Introduction to statically indeterminate beams with U.D. load central point load, eccentric point load. Number of point loads, uniformly varying load,Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT – II
CONTINUOUS BEAMS : Introduction-Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT-III
SLOPE-DEFLECTION METHOD: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT – IV
MOMENT DISTRIBUTION METHOD: Introduction, application to continuous beams with and without settlement of supports

UNIT – V
MOVING LOADS: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads

UNIT -VI
INFLUENCE LINES: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section- U.D. load longer than the span, U.D.load shorter than the span

TEXT BOOKS:
1. Analysis of Structures-Vol I & Vol II by V.N. Vazirani & M.M.Ratwani, Khanna Publications, New Delhi.
2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
3. Basic structural Analysis by C.S. Reddy, Tata Mc Graw Hill, New Delhi

REFERENCES:
1. Mechanics of Structures by S.B. Junnarkar, Charotar Publishing House, Anand, Gujrat
2. Theory of Structures by Gupta, Pandit & Gupta; Tat Mc.Graw – Hill Publishing Co.Ltd., New Delhi.
3. Theory of Structures by R.S. Khurmi, S. Chand Publishers
4. Strength of Materials and Mechanics of Structures- by B.C.Punmia, Khanna Publications, New Delhi.
5. Introduction to structural analysis by B.D. Nautiyal, New age international publishers, New Delhi
6. Structural Analysis by V.D.Prasad Galgotia publications, 2nd Editions.
7. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan & Dr. P.Perumal- Laxmi publications pvt. Ltd., New Delhi

B.Tech II Year II Sem   **BUILDING PLANNING AND DRAWING**   **T**   **C**
                                                      4+1*   **4**

PART-A

UNIT – I : BUILDING BYELAWS & REGULATIONS: Introduction, Terminology – Objectives of building byelaws Floor area ratio (FAR), Floor space Index (FSI), Principles underlying building byelaws, classification of bye buildings, Open space requirements, built up area limitations, Height of Buildings, Wall thickness, lighting and ventilation requirement.

UNIT – II: Residential Buildings: Minimum standards for various parts of buildings, requirements of different rooms and their grouping, characteristics of various types of residential buildings.

UNIT – III: Public Buildings: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

PART-B

UNIT – IV: SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminium alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT – V: DOORS WINDOWS, VENTILATORS AND ROOFS: Panalled Door paneled and glazed door, glazed windows, paneled windows, Swing ventilator, fixed ventilator, Couple roof, Collar roof, King Post truss, Queen post truss.

UNIT – VI : Given line diagram with specification to draw, plan, sections section and elevation

Note: Final examination pattern: Part- A Three questions out of 5 Each Question 14 marks from unit I to III Part- B One question out of Two (compulsory) for 28 marks from unit IV to VI. The duration of the exam will be 4 hours

TEXT BOOKS:
1. 2. Building Planning & Drawing by Dr N. Kumaraswamy
3. Planning and Designing and Scheduling – Gurucharan singh and Jagadish singh- Standard publishers.
4. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications

REFERENCE:
1. Building by laws bye state and Central Governments and Municipal corporations.
2. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur
3. Construction Planning, Equipment and methods by R.L. Peurifoy etal. – Tata Mc. Graw Hill Publications

B.Tech   III Year I Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Managerial Economics and Financial Accounting	4	1	-	4
2.		Design of Reinforced Concrete Structures	4	1	-	4
3.		Environmental Pollution and Control	4	1	-	4
4.		Water Resources Engineering	4	1	-	4
5.		Structural Analysis- II	4	1	-	4
6.		Engineering Geology	4	1	-	4
7.		Engineering Geology Lab	-	-	3	2
8.		Survey Camp*	-	-	3	2
9.		Advanced Communication Skills			3	
		TOTAL	24	6	9	28

L – Lecture, T – Tutorial, P – Practical

UNIT I
Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand determinants, Law of Demand and its exceptions.

UNIT II
Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT III
Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT IV
Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.
Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

UNIT V
Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT VI
Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS:
1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCES:
1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
8. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.Dwivedi:ManagerialEconomics, 6th Ed., Vikas

UNIT –I : INTRODUCTION Brief Introduction of working stress, ultimate load, and limit state, working stress: design, singly and doubly reinforced beam.
LIMIT STATE DESIGN: Limit State Design: Concepts, Characteristic loads, Characteristic strength, Partial load and safety factors, Assumptions, stress -block parameters.

UNIT –II : Beams: Limit state of collapse for singly reinforced, doubly reinforced, T beam, simply supported and continuous beams and detailing.

UNIT –III : Columns: Design of Short and Long columns subjected to axial loads, uniaxial bending and biaxial bending.

UNIT –IV : Footings: Design of isolated, square, and rectangular footing.

UNIT – V : Slabs: Design of Two-way slabs, one way slab, and continuous slab and introduction to flat slab theory only Using I S Coefficients.
UNIT –VI : Serviceability: Limit state design for serviceability for deflection and cracking

TEXT BOOKS:
1. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
2. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers.
3. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishres, New Delhi.
4. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
REFERENCES:
1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd.New Delhi
4. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers.
5. Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi.

UNIT – I
INTRODUCTION: Importance and Necessity of Protected Water Supply systems, Objectives of Protected water supply system, Flow chart of public water supply system, Role of Environmental Engineer.
WATER DEMAND AND QUANTITY STUDIES : Estimation of water demand for a town or city, Types of water demands, Per capita Demand, Factors affecting the Per Capita Demand.
QUALITY AND ANALYSIS OF WATER: Characteristics of water – Physical, Chemical and Biological. Analysis of Water-Impurities in water, Water borne diseases. Drinking water quality standards.

UNIT - II
WATER TREATMENT: Layout and general outline of water treatment units - coagulation – coagulants – feeding arrangements. Filtration and Chlorination**:** Filtration – theory – working of slow and rapid gravity filters – disinfection – theory of chlorination, chlorine demand, other disinfection practices.

UNIT – III
INTRODUCTION TO SANITATION : Systems of sanitation, relative merits & demerits – collection and conveyance of waste water – sewerage – classification of sewerage systems- types of sewers– design of sewers.
WASTE WATER COLLECTION AND CHARACTERSTICS : Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage – B.O.D. – C.O.D. equations.

