SRI KRISHNADEVARAYA UNIVERSITY :: ANANTAPURAM College of Engineering & Technology Academic Regulations 2018 (R18) for

B. Tech (Regular-Full time)

(With effect from the Academic Year 2018-19 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. Regular entry students shall pursue a course of study for not less than four academic years and in not more than eight academic years. However, for the students availing Gap year facility, this period shall be extended up to 2 years at the most and these two years would not be counted for the maximum time for graduation.
- ii. Regular entry students shall register for 182 credits and should secure a minimum of 176 credits.
- iii. Lateral entry students shall pursue a course of study for not less than three academic years and in not more than six academic years. However, for the students availing Gap year facility this period shall be extended up to 2 years at the most and these two years would not be counted for the maximum time for graduation.
- iv. Lateral entry students shall register for 140 credits and should secure a minimum of 134 credits.
- v. Regular Students, who fail to fulfil 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.
- vi. Lateral Students, who fail to fulfil all the academic requirements for the award of the degree within Six (Eight 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.
- vii. Compulsory Subjects: (Which the student has to register and get through)
 - 1. All Theory Subjects of 3 credits each.
 - 2. All Laboratory courses of 2 credits each.
 - 3. Seminar
 - 4. Mini Project
 - 5. Project.
 - 6. All Audit Courses.(Human values, professional ethics and Comprehensive Online Examinations)
 - 7. Community Service
 - 8. Open Elective.

Optional Subjects: Which the student shall register and can forfeit any two out of three of the following

- 1. Comprehensive Online Examinations.
- 2. MOOC's-I
- 3. MOOC's-II

2. Courses of study

The following courses of study are offered at present under B. Tech. program with effect from the academic year 2018-19

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	03			
Practical	04	02			
Drowing	03	-			
Diawing	03	03			
Online examination	-	-			
Project	7	5			

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 readmitted when the semester / year is offered next after fulfilment of academic regulations.

5. Distribution and Weightage of Marks

- i. The performance of a student in each semester for academic years I, II, III, IV shall be evaluated subject wise with a maximum of 100 marks for theory and 75 marks for practicals. In addition to the subjects and labs Mini Project, Seminar, Comprehensive Viva Voce and Project Work shall be evaluated for 50, 50, 100 and 150 marks respectively.
- ii. For theory / Engineering Drawing/Graphics course subjects the distribution shall be 30 marks for Internal Evaluation (30 marks for internal test:20 marks for descriptive and 10 marks for objective questions) 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 descriptive and multiple choice questions for 30 marks with a 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.

- 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 teacher handling the laboratory and another internal examiner.
- v. 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.

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- vi. 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 to pass. However credits will not be awarded.
- vii. There shall be one open Elective (for same and other branch students), 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 open elective.
- viii. Massive Open Online Courses (MOOCs) are to be introduced. There shall be two MOOCs in the entire course duration.
 - ix. These MOOCs included in the Course structure in the IV Year II Semester. The Student shall register for any MOOCs program offered by NPTEL or any other agency approved by the University. The MOOCs program registered by the student shall be relevant to his field of study and shall be approved by the Head of the Department.
 - x. The evaluation of mini project work shall be conducted at the end of the IV year I Semester. The End Semester Examination shall be conducted by the Board of Examiners consisting of Department staff, Project Supervisor, Head of the Department.
 - xi. Out of a total of 150 marks for the project work, 50 marks shall be for Internal Evaluation and 100 marks for the external viva-voce in the End Semester Examination. The End Semester Examination shall be conducted by the Board of Examiners consisting of Project Supervisor, Head of the 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 other will be presented to the Department committee compromising Head of the Department, Project Supervisor, and one senior faculty of the Department.
- xii. The 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 each semester of that 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/she 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/she

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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/she fulfils the academic requirement of securing **35** credits from the preceding regular and supplementary examinations.
- iii. A student shall be promoted from third year to fourth year only if he/she fulfils the academic requirements of securing **58** credits from the preceding regular and supplementary examinations.
- iv. Lateral Entry students shall be promoted from third year to fourth year only if he/she fulfils the academic requirements of securing **35 credits** from the preceding regular and supplementary examinations.
- v. Regular students who fail to earn 176 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.
- vi. Lateral entry students who fail to earn 134 credits as indicated in the course structure within six academic years (8 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

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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.

Range in which the	Grade	Grade points
marks in the subject fall		Assigned
\geq 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

Table – Conversion into Grades and Grade Points assigned

- 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	L	Т	Р	Credits
1.	FE	Functional English	3	1	-	3
2.	M-I	Mathematics	3	1	-	3
3.	EC	Engineering Chemistry	3	1	-	3
4.	PPS	Programming for Problem Solving	3	1	-	3
5.	EM	Engineering Mechanics	3	1	-	3
6.	CHEL	Chemistry Lab	-	-	4	2
7.	PROGL	Programming Lab	-	-	4	2
8.	FED	Fundamentals of Engineering Drawing	-	-	4	2
		Total	15	5	12	21

L – Lecture, T – Tutorial, P - Practical

B.Tech I Year: II Semester

S.No.	Abbreviation	Subject	L	Т	Р	Credits
1.	CE	Communicative English	3	1	-	3
2.	M-II	Mathematical Methods	3	1	-	3
3.	EP	Engineering Physics	3	1	-	3
4.	ES	Environmental Science	3	1	-	3
5.	ED	Engineering Drawing	3	1	-	3
6.	CSL	Communication Skills Lab	-	-	4	2
7.	CHEML	Physics Lab	-	-	4	2
8.	EW&IT	Engineering Workshop & IT Workshop	-	-	4	2
		Total	15	5	12	21