UNIT IV
WASTE WATER TREATMENT: Layout and general out line of various units in a waste water treatment plant – primary treatment: design of screens – grit chambers – skimming tanks – trickling filters – standard and high rate – Construction and design of Oxidation ponds.
SLUDGE TREATMENT: Sludge digestion – factors effecting – septic tanks and Imhoff Tanks- working principles.

UNIT – V
SOLID WATE MANAGEMENT: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management.
UNIT - VI
AIR POLLUTION: Types of pollutants, their sources and impacts, air pollution control, air quality standards and limits.
NOISE POLLUTION: Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.

TEXT BOOKS:
1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi
3. Water supply and sanitary Engineering by S.K.Garg,

REFERENCS :
   1.   Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
 2.   Water and Waste Water Technology by Steel
 3.   Environmental Science and Engineering by J.G.Henry and G.W.Heinke – Person Education..
 4.   Water and Waste Water Engineering by Fair Geyer and Okun
 5.   Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
 6.   Waste water Engineering by Metcalf and Eddy

UNIT –I INTRODUCTION: Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data.

UNIT-II ABSTRACTION FROM RAINFALL: Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-evapotranspiration-Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices. Runoff-components of runoff, factors affecting runoff, separation of base flow.

UNIT-III HYDROGRAPHY: Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph, S-hydrograph, IUH, Synthetic Unit Hydrograph.

UNIT-IV GROOUND WATER: Ground water Occurrence, types of aquifers, aquifer parameters, Darcy's law, steady and unsteady unidirectional flow in un-confined and confined aquifers, radial flow to wells in confined and unconfined aquifers.

UNIT-V IRRIGATION: Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility. Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, consumptive use, estimation of consumptive use, Duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

UNIT-VI CANALS: Classification of canals, design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, canal lining-classification of lining.

TEXT BOOKS:
1. Engineering Hydrology by Jayarami Reddy, Laxmi publications pvt. Ltd., New Delhi
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi
3. Engineering Hydrology by K.Subramanya, The Tata Mcgraw Hill Company, Delhi

REFERENCES:
1. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
2. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
3. Engineering Hydrology by c.s.p.ojha ,Oxford Pubilishers, New Delhi
4. Applied Hydrology by Ven Te Chow, David R.maidment and Larry W.Mays, The Tata Mcgraw Hill Edition, New Delhi
5. Applied Hydrology by Ven Te Chow, David R.maidment and Larry W.Mays, The Tata Mcgraw Hill Edition, New Delhi

UNIT I
ARCHES: Three hinged arches, Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.

UNIT – II
TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal thrust and radial shear, Rib shortening and temperature stresses, – fixed arches – (No Problems).

UNIT – III
MOMENT DISTRIBUTION METHOD : Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal frames.

UNIT – IV
KANI'S METHOD: Basic concepts- Analysis of continuous beams – including settlement of supports and single bay portal frames with out side sway and with side sway by Kani's method.

UNIT – V
Approximate method of structural analysis, application to building frames. (I) Portal method (ii) Cantilever method.(Two span or two bays)

UNIT-VI
INTRODUCTION TO MATRIX METHODS: Introduction, application to continuous beams including support settlements

TEXT BOOKS:
1. Analysis of Structures – Vol. I & 2 by Bhavikathi, Vikas publications
2. Analysis of structures by Vazrani & Ratwani – Khanna Publications.
3. Strength of Materials and mechanics of solids Vol-2 by B.C. Punmia, Laxmi Publications, New Delhi
4. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan & Dr. P.Perumal- Laxmi publications pvt. Ltd., New Delhi

REFERENCES:
1. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.
2. Theory of structures by Ramamuratam
3. Structural Analysis by C.S. Reddy, Tata McGraw-Hill, New Delhi
4. Structural Analysis(Level – 5) – By SR Mangalagiri – Longman Group Ltd (Longman Technical Series – Construction and Civil Engineering)

ENGINEERING GEOLOGY   T   C

                                                                  4+1*   **4**

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 draw backs. Importance of Physical geology, Petrology and Structural geology.

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

UNIT II: MINERALOGY: 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: Feldspar , 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.

UNIT III: 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 study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT IV: STRUCTURAL GEOLOGY: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults un conformities, and joints – their important types. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India

UNIT V: EARTH QUAKE &LAND SLIDES: Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of earth quakes and land slides.

GEOPHYSICAL STUDIES: Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc.

UNIT VI: GEOLOGY OF DAMS AND RESERVOIRS: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factor's Contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs.

TUNNELS: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations. Structural and ground water in tunneling over break and lining in tunnels.

TEXT BOOKS:
1. Engineering Geology by N.Chennkesavulu, Mc-Millan, India Ltd. 2005
2. Engineering Geology by D.Venkata Reddy, Vikas Publications, New Delhi.
REFERENCES:
1. Engineerring geology by Prabin singh
2. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992
3. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution,
4. Engineering Geology by Mukarjee, World Press.
5. Foundations of Engineering Geology by Tony Waltham, Special Indian Edition, CRC Press NewDelhi

B.Tech   III Year II Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Water & Waste Water Treatment	4	1	-	4
2.		Soil Mechanics	4	1	-	4
3.		Design of Steel Structures	4	1	-	4
4.		Design of Irrigation Structures	4	1	-	4
5.		Highway Engineering	4	1	-	4

6.		Choice Based Credit Courses (For Non Civil Students)
		  1. Geo Informatics
		  2. Disaster Mitigation and Management
		  3. Environmental Impact Assessment
			4	1	-	4

7.		Highway Engineering Lab	-	-	3	2
8.		Environmental Engineering Lab	-	-	3	2
9.		Comprehensive Online Examination				2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P – Practical

UNIT-I: Introduction: Necessity and importance of water works, Population forecasts, design period – water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards - Waterborne diseases - Comparison from quality and quantity and other considerations.

UNIT II: Water Supply Sources: Surface, Sub-surface, and Ground Waters – Hydrology and Impounded Storage Requirements –Mass–Inflow Curve, Hydraulics of Ground Water Flow – Estimating Yields of Wells by Steady State Methods (without derivation) – Intake Structures for Different Sources – River, Canal, Lake, Reservoir, Wells and Infiltration Galleries – Construction, Rain water harvesting.