L – Lecture, T – Tutorial, P - Practical

B.Tecl	n II Year	I Semester	Co	urse S	tructur	e
S.No	Abbreviation	Subject	Peri	Periods / Week		Credits
•			L	Т	Р	
1.	P&S	Probability & Statistics	3	1	-	3
2.	SM-I	Strength of Materials -I	3	1	-	3
3.	SUY	Surveying	3	1	-	3
4.	FM	Fluid Mechanics	3	1	-	3
5.	BMC	Building Materials and Construction	3	1	-	3
6.	EPC	Environmental Pollution and Control	3	1	-	3
7.	SUY LAB	Surveying Lab	-	-	4	2
8.	SM LAB	Strength of Materials Electronics Lab	-	-	4	2
9.	HVPE	Human Values and Professional Ethics	2			
		Total	20	6	8	22

L – Lecture, T – Tutorial, P - Practical

B.Tech	II Year I	I Semester	Co	urse S	tructur	e
S.No.	Abbreviation	Subject	Peri	ods / `	Week	Credits
			L	Т	Р	
1.	СТ	Concrete Technology	3	1	-	3
2.	EMT	Electrical & Mechanical Technology	3	1	-	3
3.	SM-II	Strength of Materials- II	3	1	-	3
4.	HHM	Hydraulics and Hydraulic Machinery	3	1	-	3
5.	SA-I	Structural Analysis - I	3	1	-	3
6.	BPD	Building Planning and Drawing	3	1	-	3
7.	FMHM LAB	Fluid Mechanics and	-	-	4	2
		Hydraulic Machinery Lab				
8.	CT LAB	Concrete Technology Lab	-	-	4	2
9.	COE-I	Comprehensive Online Examination-I	-	-	-	-
		Total	18	6	8	22

L – Lecture, T – Tutorial, P - Practical

B.Tech III Year I Semester Course Structure					e	
S.No.	Abbreviation	Subject	Peri	Periods / Week		Credits
			L	Т	Р	
1.	MEFA	Managerial Economics and Financial Analysis	3	1	-	3
2.	DRCS	Design of Reinforced Concrete Structures	3	1	-	3
3.	EE-I	Environmental Engineering - 1	3	1	-	3
4.	WRE	Water Resources Engineering	3	1	-	3
5.	SA-II	Structural Analysis - II	3	1	-	3
6.	EG	Engineering Geology	3	1	-	3
7.	EG LAB	Engineering Geology Lab	-	-	4	2
8.	SUYC	Survey Camp	-	-	4	2
9.	ACSP	Advanced Communications Skills Practice			3	
10.	CMS	Community Service	-	-	-	2
		Total	18	6	11	24

L – Lecture, T – Tutorial, P – Practical

B.Tech	III Year II	Semester	Cou	rse Sti	ructure	
S.No.	Abbreviation	Subject	Peri	ods / '	Week	Credits
			L	Т	Р	
1.	EE-II	Environmental Engineering - II	3	1	-	3
2.	SOM	Soil Mechanics	3	1	-	3
3.	DSS	Design of Steel Structures	3	1	-	3
4.	DIS	Design of Irrigation Structures	3	1	-	3
5.	HE	Highway Engineering	3	1	-	3
6.	OE	Open Elective	3	1	-	3
		1. Geo Informatics				
		2. Disaster Mitigation and Management				
		3. Environmental Impact Assessment				
7.	HE LAB	Highway Engineering Lab	-	-	4	2
8.	EE LAB	Environmental Engineering Lab	-	-	4	2
9.	COE-II	Comprehensive Online Examination-II	-	-	-	-
		Total	18	6	8	22

L – Lecture, T – Tutorial, P - Practical

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B.Tech	IV Year	I Semester	Cou	irse Sti	ructure	
S.No.	Abbreviation	Subject	Peri	Periods / Week		Credits
			L	Т	Р	
1.	FE	Foundation Engineering	3	1	-	3
2.	ECV	Estimation, Costing & Valuation	3	1	-	3
3.	ASD	Advanced Structural Design	3	1	-	3
4.	PSC	Pre-Stressed Concrete	3	1	-	3
5.	E-I	Elective-I	3	1	-	3
		1. Noise and Air Pollution				
		2. Maintenance and Rehabilitation of Structures				
		3. Bridge Engineering				
6.	E-II	Elective-II	3	1	-	3
		1. Traffic Engineering				
		2. Construction Planning and Project Management				
		3. Water Shed Management				
7.	CAD LAB	CAD Lab	-	-	4	2
8.	GT LAB	Geotechnical Engineering Lab	-	-	4	2
	MP	Mini Project	-	-	-	2
		Total	18	6	8	24

L – Lecture, T – Tutorial, P – Practical

B.Tech	IV Year	II Semester	Cou	ırse St	ructure	
S.No.	Abbreviation	Subject	Peri	Periods / Week		Credits
			L	Т	Р	
1	ESA	Experimental Stress Analysis	3	1	-	3
2	FEMCE	Finite Element Methods in Civil Engineering	3	1	-	3
3	MOOCs-I	Massive Open Online Courses-I	3		-	3
		1. Environmental Impact Assessment				
		2. Railways and Airport Engineering				
		3. Ground Water Development and Management				
4	MOOCs-II	Massive Open Online Courses-II	3		-	3
		1. Civil Engineering Professional Practice				
		2. Flood and Droughts their Management				
		3. Tunnel Engineering				
5	PW	Project Work	-	-	-	5
6	SMNR	Seminar	-	-	-	2
7	CV	Comprehensive Viva-Voce	-	-	-	3
		Total	12	2	-	22

B.Tech I Year I Sem. FUNCTIONAL ENGLISH (Common for CSE,ECE,MECHANICAL,EEE&CIVIL)

L	Т	С
3	1	3

UNIT – I

Green Cover, Pollution

Tenses, Prepositions, Prepositional Phrases, Writing Letters

UNIT – II

Solar Thermal Power, Cloud Computing

Subject-Verb Agreement, Prefixes and Suffixes, Compound Nouns, Imperatives

UNIT – III

Child Labour, Food Crisis

Synonyms & Antonyms, Verbs: Regular & Irregular, Homonyms, Homophones and Homographs, Direct and Indirect Speech

$\mathbf{UNIT} - \mathbf{IV}$

E-Waste, Assistive Technology

Articles, Collocations, Conjunctions, Note-Making, Making Recommendations, If Conditional

Hubble Telescope, A Home in the Sky

Degrees of Comparisons, Voice, Question Tags

UNIT – V

The Evolution of Media, Ten Developments in Media, Advertisements

Paragraph Writing, Effective Writing, Writing Reports, Expansion of Proverbs and Idioms, Commonly Confused Words

Primary Source: The Prescribed Textbook:

1. *Mindscapes: English for Technologists and Engineers*. Department of English, Anna University, Chennai. Published by Orient Blackswan Private Limited, 2012, Reprinted: 2013, 2014.

Web Resources:

- 1. https://www.theguardian.com/commentisfree/2011/nov/27/durban-climate-change-delivery
- 2. http://andromida.hubpages.com/hub/cloud-computing-architecture
- 3. http://www.unicef.org/protection/childlabour.html
- 4. http://www.thehindu.com/health/article111240.ece
- 5. http://hubblesite.org/the_telescope/nuts_.and._bolts/spacecraft_systems/
- 6. http://journalism.about.com/od/trends/tp/topstories2000s.htm

B.Tech I Year I Sem

MATHEMATICS

L	Т	С
3	1	3

(Common for CSE, ECE, MECHANICAL, EEE&C IVIL)

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 eax, 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 outproofs).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 function-multiplication by tⁿ –Division by t-Evaluation of integrals by Laplace Transforms-Laplace Transform of periodic functions.

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. Engineering 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.

Web Resources:Khanacademy.org

Maths.psu.edu

Whitmen.edu/Mathematics

(B.Tech.I-Year I-Sem) ENGINEERING CHEMISTRY

(Common to MECH and Civil)

L	Т	С
3	1	3

UNIT I : Atomic structure, crystal field theory and water technology

Atomic structure: Schrodinger wave equation (Eigen-value and Eigen-function). Crystal field theory: Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Water technology: Source of water, impurities in water, hardness of water by using EDTA method, temporary and permanent hardness and its units. UNIT II: Periodic Properties

Effective nuclear charge, penetration of orbitals, vibrations of s, p, d and f orbital's energies of atoms in the periodic table, electronic configuration, atomic sizes, ionization energies, electron affinity and electro negativity, polarizability, oxidation states, coordination number and geometries..

UNIT III: Corrosion

Corrosion: Theories (dry-wet, chemical and electrochemical corrosion) of corrosion and mechanism. Types of corrosions and control methods-cathode protection sacrificial anodic, impressed current method.

UNITIV: Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction,

cyclization and ring openings and synthesis of a commonly used drug molecule.

UNIT V: Stereochemistry

Structural isomers and stereo isomers, configurations and symmetry and chirality, enantiomers,

diastereomers, optical activity, absolute configurations and conformational analysis.

TEXT BOOKS

1. Chemistry of engineering., Prof. K.N. Jayaveera, Dr. G.V. Subba Reddy and Dr. C. Ramachandraiah. *McGraw hill higher education*. Hyderabad, **2009**.

2.A text book of engineering chemistry., S.S. Dara, S. Chand & Co., New Delhi, 2008.

3.A text book of engineering chemistry., Jain and Jain, *Dhanpat Rai Publishing Company.*, 15th edition, New Delhi,**2008**.

4. University chemistry, by B.H. Mahan

5. Chemistry: Principles and applications, by Sienko and R.A. Plane

6.Engineering chemistry(NPTEL Web-book), by B.L. Tembe, kamaluddin and M.S. Krishna. 7.Physical chemistry ,by P.W. Atkins

8.Organic chemistry: Structure and function by K.P.C. Volhardt and N.E. Schore, 5th Edition. http://bcs. whfreeman.com/vollhardtschore5e/default.asp

RÉFERENCE BOOK

1.Engineering chemistry 3e, R.P. Mani, K.N. Mishra, B. Rama Devi and V.R. Reddy, *Cengage Learning*, India, First Impression, **2014**.

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B.Tech I Year I Sem PROGRAMMING FOR PROBLEM SOLVING (Common for CSE, ECE, EEE, Civil & Mechanical)

L	Т	С
3	1	3

Unit I-

Introduction to Programming Introduction to components of a computer system (Disks,Memory,Processor, where a program is stored and executed, Operating system, Compilers etc..) Idea of Algorithm: Steps to solve logical and Numerical problems.

Representation of Algorithm: Flowchart/pseudo code with examples From Algorithms to Programs: Source code, variables (With Data types) variables and Memory locations, syntax and logical errors in compilation, Object and executable code. Arithmetic Expressions and precedence, Conditional Branching and loops.Writing and Evaluation of Conditionals and Consequent branching, Iteration and Loops.

Unit II -

Arrays-Arrays (1-D,2-D), Character Arrays and Strings.

Basic Algorithms: Searching, Basic sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notation of order of complexity through example program.(No formal definition required).

Unit III-

Function: functions (including using built in libraries), parameter passing in functions, call by value, passing arrays to functions: idea of call by reference.

Recursion: Recursion, as a different way of solving problems. Example programs such as finding factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Unit IV-

Structure: Structures, defining structures and Array of structures.

Pointers: Idea of pointers, Defining pointers, use of pointers in self referential structures, notion of linked lists(No implementation).

Unit V-

Files - Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write.

Dynamic Memory Allocation, Introduction to Data Structures: Linear and Non Linear Data Structures.