UNIT III: Water Transmission Systems: Gravity and Pressure Systems – Hydraulics and Design of Pressure Pipes – Analytical Methods and Nomograms – Series and Parallel Pipes - Different Materials of Pipes - Selections and Class of Pipes – Laying, Jointing and Testing of Commonly used Pipes – Appurtenances of Pipes – Pumps and their Selections – Pumping Stations - Automatic Controls.

UNIT IV: Water Treatment: Layout and general outline of water treatment units, sedimentation, principles, design factors, coagulation, flocculation clarifier design, coagulants, feeding arrangements

UNIT V: Filtration and Chlorination: 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, and other disinfection practices- Miscellaneous treatment methods.

UNIT VI: Water Distribution Network Analysis : Distribution systems – Requirements, Layout of Water distribution systems - Design procedures- method of sections, Hardy Cross and equivalent pipe methods service reservoirs – Operation and Maintenance of Distribution Systems – Leak Detection, Corrosion Control and Langelier Index, and Lining of Pipes – Storage Reservoirs – Types, Functions, Location, and Capacity – House Connections and Appurtenances

TEXT BOOKS:
1. Raju, B.S.N., "Water Supply and Waste Water Engineering", Tata McGraw-Hill Book Co., New Delhi, 1995.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi
3. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers.
4. Water supply and sanitary Engineering by S.A.Garg,
5. Birdie, G.S., and Birdie, J.S., "Water Supply and Sanitary Engieneering", 8th Edn., Dhanpat Rai and Sons Ltd., 1997.

REFERENCS:
1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel
3. Introduction to Environmental Engineering by Mackenzie, Devis and David.A.Cornwell, TMH Publications, New Delhi

UNIT – I
INTRODUCTION: Origin and Soil formation, soil structure and clay mineralogy, Adsorbed water, Mass-volume relationship, Relative density.

UNIT – II
INDEX PROPERTIES OF SOILS: Moisture Content, Specific Gravity, Insitu density, Grain size analysis – Sieve and Hydrometer methods, consistency limits and indices – I.S. Classification of soils

UNIT –III
PERMEABILITY: Soil water, capillary rise, flow of water through soils, Darcy's law- permeability,Factors affecting – laboratory determination of coefficient of permeability, Permeabillity of layered systems.
SEEPAGE THROUGH SOILS: Total, neutral and effective stresses, quick sand condition, Seepage through soils – Flownets: Characteristics and Uses.

UNIT – IV
STRESS DISTRIBUTION IN SOILS: Boussinesq's and Wester gaard's theories for point loads and areas of different shapes, Newmark's influence chart, construction and uses.

UNIT – V
COMPACTION: Mechanism of compaction, factors affecting, effect of compaction on physical and engineering properties of soils. Field compaction Equipment.
CONSOLIDATION: Stress history of clay; e-p and e-log p curves – magnitude and rate of 1-D consolidation Terzaghi's Theory.

UNIT – VI
SHEAR STRENGTH OF SOILS: Stress at a point, Mohr circle of stress, Mohr-Coulomb Failure theories – Types of laboratory strength tests, strength tests based on drainage conditions – Shear strength of sands – Critical Void Ratio, Liquefaction-shear strength of clays.

TEXT BOOKS:
1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi
2. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
3. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.
4. Geotechnical Engineering V.N.S.Murthy, CRC Press, Newyork, Special Indian Edition.

REFERENCES:
1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
2. Soil Mechanics – T.W. Lambe and Whitman, Mc-Graw Hill Publishing Company, Newyork.
3. Geotechnical Engineering by Brije.M.Das, Cengage Publications, New Delhi.
4. Geotechnical Engineering by Purushotham Raj.
5. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi

UNIT – I
INTRODUCTION: Fundamental concepts of design of structures, different types of rolled steel sections available to be used in steel structures, stress strain relationship for steel. Concept of limit State Design Different Limit States as per IS 800 -2007. Design Strengths- deflection limits, serviceability,
TENSION MEMBERS: Bolted connections,Welded connections, Design Strength, Efficiency of joint – Prying action Types of Welded joints - Design of Tension members – Design Strength of members.

UNIT – II
COMPRESSION MEMBERS: Design of compression members, Buckling class, slenderness ratio / strength design – laced – battened columns, column splice, column base – slab base.

UNIT – III
DESIGN OF BEAMS: Plastic moment – Bending and shear strength laterally / supported beams design – Built up sections – large plates Web buckling Crippling and Deflection of beams, Design of Purlin.

UNIT – IV
Design of eccentric connections with brackets, Beam end connections – Web angle – Un-stiffened and stiffened seated connections (bolted and Welded types) Design of truss joints

UNIT – V
PLATE GIRDER: Plate Girder: Design consideration – I S Code recommendations Design of plate girder-Welded – Curtailment of flange plates stiffeners – splicings and connections.

UNIT – VI
GANTRY GIRDER: Gantry girder impact factors – longitudinal forces, Design of Gantry girders.

Note: The students should prepare the following plates.
Plate 1 Detailing of simple beams
Plate 2 Detailing of Compound beams including curtailment of flange plates.
Plate 3 Detailing of Column including lacing and battens.
Plate 4 Detailing of Column bases – slab base and gusseted base
Plate 5 Detailing of steel roof trusses including particulars at joints.
Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

TEXT BOOKS
1. Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi
2. Design of Steel Structures by Ramachandra. Vol – 1, Universities Press. Hyderabad
3. Steel Structures by Subramanyam.N, Oxford University press, New Delhi
4. Structural Design and Drawing by N.Krishna Raju; University Press, Hyderabad.

REFERENCES
1. Comprehensive Design of Steel structures, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.
2. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi
3. Design of Steel Structures by P.Dayaratnam; S. Chand Publishers
4. Design of Steel Structures by M.Raghupathi, Tata Mc. Graw-Hill.

UNIT – I CANAL REGULATION WORKS: Canal falls: Necessity and location of falls; Types of falls; Canal regulators: off-take alignment; head regulators and cross-regulators;

CROSS DRAINAGE WORKS: Introduction; types of cross drainage works; selection of suitable type of cross drainage work; classification of aqueducts and siphon aqueducts
.

UNIT-II STREAM GAUGING: Necessity; Selection of gauging sites; Area-Velocity method; Slope-Area method.