TEXT BOOKS :

- 1. Byron Gottfried, Schaum's Outline of programming with C, McGraw-Hill.
- 2. E.Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.

REFERENCES :

1. Brian W.Kernighan and Dennies M Ritchie, The C Programming Language, Prentice Hall of India.

B.Tech I Year I Sem. ENGINEERING MECHANICS (Common for MECHANICAL & CIVIL)

L	Т	С
3	1	3

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) .

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.

S.No.	Abbreviation	Subject	L	Т	Р	Credits
1.	CE	Communicative English	3	1	-	3
2.	M-II	Mathematical Methods	3	1	-	3
3.	EP	Engineering Physics	3	1	-	3
4.	ES	Environmental Science	3	1	-	3
5.	ED	Engineering Drawing	3	1	-	3
6.	CSL	Communication Skills Lab	-	-	4	2
7.	CHEML	Physics Lab	-	-	4	2
8.	EW&IT	Engineering Workshop & IT Workshop	-	-	4	2
		Total	15	5	12	21

B.Tech I Year: II Semester

L – Lecture, T – Tutorial, P - Practical

B.Tech I Year II Sem. COMMUNICATIVE ENGLISH (Common for CSE,ECE, MECHANICAL,EEE & CIVIL)

L	Т	С
3	1	3

UNIT – I

The Importance of History, The Mother of Modern Corporatism Pure Vowels, Just-A-Minute, Designing Posters

UNIT – II

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

UNIT – III

Learning from Disasters, Biotechnology: Ethical Questions Consonant Sounds, Debate, Blog Making Ten Reasons Why Travel is a Waste of Time, Atithi Devo Bhava Syllables, Word Stress Rules, Group Discussion

UNIT – IV

SWOT Analysis, Tourism in India: Role in Conflict & Peace Presentation Skills, Writing Emails, Creativity: Thinking and Writing

UNIT – V

Curriculum Vitae, Preparing for the Interviews Types of Interviews, Mock Interviews, Personality Development

Primary Source: The Prescribed Textbook:

2. *Mindscapes: English for Technologists and Engineers*. Department of English, Anna University, Chennai. Published by Orient Blackswan Private Limited, 2012, Reprinted: 2013, 2014.

Web Resources:

- 1. http://www.redpepper.org.uk/The-mother-of-modern-corporatism/
- 2. https://energypedia.info/wiki/Wind_Energy_-_Introduction#Wind_Energy_-_Overview
- 3. http://www.aerospaceguide.net/spaceshuttle/challenger disaster.html
- 4. http://www.501places.com/2010/05/10-reasons-why-travel-is-waste-of-tim/
- 5. www.seiofbluemountain.com/search/detail.php?id=3829
- 6. http://economictimes.indiatimes.com/quickiearticlesshow/10155264.cms

B.Tech I Year II Sem

MATHEMATICAL METHODS (Common for CSE,ECE, Mechanical, EEE& Civil)

L	Т	С
3	1	3

UNIT -1

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 matric by Cayley-Hamilton therem – Diagonolization of matrix. Calculation of powers of matrix.

UNIT-II

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-III

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

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

UNIT-IV

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

UNIT-V

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. Mathematical Methods, T.K.V. Iyengar, B.Krishna Gandhi and Others, S.Chand& Company.
- 2. Mathematical Methods, C.Sankaraiah, V.G.S.Book Lines.
- 3. Mathematical Methods, G.Shanker Rao, E.Keshava Reddy., I.K.International Publishing House Pvt.Ltd.

REFERNCES:

- 1. Numerical Methods for Scientific and Engneering Comunication, 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.

Web Resources:Khanacademy.org

Maths.survey.ac.uk

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B.Tech I Year II Sem.

ENGINEERING PHYSICS

(Common for MECHANICAL &CIVIL)

L T C 3 1 3

UNIT I

PHYSICAL 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.

LASERS

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

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-LED-Photodiode.

SUPERCONDUCTIVITY

Introduction-General properties-Meissner effect-Penetration depth- Type-I and Type-II superconductors-Josephson effects-Application of superconductors.

UNIT V

DIELECTRIC PROPERTIES

Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector-Relation between D, E, P - Internal Fields in Solids (Lorentz field)-Clausius - Mossotti Equation.

ELECTROMAGNETIC THEORY

Scalar and Vector Fields-Gradient, Divergence of fields-Fundamentals of Electromagnetism: Guass law for electrostatics and magnetostatics-Derivations of Maxwell's Equations (Integral & Differential form)-Equation of Electromagnetic waves.

Text Books

- 1. Engineering Physics- B.K. Pandey & S. Chaturvedi CENGAGE Learning Publications
- 2. Applied Physics P.K.Palanisamy (SciTech Publications Pvt. Ltd.,
- 3. Engineering Physics- K. Vijay Kumar, S. Chand Publications
- 4. Engineering Physics-K. Thyagarajan, Mac Graw Hill Education Private Limited, New Delhi, 2015

References

- 1. Fundamentals of Physics- Halliday, Resnick and Walker, John Wiley & Sons
- 2. Engineering Physics- D.K Battacharya and Poonam Tandon, Oxford University Press.

Weblinks

- 1. http://nptel.ac.in/courses/115101005/-----EMT
- 2. http://nptel.ac.in/courses/115104096/-----QM
- 3. http://nptel.ac.in/courses/115102025/-----Semiconductor Devices

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B.Tech I Year II Sem. ENGINEERING DRAWING (Common for MECHANICAL & CIVIL)

L	Т	С
3	1	3

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 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.

$\mathbf{UNIT} - \mathbf{IV}$

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.

$\mathbf{UNIT} - \mathbf{V}$

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.