RIVER ENGINEERING: Classification of rivers; Meandering; Causes of meandering; Basic factors controlling process of meandering; Aggrading type of river; Degrading type of River; River training: objectives, Classification of river training works;

UNIT-III RESERVOIR PLANNING: Introduction; Investigations for reservoir planning; Selection of site for a reservoir; Zones of storage in a reservoir; Mass inflow curve and demand curve; Sediment flow in streams: Reservoir sedimentation; Life of reservoir; Reservoir sediment control; Flood routing ;Methods of flood routing

DAMS : Introduction; Classification according to use; classification according to material- Gravity dams, Arch dams,Earth dams -advantages and disadvantages; Physical factors governing selection of type of dam ; selection of site for a dam.

UNIT-IV GRAVITY DAMS: Introduction; Forces acting on a gravity dam; Combination of loading for design; Modes of failure: stability requirements; Stability analysis; Elementary profile of a gravity dam;High and low gravity dams; Stability analysis of non–overflow section of Gravity dam.

EARTH DAMS: Introduction; Types of earth dams; Causes of failure of earth dams; Criteria for safe design of earth dams; Seepage control measures.

UNIT-V SPILLWAYS: Introduction; Types of spillways; Profile of ogee spillway; Stilling basins; Indian standards on criteria for design of hydraulic jump type stilling basins with horizontal aprons.

UNIT – VI WATER POWER ENGINEERING: Development of hydro power in India; Classification of hydel plants: runoff river plants, storage plants and pumped storage plants; Investigation and planning; components of hydel schemes – fore bay, intake structure, surge tanks, penstocks ,power house, turbines-selection of suitable type of turbine, definition of gross head ,operating head ,effective head.

TEXT BOOKS:
 1. Irrigation and Water Power Engineering by Dr. B.C.Punmia & Dr. Pande B.B. Lal; Laxmi
 2. Publications pvt. Ltd., New Delhi. Irrigation Engineering and Hydraulic Structure by S. K. Garg; Khanna Publishers, Delhi.
 3. Irrigation, Waterpower and Water Resources Engineering by K R Arora; Standard Publication,New Delhi.

REFERENCES:
1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
3. Water resources engineering by Satyanarayana Murthy. Challa, New Age International Publishers
4.Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers
5. Irrigation and Water Power Engineering by Punmia and Lal, Laxmi Publications, New Delhi

UNIT I
HIGHWAY DEVELOPMENT AND PLANNING:
Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT – II
HIGHWAY MATERIALS: Soil, Aggregate and Bitumen- Tests on aggregates – Aggregate Properties and their Importance- Tests on Bitumen – Bituminous Concrete- Requirements of Design Mix- Marshall's Method of Bituminous Mix design

UNIT – III
HIGHWAY GEOMETIC DESIGN:
Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance- Design of Horizontal Alignment- Design of Superelevation and Extra widening- Design of Transition Curves- Design of Vertical alignment-Gradients- Vertical curves.

UNIT – IV
FLEXIABLE PAVEMENT DESIGN:
Types of pavements – Difference between flexible and rigid pavements – Pavement Components – Sub grade, Sub base, base and wearing course – Functions of pavement components – Design Factors – Flexible pavement Design methods – G.I method, CBR Method, Triaxial method – Numerical examples

UNIT – V
RIGID PAVEMENT DESIGN:
Design of Rigid pavements – Critical load positions - Westergaard's stress equations – computing Radius of Relative stiffness and equivalent radius of resisting section – stresses in rigid pavements – Design of Expansion and contraction joints in CC pavements. Design of Dowel bars and Tie bars.

UNIT – VI
HIGHWAY CONSTRUCTION: Construction of Earth Roads- Gravel Roads – WBM Roads- Bituminous Pavements- Cement Concrete Roads- Steps in Construction- Reinforced Concrete Pavements – Soil Stabilization – Methods and Objectives- Soil-cement Stabilization and Soil-lime Stabilization.

TEXT BOOKS:
   1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000)
    2. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
    3. Text book of Highway Engineering by R.Srinivasa Kumar, Universities Press, Hyderabad.

Reference Books:
   1. Traffic Engineering and Transportation planning by L.R.Kadiyali and Lal- Khanna Publications.
   2. Transportation Engineering an introduction by Khisty Lal, Pearson Pubilications
   3. Highway Engineering – S.P.Bindra , Dhanpathi Rai & Sons. – 4th Edition (1981)
   4. Introduction to Transportation Engineering by James.H.Banks, Tata Mc.Grawhill Edition, NewDelhi
  5. Traffic and Highway Engineering Nicholas.J.Garber & Lester A.Hoel, Cengage Learning.
  6. High way engineering by Paul .H.Wright & Karen K.Dixon,wiley india limited
  7. A Text book of Transportation Engineering by S.P.Chandola, S.Chand Publications, New Delhi.

UNIT – I
INTRODUCTION TO PHOTOGRAMMETRY: Principle and types of aerial photographs, scales, stereoscopy, ground control, Parallax measurements for height, determinations.

UNIT – II
REMOTE SENSING: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, introduction to digital data analysis.

UNIT – III
GEOGRAPHIC INFORMATION SYSTEM: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

UNIT – IV
TYPES OF DATA REPRESENTATION: Data collection and input overview, data input and output.
Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – V
GIS SPATIAL ANALYSIS: Introduction, geospatial data analysis, integration and modeling of spatial data, geospatial data analysis methods, database query, geospatial measurements, overlay operations, network analysis, surface analysis, geostatistics, geovisualization,

UNIT – VI
REMOTE SENSING & GIS APPLICATIONS : Flood management; Reservoir sedimentation; Geomorphology; Monitoring urban growth; Military operations; Watershed management, Satellite surveillance for drought conditions; Estimating forest cover, Water resources management, Land use/Land cover – changes and mapping; Agriculture – crop type mapping, monitoring and damage assessment; Ground Water Targeting, Identification of sites for artificial Recharge structures.

TEXT BOOKS:
1 Remote Sensing and GIS by B.Bhatta,Oxford University Press,New Delhi.
2 Advanced surveying : Total station GIS and remote sensing – Satheesh Gopi – Pearson publication.
3 Geographical Information Science by Narayana Panigrahi, University press,New Delhi
4 GIS by Kang – tsung chang, TMH Publications & Co.,
5 Principals of Geo physical Information Systems – Peter A Burragh and Rachael Mc Donnell, Oxford Publishers 2004

REFERENCES:
1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
3. The GIS book by Korte,cengage pubilications,New Delhi.
4. Fundamental of GIS by Mechanical designs John Wiley & Sons.
5. Remote sensing and GIS by M.Anji reddy ,B.S.Pubiliications,New Delhi.
6. Remote Sensing and its applications by LRA Narayana University Press 1999.
7. Geoinformation for Development by Zeil/Kienberger (Eds) – Univ.Science Press, New Delh

B.Tech IV Year I Sem   DISASTER MITIGATION AND MANAGEMENT   T   C
(Choice Based Credit Courses for non Civil students)   4+1*   4

Unit-I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit–II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards

Unit–III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Unit –IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters Infrequent events: Cyclones – Lightning – Hailstorms Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation)Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves.Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation).Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced   Hazards   /Disasters-   Physical   hazards/   Disasters-Soil   Erosion

Unit –V

Soil Erosion: Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion.Chemical hazards/ disasters:-- Release of toxic chemicals, nuclear explosion- Sedimentation processes.Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems-Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation.Biological hazards/ disasters:- Population Explosion.

Unit –VI

Emerging   approaches   in   Disaster   Management-   Three   Stages
1. Pre- disaster stage (preparedness) 2. Emergency Stage   3. Post Disaster stage-Rehabilitation

Text books:
1. Disaster Management by Rajib Shah, Universities Press, India, 2003
2. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni
3. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning

References
1.Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
2.R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
3.H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
4.R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
5.Dr.Satender,Disaster   Management   t   in   Hills,   Concept   Publishing   Co.,   New Delhi, 2003

B.Tech IV Year II Sem   **Environmental Impact Assessment**   **T   C**
                                   (Choice Based Credit Courses for non Civil students)   4+1*   4

UNIT – I : Basic concept of EIA : Initial environmental Examination, Elements of EIA, factors affecting E-IA Impact evaluation and analysis, preparation of Environmental Base map, participants in EIA process and main stages of EIA process.

UNIT- II : E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, Leopold Interaction matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT –III : Quality Assessment using EIA: Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives, Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation

UNIT-IV : Quality Assessment using EIA: Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, generalized approach for assessment of Air pollution Impact.

UNIT –V : Environmental Evaluation systems, Preparation of Environmental Impact statements.

UNIT-VI : Case Studies: Case studies and preparation of Environmental Impact assessment statement for various Industries namely thermal power plants, steel plant, highway and pharmaceutical industries.

TEXT BOOKS:
1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad
2. Canter, L.W., " Environmental Impact Assessment ", McGraw Hill, New York, 1996.

REFERENCES:
1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katania & Sons Publication., New Delhi.
2. Petts, J., " Handbook of Environmental Impact Assessment Vol. I and II ", Blackwell Science, London, 1999.
3. The World Bank Group., " Environmental Assessment Sourcebook Vol. I, II and III ", The World Bank, Washington, 1991

B.Tech   IV Year I Semester   Course Structure

S.No.	Abbreviation	Subject	Periods / Week			Credits
			L	T	P	
1.		Foundation Engineering	4	1	-	4
2.		Estimation, Costing & Valuation	4	1	-	4
3.		Advanced Structural Design	4	1	-	4
4.		Pre-stressed Concrete	4	1	-	4
5.		**Choice Based Credit Courses;: (for Civil students)** 5.Geoinformatics 6.Water Resources System Planning and Management 7.Bridge Engineering 8.Disaster Mitigation & Management	4	1	-	4
6.		**Choice Based Credit Courses;: (for Civil students)** 5.Traffic Engineering 6.Construction Planning and Project Management 7.Ground Improvement Techniques 8.Earthquake Resistant Design	4	1	-	4
7.		CAD Lab	-	-	3	2
8.		Geotechnical Engineering Lab	-	-	3	2
		Mini Project	-	-	-	2
		TOTAL	24	6	6	30

L – Lecture, T – Tutorial, P – Practical

B.Tech IV Year I Sem **FOUNDATION ENGINEERING** T C
  4+1* 4

UNIT I
SHALLOW FOUNDATIONS: General requirements of foundations. Types of shallow foundations and the factors governing the selection of a type of shallow foundation. Bearing capacity of shallow foundations by Terzaghi's theory and Meyerhof's theory, Local shear and general shear failure and their identification. Bearing capacity of isolated footing resting on stratified soils.

UNIT II
ANALYSIS AND STRUCTURAL DESIGN OF R.C.C. FOOTINGS: Analysis and structural design of R.C.C. isolated, combined and strap footings.

UNIT III
DEEP FOUNDATIONS-I: Pile foundations-types of pile foundations- Estimation of bearing capacity of pile foundation by dynamic and static formulae- Bearing capacity and settlement analysis of pile groups-principle of functioning of under reamed pile.

UNIT IV
DEEP FOUNDATIONS – II: Well foundations – elements of well foundation- Forces acting on a well foundation- Depth and bearing capacity of well foundation- Problems associated with well sinking.

UNIT V
SHEET PILE WALLS: Cantilever sheet piles, Earth Pressure diagram, Determination of depth of embedment in sands and clays – Forces in struts.

UNIT VI
FOUNDATIONS IN PROBLEMATIC SOILS: Foundations in black cotton soils- basic foundation problems associated with black cotton soils- Use of Cohesive Non Swelling (CNS) layer below shallow foundations.

TEXT BOOKS :
1. Analysis and Design of Foundations and Retaining Structures- Shamsher Prakash, Gopal Ranjan and Swami Saran.
2. Foundation Design-Teng.
3. Geotechnical Engg. – C.Venkatramaiah.
4. Geo technical engineering by V.N.S.Murthy,CRC Press,New Delhi Design of Reinforced concrete Foundations by P.C. Varghese, PHI Publications, New Delhi.

REFERENCES:
1. Analysis and Design of Foundations – E.W.Bowles.
2. Foundation engineering by Brije.M.Das, Cengage pubilications,New Delhi.
3. Foundations Design and Construction – Tomlinson

B.Tech IV Year I Sem   ESTIMATION, COSTING AND VALUATION   T   C
                                                                     4+1*   4

UNIT – I
INTRODUCTION: General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating.
STANDARDS SPECIFICATIONS: Standard specifications for different items of building construction

UNIT – II
ESTIMATION OF BUILDINGS: Detailed Estimates of Buildings by using centerline & long wall and short wall method.