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
- 4. Engineering Drawing, K.L.Narayana
- 5. Engineering Drawing, Sankar Prasad Dey

REFERENCES:

- 1. Engineering Drawing and Graphics, Venugopal/ New age
- 2. Engineering Drawing, B.V.R. Guptha, J.K. Publishesrs

B.Tech I Year II Sem ENVIRONMENTAL SCIENCE

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Sri Krishnadevaraya University College of Engineering and Technology: Anantapur

Department of Civil Engineering

(Common for MECHANICAL&CIVIL)

L	Т	С
3	1	3

UNIT-I

Introduction of Environmental Studies-Natural Resources: Definition, The Global environment and its segments; 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 – 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. - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

$\mathbf{UNIT} - \mathbf{IV}$

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. **UNIT-V**

Social Issues and the Environment: From Unsustainable to Sustainable development -Water conservation, rain water harvesting, - Climate change, global warming, acid rain, ozone layer depletion. -Wasteland reclamation. —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.

Human Population and the Environment: Population growth, variation among nations. Population explosion - Family Welfare Programme. -Value Education. -HIV/AIDS. 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 ,DhanpatRai& Co **WEB LINK:**

1) nptel.ac.in-coursera.org-engg.vediolectures.com.

2) https://www.youtube.com/watch?v=7G3eXI_DPn8 https://www.youtube.com/watch?v=UqWgrBnJYVQ

B. Tech II Year I Semester	B.Tech	II Year I Semester
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S.No	Abbreviation	Subject		ods / '	Credits	
			L	Т	Р	
1.	P&S	Probability & Statistics	3	1	-	3
2.	SM-I	Strength of Materials -I	3	1	-	3
3.	SUY	Surveying	3	1	-	3
4.	FM	Fluid Mechanics	3	1	-	3
5.	BMC	Building Materials and Construction	3	1	-	3
6.	EPC	Environmental Pollution and Control	3	1	-	3
7.	SUY LAB	Surveying Lab	-	-	4	2
8.	SM LAB	Strength of Materials Electronics Lab	-	-	4	2
9.	HVPE	Human Values and Professional Ethics	2			
		Total	20	6	8	22

L	Т	С
3	1	3

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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.

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.

$\mathbf{UNIT} - \mathbf{IV}$

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 – V

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

B.Tech II Year II Sem

STRENGTH OF MATERIALS -I

L	Т	С
3	1	3

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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 forceand 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, Neutralaxis, 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 puretorsion, Torsion moment of resistance, Polar section modulus, Power transmitted by shafts

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

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

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B.Tech II Year I Sem

Department of Civil Engineering **SURVEYING**

L	Τ	С
3	1	3

UNIT – I

INTRODUCTION: Definition of surveying, Importance of surveying to civil Engineers, objectives of surveying, classification of surveying, principles of surveying. Introduction to Total station survey: Features of Total station-Electronic Data Recording.

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. Curves: Types of curves, design and setting out, simple and compound curves

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.

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,

SKUCET, S.K University Anantapuramu

2004.

B.Tech II Year I Sem UNIT – I

FLUID MECHANICS

L	Т	С
3	1	3

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

UNIT - V

CLOSED CONDUIT FLOW: Laws of Fluid friction, Darcy's equation, Minor losses (types), equation forhead 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. 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.

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.)

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5. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P Schaffer, Oxford University Press, New Delhi.

B.Tech II Year I Sem BUILDING MATERIALS AND **CONSTRUCTION**

u	z and	Jam	es P.
	L	Т	С
	3	1	3

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 CONCRETE: Various ingredients of cement concrete, preparation of concrete, Different types of Mortars, Preparation of Mortar. MASONARY: Types of masonry, Types of bonds and their discussions.

UNIT-IV

FOUNDATIONS: Shallow foundations. Spread, combined, strap and mat footings.

BUILDING COMPENENTS: Lintels, arches, staircase types. Different types of floorsconcrete, mosaic, terrazzo floors, pitched, flat and curved roofs. Lean to roof, coupled roofs, trussed roofs-king and queen post trusses.

UNIT – V

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 ENVIRNOMENTAL POLLUTION & CONTROL

L	Т	С
3	1	3

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 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 – V 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 Erach Bharucha 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 I	I Semester	Co	ourse S	Structu	re
S.No.	Abbreviation	Subject	Peri	ods / '	Week	Credits
			L	Т	Р	
1.	СТ	Concrete Technology	3	1	-	3
2.	EMT	Electrical & Mechanical Technology	3	1	-	3
3.	SM-II	Strength of Materials- II	3	1	-	3
4.	HHM	Hydraulics and Hydraulic Machinery	3	1	-	3
5.	SA-I	Structural Analysis - I	3	1	-	3
6.	BPD	Building Planning and Drawing	3	1	-	3
7.	FMHM LAB	Fluid Mechanics and	-	-	4	2
		Hydraulic Machinery Lab				
8.	CT LAB	Concrete Technology Lab	-	-	4	2
9.	COE-I	Comprehensive Online Examination-I	-	-	-	-
		Total	18	6	8	22

L – Lecture, T – Tutorial, P - Practical

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B.Tech II Year II Sem CONCRETE TECHNOLOGY

L	Т	С
3	1	3

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 concreteProportioning of concrete mixes by various methods – ACI method & IS 10262 method.

SPECIAL CONCRETES: Light weight aggregate concrete, Fibre reinforced concrete, types of fibres, Factorsaffecting 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 STRENGTH OF MATERIALS -II

L	Т	С
3	1	3

UNIT – I

PRINCIPAL STRESSES AND STRAINS: Introduction – Stresses on an inclined section of a bar under axialloading, 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, Analytical and graphical solutions. **THEORIES OF FAILURES:** Introduction, Various Theories of failures like Maximum Principal stress theory, Maximum Principal strain theory, Maximum shear stress theory, Maximum shear strain energy theory.