UNIT – III
EARTHWORK ESTIMATION: Estimation of Earthwork for roads and canals

UNIT – IV
RATE ANALYSIS: Working out data for various items of work over head and contingent charges.

UNIT-V
REINFORCEMENT ESTIMATION: Reinforcement bar bending and bar requirement schedules.

UNIT – VI
CONTRACTS AND TENDERS: Contracts – Types of contracts – Contract Documents – Conditions of contract – Types of Tenders – Requirement of Tendering. **VALUATION:** Valuation of buildings.

TEXT BOOKS
1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. M. Chakraborti, Estimation Costing Specifications and Valuation in Civil Engineering.

References

1. Standard schedule of rates and standard data book by public works department.
2. G.S. Birdie, Textbook of Estimating and Costing in Civil Engineering, 2014.
3. IS 1200-1992 "Methods of Measurements of Building and Civil Engineering Works".

B.Tech IV Year I Sem   ADVANCED STRUCTURAL DESIGN   T   C
                                                                          4+1*   4

UNIT – I
Design of RCC Retaining walls such as cantilever and counter fort

UNIT – II
Design of RCC water tanks, Circular and rectangular types.

UNIT – III
Design of steel water tanks

UNIT – IV
Introduction to silos concepts of loading and Design.

UNIT – V
Introduction to Chimney concept of loading and design

UNIT – VI
Introduction to concrete bridges, IRC loading, slab bridges and T - beam bridges design concepts.

TEXT BOOKS:
1. Advanced Reinforced concrete structures by Vargheesh, Pranties Hall of India Pvt. Ltd.
2. Design drawing of concrete and steel structures by N.Krishna Raju University Press 2005.
3. Reinforced concrete structures Vol-2 by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:
1. Essentials of Bridge Engineering by D.John son Victor, Oxford and IBM publication Co., Pvt. Ltd.
2. Reinforced concrete design by S.U, Pillai and D.Menon, Tata Mc.Ghrawhill Publishing Company
3. Advanced Reinforced Concrete Design by P.C. Varghese, Prentice Hall India

UNIT – I
INTRODUCTION: Historic development – General principles of prestressing pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

UNIT – II
METHODS OF PRESTRESSING: Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT – III
LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, bending of member and frictional losses.

UNIT – IV
ANALYSIS OF SECTIONS FOR FLEXURE: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – V
DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses – design for shear in beams – Kern – lines, cable profile.

UNIT – VI
DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections – factors influencing deflections – short term deflections of uncracked member's prediction of long term deflections.

TEXT BOOKS:
1. Prestressed Concrete by Krishna Raju; - Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

REFERENCE:
1. Prestressed Concrete by Ramamrutham; Dhanpatrai Publications.
2. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.

UNIT – I
INTRODUCTION TO PHOTOGRAMMETRY: Principle and types of aerial photographs, scales, stereoscopy, ground control, Parallax measurements for height, determinations.

UNIT – II
REMOTE SENSING: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, introduction to digital data analysis.

UNIT – III
GEOGRAPHIC INFORMATION SYSTEM: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

UNIT – IV
TYPES OF DATA REPRESENTATION: Data collection and input overview, data input and output.
Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – V
GIS SPATIAL ANALYSIS: Introduction, geospatial data analysis, integration and modeling of spatial data, geospatial data analysis methods, database query, geospatial measurements, overlay operations, network analysis, surface analysis, geostatistics, geovisualization,

UNIT – VI
REMOTE SENSING & GIS APPLICATIONS : Flood management; Reservoir sedimentation; Geomorphology; Monitoring urban growth; Military operations; Watershed management, Satellite surveillance for drought conditions; Estimating forest cover, Water resources management, Land use/Land cover – changes and mapping; Agriculture – crop type mapping, monitoring and damage assessment; Ground Water Targeting, Identification of sites for artificial Recharge structures.

TEXT BOOKS:
1 Remote Sensing and GIS by B.Bhatta,Oxford University Press,New Delhi.
2 Advanced surveying : Total station GIS and remote sensing – Satheesh Gopi – Pearson publication.
3 Geographical Information Science by Narayana Panigrahi, University press,New Delhi
4 GIS by Kang – tsung chang, TMH Publications & Co.,
5 Principals of Geo physical Information Systems – Peter A Burragh and Rachael Mc Donnell, Oxford Publishers 2004

REFERENCES:
1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
3. The GIS book by Korte,cengage pubilications,New Delhi.
4. Fundamental of GIS by Mechanical designs John Wiley & Sons.
5. Remote sensing and GIS by M.Anji reddy ,B.S.Pubiliications,New Delhi.
6. Remote Sensing and its applications by LRA Narayana University Press 1999.
7. Geoinformation for Development by Zeil/Kienberger (Eds) – Univ.Science Press, New Delh

B.Tech IV Year I Sem   WATER RESOURCE SYSTEM PLANNING AND MANAGEMENT   T   C
                            (Choice Based Credit Courses forCivil students)   4+1*   4

UNIT – I
INTRODUCTION: concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models, objective function and constraints, types of optimization techniques.

UNIT – II
LINEAR PROGRAMMING –I: Formulation linear programming models, graphical method, simplex method, application of Linear programming in water resources.

UNIT – III
LINEAR PROGRAMMING – II: Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT – IV
DYNAMIC PROGRAMMING: Belman's of principles of optimality forward and backward recursive dynamic programming, case of dimensionality, application of dynamic programming for resource allocation.

UNIT – V
SIMULATION: application of simulation techniques in water resources.

UNIT – VI
WATER RESOURCES MANAGEMENT: Planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

TEXT BOOKS:
1. Water Resources System Analysis – Vedula & Mujumdar – Tata Mc.Graw Hill Company Ltd. 2005.
2. Water Resources Economics - James & Lee. Oxford Publishers 2005.
3. Optimisation technique by S.S.Rao

REFERENCES:
1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Operations research by P.Sankar Iyer,TMH Pubilications,New Delhi.
    1.   3. Operations research by N.Ramanathan,TMH Pubilications,New Delhi

BRIDGE ENGINEERING   **T   C**
(Choice Based Credit Courses forCivil students)   **4+1*   4**

UNIT - I
INTRODUCTION:
Importance of site investigation in Bridge design. Highway Bridge loading standards. Impact factor. Railway Bridge loading standards (B.G. ML Bridge) various loads in bridges.
BOX CULVERT: General aspects. Design loads, Design of Box culvert subjected to RC class AA tracked vehicle only.
BRIDGE BEARINGS:
General features – Types of Bearings – Design principles of steel Rocker & Roller Bearings – Design of a steel Rocker Bearing – Design of Elastometric pad Bearing.