UNIT – II

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 – III

DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and B.M,. coreof 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 – IV

COLUMNS AND STRUTS: Introduction, Types of columns – Short, medium and long columns, Axiallyloaded 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

UNIT – V

UNSYMETRICAL BENDING: Introduction – centroidal principal axes of section, Graphical method forlocating 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.

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.

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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 Delh B.Tech II Year II Sem HYDRAULIC AND HYDRAULIC

L	Т	С
3	1	3

UNIT – I

MACHINERY

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. **NON – UNIFORM FLOW:** Concept of specific energy; Specific energy curves; Critical flow; Critical flow in a rectangular channel; Critical slope.

UNIT - II

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

UNIT – III

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.

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 – IV

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 pumps characteristic curves- NPSH-cavitation.

UNIT - V

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. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi

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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.

Hydraulics, Fluid Mechanics and Fluid Machines by S Ramamrutham, Dhanapat Rai Publishing Compan

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B.Tech II Year II Sem STRUCTURAL ANALYSIS	- I	3	1	3	

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 **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,

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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

L	Т	С
3	1	3

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. **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 – V:

Given line diagram with specification to draw, plan, sections section and elevation

Note: Final examination pattern: Part- A Three questions out of 6 each Question 10 marks from unit I to III **Part- B** From Unit IV one question out of two 10 Marks. From Unit V one question out of Two Question 30 Marks (Compulsory Question)

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

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REFERENCE:

1. Building by laws bye state and Central Governments and Municipal corporations.

2. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur

Construction Planning, Equipment and methods by R.L. Peurifoy etal. – Tata Mc. Graw Hill Publications

B.Tech	III Year l	Semester	Co	ourse	Structu	re
S.No.	Abbreviation	Subject	Peri	ods / `	Week	Credits
			L	Т	Р	
1.	MEFA	Managerial Economics and Financial Analysis	3	1	-	3
2.	DRCS	Design of Reinforced Concrete Structures	3	1	-	3
3.	EE-I	Environmental Engineering - 1	3	1	-	3
4.	WRE	Water Resources Engineering	3	1	-	3
5.	SA-II	Structural Analysis - II	3	1	-	3
6.	EG	Engineering Geology	3	1	-	3
7.	EG LAB	Engineering Geology Lab	-	-	4	2
8.	SUYC	Survey Camp	-	-	4	2
9.	ACSP	Advanced Communications Skills Practice			3	
10.	CMS	Community Service	-	-	-	2
		Total	18	6	11	24

L – Lecture, T – Tutorial, P – Practical

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B.Tech II Year I Sem MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS (Common for CSE,ECE,EEE,,CIVIL,ME)

L	Т	С	
3	1	3	

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 : THEORY OF PRODUCTION AND COST ANALYSIS

Production Function – Isoquants and Isocosts, MRTS, least cost-combination of inputs, Cobb-Douglas production function, laws of returns, internal and external economies of scale.

Cost Analysis: Cost concepts, opportunity cost, fixed Vs variable costs, explicit costs Vs Implicit costs, out of pocket costs Vs Imputed costs.Break-Even Analysis (BEA) - Determination of Break Even Point (Simple Problems)- Managerial significance and limitations of BEA.

UNIT IV

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 V

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) 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).

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.

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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: Managerial Economics, 6th Ed., Vikas

WEB LINK:

1)<u>WWW.SMARTZWORLD.COM</u> 2) jntumaterials.co.in 3) <u>WWW.indianshout.com</u> 4) <u>www.tutorialspoint.com</u> 5) notes.specworld.in

B.Tech III Year I Sem DESIGN OF REINFORCED CONCRETE STRUCTURES

L	Т	С
3	1	3

UNIT –I: INTRODUCTION Brief Introduction of working stress, ultimate load, and limit state, workingstress: design, singly and doubly reinforced beam.

LIMIT STATE DESIGN: Limit State Design: Concepts, Characteristic loads, Characteristic strength, Partialload 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 andbiaxial 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 slabtheory only Using I S Coefficients.**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,

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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.

B.Tech III Year I Sem

ENVIRNOMENTAL ENGINEERING-I

L	Т	С
3	1	3

UNIT – I

Sources and Demand of Water: Different sources of water, quantity and quality of different sources, Types and variation in water demand, factors affecting water demand, design period, population forecasting – Different methods and their suitability.

Water Collection, Conveyance and Distribution : Intake works for collection of surface water – Conveyance of water – Gravity and pumping – Their design – Different materials used for conveying conduits and their suitability, systems of distribution – Distribution reservoirs – Distribution networks, design of simple and complex pipe networks, pipe accessories – Valves and their location and suitability.

UNIT – II

Water uses and Quality Requirements: Sources of water pollution, water borne, water carried and water related diseases – Need for protected water supply, water quality – Physical, chemical and biological, water quality requirement and standards for different uses. **Water Treatment**: Conventional water treatment processes units and their functions. Theory and design of aeration, coagulation, flocculation and clarification, Determination of optimum dose of alum for coagulation of water.

UNIT – III

Theory of Filtration – Different types of filters and their design. Disinfection – Disinfectants mechanism of disinfection – Different types, Break point chlorination – Types of calculation – Does of disinfectant.

UNIT – IV

Advanced Treatment Methods: Removal of fluorides, arsenic, hardness, iron and manganese, salinity, colour, organic chemical and biological residues – Adsorption with activated carbon, ion exchange resigns, membrane processes, chemical oxidation and softening.

UNIT – V

Air Pollution: Types of pollutants, their sources and impacts, air pollution meterology, 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.

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TEXT BOOKS:

- 1. Water Supply Engineering, by S.K.Garg.
- 2. P.N. Modi, Water Supply Engineering Environmental Engineering (Vol I), Standard Book House, 2006
- 3. K.N. Duggal, Elements of Public Health Engineering, S Chand, 1988
- 4. Air pollution and its Control by C.S.Rao
- 5. Environmental Engineering by H.S.Peavy et al.