UNIT - II
DECK SLAB BRIDGE: Introduction – Effective width method of Analysis Design of deck slab bridge (Simply supported) subjected to class AA Tracked Vehicle only.

UNIT - III
BEAM & SLAB BRIDGE (T-BEAM BRIDGE) General features – Design of interior panel of slab – Pigeauds method – Design of a T-beam bridge subjected to class AA tracked vehicle only.

UNIT – IV
PLATE GIRDER BRIDGE: Introduction – elements of a plate girder and their design. Design of a Deck type welded plate girder – Bridge of single line B.G.

UNIT V
COMPOSITE BRIDGES: Introduction – Advantages – Design of Composite Bridges consisting of RCC slabs over steel girders' including shear connectors

UNIT VI
PIERS & ABUTMENTS:
General features – Bed Block – Materials piers & Abutments Types of piers – Forces acting on piers – Stability analysis of piers – General features of Abutments – forces acting on abutments – Stability analysis of abutments Types of wing walls – Approaches – Types of Bridge foundations (excluding Design).

TEXT BOOKS:
1. Bridge Engineering by Ponnu Swamy, TATA Mcgraw Hill Company, New Delhi.
2. Design of Bridges by N.Krishnam Raju, Oxford & IBH, Publishing Company Pvt.ltd., Delhi.
3. Relevant – IRC & Railway bridge Codes.

REFERENCE:
1. Design of Steel structures, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.
2. Design of Bridges Structure by D.J.Victor
3. Design of Steel structures by Ramachandra.
4. Design of R.C.C. structures B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.
5. Design of Bridges Structure by T.R.Jagadish & M.A.Jayaram Prentice Hall of India Pvt., Delhi

B.Tech III Year II Sem   DISASTER MITIGATION AND MANAGEMENT   T   C
(Choice Based Credit Courses forCivil students)   4+1*   4

Unit-I
Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit–II
Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards

Unit–III
Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Unit –IV
Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters Infrequent events: Cyclones – Lightning – Hailstorms Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation)Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves.Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation).Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced   Hazards   /Disasters-   Physical   hazards/   Disasters-Soil   Erosion

Unit –V
Soil Erosion: Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion.Chemical hazards/ disasters:-- Release of toxic chemicals, nuclear explosion- Sedimentation processes.Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation.Biological hazards/ disasters:- Population Explosion.

Unit –VI
Emerging   approaches   in   Disaster   Management-   Three   Stages
1. Pre- disaster stage (preparedness) 2. Emergency Stage   3. Post Disaster stage-Rehabilitation

Text books:
1. Disaster Management by Rajib Shah, Universities Press, India, 2003
2. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni
3. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning

References
1.Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
2.R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
3.H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
4.R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
5.Dr.Satender,Disaster   Management   t   in   Hills,   Concept   Publishing   Co.,   New Delhi, 2003
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B.Tech IV Year I Sem   **TRAFFIC ENGINEERING**   **T   C**
                    (Choice Based Credit Courses forCivil students)   **4+1*   4**

UNIT-I
TRAFFIC CHARACTERISTICS: Basic characteristics of Traffic- Volume, Speed and Density- Relationship among Traffic parameters.

UNIT-II
TRAFFIC ENGINEERING:Basic Parameters of Traffic-Volume, Speed and Density – Definitions and their inter relation - Traffic Volume Studies-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures.

UNIT-III
PARKING STUDIES: Types of parking facilities – Onstreet and Off Street Parking Facilities- Parking Studies- Parking InventoryStudy- Analysis of Parking Data and parking characteristics.

UNIT-IV
TRAFFIC CONTROL & REGULATION: Traffic Problems in Urban areas- Importance of Traffic Control and regulation- Traffic Regulatory Measures- Channelisation

UNIT-V
TRAFFIC SIGNS AND ROAD MARKINGS: Types of Traffic Signs- cautionary,Regulatory and Informative Signs- Specifications- Pavement markings- Types of Markings and Specifications for Road Markings.

UNIT-VI
HIGHWAY SAFETY: Problem of Highway Safety – Types of Road accidents- Causes – Engineering Measures to reduce Accidents- Road Safety Audit- Principles of Road Safety Audit.

TEXT BOOK:
1. Traffic Engineering and Transportation planning – LK kadiyali – Khanna publishers.
2. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
3. Text book of Highway Engineering by R.Srinivasa Kumar, Universities Press, Hyderabad.

Reference Books:
1. Traffic Engineering and Transportation planning by L.R.Kadiyali and Lal- Khanna Publications.
2. Transportation engineering an introduction by Khisty Lal, Pearson Pubilications
3. Highway Engineering – S.P.Bindra , Dhanpathi Rai & Sons. – 4th Edition (1981)
4. Introduction to Transportation Engineering by James.H.Banks, Tata Mc.Grawhill Edition, New Delhi
5. Traffic and Highway Engineering Nicholas.J.Garber & Lester A.Hoel, Cengage Learning.
6. High way engineering by Paul .H.Wright & Karen K.Dixon,wiley india limited
7. A Text book of Transportation Engineering by S.P.Chandola, S.Chand Publications, New Delhi.

B.Tech IV Year I Sem   CONSTRUCTION PLANNING AND PROJECT MANAGEMENT   T   C
                        (Choice Based Credit Courses forCivil students)   4+1*   4

UNIT I
Construction Organization And Its Management: Introduction-Objective of Building construction organization-Structure of Organization-communication and co-ordination of various Departments-Function of Each Department-Future prospects.

UNIT II
Engineering Department And its Management: Introduction-objective and scope-Department structure-Function of Individual Divisions-Role and Responsibilities of chief Engineer-Reporting and Meetings.

UNIT III
Site-Set up And Day to Day working: Introduction-General site Rules-Responsibilities of site staff, store keeper, supervisor, junior Engineer, project Engineer-Submission of Reports to the Head office-Records to be Maintained at site-Important points to be considered at site.