Reference:

- 1. Water Treatment Principles and Design by James M. Montgomery.
- 2. Water Supply and Sewerage, by E.W.Steel.
- 3. Gurucharan Singh Water Supply and Sanitary Engineering Vol, 1; Standard Publishers, Distributors, 2013.
- 4. J. Mark Hammer Water and Wastewater Technology; John Wiley and Sons, 2013.
- 5. Manual on Water Supply and Treatment; CPH and EEO, Ministry of Urban Development; Govt, of India, New Delhi.

B.Tech III Year I Sem WATER RESOURCES ENGINEERING

L	Т	С
3	1	3

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.

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

UNIT-IV 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 –**V 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

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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

B.Tech III Year I Sem UNIT I

STRUCTURAL ANALYSIS - II

L	Т	C
3	1	3

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

UNIT – II

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

UNIT – III

KANI'S METHOD: Basic concepts- Analysis of continuous beams – including settlement of supports and single bay portal frames without side sway and with side sway by Kani's method.

UNIT – IV

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

UNIT-V

INTRODUCTION TO MATRIX METHODS (Flexibility and Stiffness 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

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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)

B.Tech III Year I Sem

ENGINEERING GEOLOGY

L	Т	С
3	1	3

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.

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 IV: 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

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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 V: GEOLOGY OF DAMS AND RESERVOIRS: Types of dams and bearing of Geology of site intheir 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 tunnelling, Effects of Tunnelling 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	Co	urse S	tructur	e
S.No.	Abbreviation	Subject	Peri	ods / `	Week	Credits
			L	Т	Р	
1.	EE-II	Environmental Engineering - II	3	1	-	3
2.	SOM	Soil Mechanics	3	1	-	3
3.	DSS	Design of Steel Structures	3	1	-	3
4.	DIS	Design of Irrigation Structures	3	1	-	3
5.	HE	Highway Engineering	3	1	-	3
6.	OE	Open Elective	3	1	-	3
		1. Geo Informatics				
		2. Disaster Mitigation and Management				
		3. Environmental Impact Assessment				
7.	HE LAB	Highway Engineering Lab	-	-	4	2
8.	EE LAB	Environmental Engineering Lab	-	-	4	2
9.	COE-II	Comprehensive Online Examination-II	-	-	-	-
		Total	18	6	8	22

L – Lecture, T – Tutorial, P - Practical

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B.Tech III Year II Sem ENVIRNOMENTAL ENGINEERING-II

L	Т	С
3	1	3

UNIT I

WASTEWATER COLLECTION: Sanitation - systems of sanitation, water carriage system, sewerage, systems of sewerage, sources of wastewater - Estimation of quantity of municipal wastewater - Estimation of quantity of storm water - Different types of sewers, design flows through sanitary sewers, storm sewers and combined sewers. Hydraulic design of sewers - Sewer appurtenances House drainage and Plumbing systems

UNIT II

CHARACTERISTICS OF DOMESTIC WASTEWATER: Characteristics and composition of sewage - Physical, chemical and biological. BOD equation and factors affecting the BOD rate of reaction, population equivalent.

PRELIMINARY AND PRIMARY SEWAGE TREATMENT: Concept of wastewater treatment, primary, secondary and tertiary treatment - Conventional treatment process flow diagrams of municipal wastewater treatment plants - Functions of each unit Principles and design of screens, grit chamber, and primary settling tanks.

UNIT III

SECONDARY TREATMENT OF SEWAGE: Principles of biological treatment, nutritional requirement of biological treatment system, factors affecting biological treatment systems Design, construction, operation and maintenance of activated sludge process, oxidation ditch trickling filters and waste stabilization ponds.

UNIT IV

SLUDGE MANAGEMENT: Quantity and characteristics, and types of sludges, sludge conditioning and dewatering, handling, treatment, sludge utilisation and disposal.

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Tertiary treatment - Removal of nitrogen, phosphorus, refractory organic, heavy metals, suspended solids and pathogenic bacteria.

UNIT V

EFFLUENT DISPOSAL: Standards for disposal - disposal into surface water bodies - Self purification, zones of pollution - Dissolved oxygen sag curve- Streeter - Phelps equation, Marine disposal - On land disposal and treatment systems - overflow, flooding and irrigation. Onsite Disposal System: Septic tank and effluent disposal system. **MUNICIPAL SOLIDWASTES:** Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/recycle, energy recovery, treatment and disposal).

TEXT BOOKS:

1. Sewage Disposal and Air Pollution Engineering, by S.K.Garg.

2. Environmental Engineering by H.S.Peavy et al.

3. Water Supply and Sewerage, by E.W.Steel and Mc.Ghee.

REFERENCE BOOKS:

1. Wastewater Engineering, Treatment, Disposal, and Reuse by Metcalf and Eddy.

2. G. Tchobanoglous, H. Theisen and S.A. Vigil 'Integrated Solid Waste Management, Engineering

3. Principles and Management Issues' McGraw-Hill, 1993.

P.A. Vesilind, W.A. Worrel and D.R. Reinhart, Solid Waste Engineering, 1/e, Thomson Brooks/Cole, 2002.

B.Tech III Year II Sem SOIL MECHANICS

L	Т	С
3	1	3

UNIT – I

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

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

UNIT – III

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 – IV

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 – V

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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

B.Tech III Year II Sem UNIT – I

DESIGN OF STEEL STRUCTURES

L	Т	С
3	1	3

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

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

UNIT – II

TENSION & COMPRESSION MEMBERS: Bolted connections, Welded connections, Design Strength, Efficiency of joint –Prying action Types of Welded joints - Design of Tension members – Design Strength of members.Design of compression members, Buckling class, slenderness ratio / strengthdesign – laced – battened columns, column splice, column base – slab base.