UNIT IV
Guide Lines to start New Site: Introduction-Basic Requirements to start new site-List of stationary and Material Required to start a New site-Collection of Documents and Drawings from various Authorities.
Preparation of site:-Site clearing and levelling-plot Boundaries-site office and store-water arrangement-Electricity arrangement-compound walls-fencing and security fencing-temporary water storage tank

UNIT V
Planning and Programming (of construction Activities): Introduction-construction planning of project material schedule,labour schedule- Methods of preparing construction schedule C.P.M, P.E.R.T, Bar Chart.

UNIT VI
Importance of consultants(Role in planning and Execution): Introduction-Role and Responsibilities of various consultants such as Architect, structural consultant-plumbing consultant-Electrical consultant-Road work , Swimming pool work consultant.

TEXT BOOK:
1. Practical Building construction and its management by Sandeep Mantri :New Delhi
2. Construction Technology by Subir K.Sarkar and Subhajit Saraswati – Oxford Higher Education-Univ.Press, Delhi.
3. Project Planning and Control with PERT and CPM by Dr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi.

Reference Books:

1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Total Project management , the Indian context- by : P.K.JOY- Mac Millan Publishers India Limited.

B.Tech IV Year I Sem   **GROUND IMPROVEMENT TECHNIQUES**   T   C
                              (Choice Based Credit Courses forCivil students)   4+1*   4

UNIT – I : DEWATERING: Methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains –Electro-osmosis.

UNIT –II : GROUTING: Objectives of grouting- grouts and their properties- grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test- Grouting equipment.

UNIT – III : DENSIFICATION METHODS IN GRANULAR SOILS: In – situ densification methods in granular Soils:– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

DENSIFICATION METHODS IN COHESIVE SOILS: In – situ densification methods in Cohesive soils:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geo-drains – Stone and lime columns – forced vacuum pre-consolidation- thermal methods.

UNIT – IV : STABILISATION: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum, design of mixtures, construction methods.

UNIT – V: REINFORCED EARTH: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.
GEOSYNTHETICS : Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications. Tests for geotextile materials

UNIT – VI : EXPANSIVE SOILS: Problems of expansive soils – tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

TEXT BOOKS:
1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Dr.P.Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi / University science press, New Delhi

REFERENCES:
1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA.
2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy, USA

B.Tech IV Year I Sem   **EARTHQUAKE RESISTANT DESIGN**   T   C
                          (Choice Based Credit Courses forCivil students)   **4+1*   4**

UNIT – I
Earthquake Engineering : - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc - Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes.

UNIT – II
Introduction to Structural Dynamics: – Theory of vibrations – Lumped mass and continuous mass systems – Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Undamped and damped free vibration – Damping – Response to harmonic excitation – Concept of response spectrum.

UNIT – III
Earthquake Analysis : - Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storyed buildings – Use of response spectra.

UNIT – IV
Multi-Degree of Freedom (MDOF) Systems: - Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT – V
Codal Design Provisions : - Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings – Earthquake design philosophy – Assumptions – Design by seismic coefficient method – Displacements and drift requirements – Provisions for torsion.

UNIT – VI
Shear walls: - Types – Design of Shear walls as per IS: 13920 – Detailing of reinforcements.

TEXT BOOKS:
1. Dynamics of Structures – Clough & Penzien, McGraw Hill – International Edition.
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi

REFERENCES:
1. Dynamics of Structures by A.K.Chopra – Pearson Education, Indian Branch, Delhi.
2. Earthquake Tips by C.V.R.Murty, I.I.T. Kanpur.
3. Structural Dynamics by Mario Paaz

B.Tech   IV Year II Semester   Course Structure

S.No.	Abbrevi ation	Subject	Periods / Week			Credits
			L	T	P	
1.		Environmental Impact Assessment	4	1		4
2.		Ground Water Development and Management	4	1		4
3.	MOOCs-I	**Massive Open Online Courses-I** 4.Finite Element Methods in Civil Engineering 5.Railways and Airport Engineering 6.Experimental Stress Analysis	4	1	-	4
4.	MOOCs-II	**Massive Open Online Courses-II** 4.Advanced Structural Analysis 5.Tunneling Engineering 6.Offshore Engineering	4	1	-	4
5.		Project Work	-	-	-	8
6.		Seminar	-	-	-	2
7.		Comprehensive Viva-Voce	-	-	-	4
		TOTAL	8	2	-	30

L – Lecture, T – Tutorial, P – Practical

UNIT – I : Basic concept of EIA : Initial environmental Examination, Elements of EIA, factors affecting E-IA Impact evaluation and analysis, preparation of Environmental Base map, participants in EIA process and main stages of EIA process.

UNIT- II : E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, Leopold Interaction matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT –III : Quality Assessment using EIA: Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives, Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation

UNIT-IV : Quality Assessment using EIA: Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, generalized approach for assessment of Air pollution Impact.

UNIT –V : Environmental Evaluation systems, Preparation of Environmental Impact statements.

UNIT-VI : Case Studies: Case studies and preparation of Environmental Impact assessment statement for various Industries namely thermal power plants, steel plant, highway and pharmaceutical industries.

TEXT BOOKS:
1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad
2. Canter, L.W., " Environmental Impact Assessment ", McGraw Hill, New York, 1996.

REFERENCES:
1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katania & Sons Publication., New Delhi.
2. Petts, J., " Handbook of Environmental Impact Assessment Vol. I and II ", Blackwell Science, London, 1999.
3. The World Bank Group., " Environmental Assessment Sourcebook Vol. I, II and III ", The World Bank, Washington, 1991

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.

UNIT – II: 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 their applications.

UNIT – III: Analysis of Pumping Test Data – I: Steady flow groundwater 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. Analysis of Pumping Test Data – II: Unsteady flow towards a well – Non equilibrium equations – Thesis solution – Jocob and Chow's simplifications

UNIT – IV: Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic refraction methods. Subsurface methods – Geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT – V: Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies. Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg relation, Shape of interface, control of seawater intrusion.

UNIT – VI: Groundwater Basin Management: Concepts of conjunction use, Case studies.

TEXT BOOKS:
1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.

REFERENCES:
1. Groundwater by Bawvwr, John Wiley & sons.
2. Groundwater Syatem Planning & Managemnet – R.Willes & W.W.G.Yeh, Printice Hall.
3. Applied Hydrogeology by C.W.Fetta, CBS Publishers & Distributers