UNIT – III

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

UNIT – IV

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

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UNIT – V

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.

B.Tech III Year II Sem DESIGN OF IRRIGATION STRUCTURES UNIT – I CANAL REGULATION WORKS: Canal falls: Necessity and

L	Т	С
3	1	3

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

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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, spillway crest gates outlet works- components

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

B.Tech III Year II Sem

HIGHWAY ENGINEERING

L	Т	С
3	1	3

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:

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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 **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 – V HIGHWAY CONSTRUCTION:

Construction of Earth Roads- Gravel Roads – WBM Roads- BituminousPavements- 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.

B.Tech	IV Year	I Semester	Coi	ırse S	tructur	e
S.No.	Abbreviation	Subject	Peri	ods / '	Week	Credits
			L	Т	Р	
9.	FE	Foundation Engineering	3	1	-	3
10.	ECV	Estimation, Costing & Valuation	3	1	-	3
11.	ASD	Advanced Structural Design	3	1	-	3
12.	PSC	Pre-Stressed Concrete	3	1	-	3
13.	E-I	Elective-I	3	1	-	3
		1. Noise and Air Pollution				
		2. Maintenance and Rehabilitation of Structures				
		3. Bridge Engineering				
14.	E-II	Elective-II	3	1	-	3
		4. Traffic Engineering				
		5. Construction Planning and Project Management				
		6. Water Shed Management				

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15.	CAD LAB	CAD Lab	-	-	4	2
16.	GT LAB	Geotechnical Engineering Lab	-	-	4	2
	MP	Mini Project	-	-	-	2
		Total	18	6	8	24

L – Lecture, T – Tutorial, P – Practical

B.Tech IV Year I Sem UNIT I

FOUNDATION ENGINEERING

L	Т	С
3	1	3

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

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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. **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 IV

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

UNIT V

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 publications, New Delhi.
- 3. Foundations Design and Construction Tomlinson

B.Tech IV Year I Sem ESTIMATION, COSTING AND VALUATION

L	Т	С	
3	1 T	3	С

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 shortwall method.

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UNIT – III

EARTHWORK ESTIMATION: Estimation of Earthwork for roads and canals. **REINFORCEMENT ESTIMATION:** Reinforcement bar bending and bar requirement schedules.

UNIT – IV

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

UNIT – V

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".

L	Τ	С
3	1	3

B.Tech IV Year I Sem ADVANCED STRUCTURAL DESIGN

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

Introduction to silos concepts of loading and Design.

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UNIT – IV

Introduction to Chimney concept of loading and design

UNIT – V

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

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3	1	3

B.Tech IV Year I Sem

PRE-STRESSEDCONCRETE

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

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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.

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 – III

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

UNIT – IV

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.

$\mathbf{UNIT} - \mathbf{V}$

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

B.Tech IV Year I Sem

NOISE AND AIR POLLUTION (ELECTIVE - I)

L	Т	С
3	1	3

UNIT - I

NOISE POLLUTION: Sources of noise pollution in urban areas, effect of noise pollution on urban environment, status of noise pollution in major cities.

UNIT - II

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ACOUSTICAL CONCEPTS: Nature of sound – sound propagation characteristics – Propagation of sound in air – absorption of sound in air – Hearing mechanics – Measurement scale – Equal loudness contours. NOISE CHARACTERISTICS AND SOURCES OF NOISE: Noise characterization – Sources of noise.

UNIT - III

NOISE CONTROL TECHNIQUES: Mechanism of noise generation- Control methodology – Noise control at source – Noise control along the path- Control on the receiver end. NOISE STRATEGY – FUTURE GUIDELINES: Current trend – Noise control measures – Environmental noise management – Noise labelling – Diagnostics – Noise strategy – Problems for future investigations

UNIT -IV

AIR POLLUTION SOURCES: Sources and classification of air pollution, natural and manmade, primary and secondary pollutants and various classifications of air pollutant standards as per central pollution control board (CPCB).

UNIT - V

AIR POLLUTION DUE TO AUTOMOBILES: Exhaust emissions; crank case emission, evaporative emissions, air-fuel ratio. Spark timing, control of exhaust emissions. Air quality and emission standards, air pollution legislations and regulations.

Text Books:

- 1. M.N. Rao and H.V.N. Rao, Air Pollution, Tata McGraw, 1989.
- 2. C.S. Rao, Environmental Pollution Control, 2/e, Wiley Eastern, 2006
- 3. Air Pollution & Control Kvsg Murali Krishna Published by Kaushal & Co

Reference Books:

- 1. A.C. Stern, Air Pollution, Vol, I-Viii, Academic Press, 1984..
- 2. K.V.G.S. Murali Krishna Air Pollution and control, Kakinada, 1995

B.Tech IV Year I Sem MAINTENANCE AND REHABILITATION OF STRUCTURES

L	Т	С
3	1	3

(ELECTIVE - I)

UNIT –I General: - quality assurance for concrete construction, as built concrete properties, strength, permeability, volume changes, thermal properties, cracking. Influence on serviceability and Durability effects due to climate, temperature, chemicals, wear and erosion, design and construction errors,

corrosion mechanism, Effects of cover thickness and cracking methods of corrosion protection, inhibitors, resistant steels, coatings cathodic protection

UNIT – II Maintenance and Repair Strategies: - Inspection, Structural Appraisal, Economic appraisal, components of quality assurance, conceptual base for quality assurance schemes.

UNIT - III Materials for Repair : - Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, expansive cement, polymer concrete, sulphur infiltrated concrete, ferro cement, Fibre reinforced concrete.

UNIT –IV **Techniques for Repair** :- Rest eliminators and polymers coating for rebars during repair, foamed concrete, mortar and dry pack, vacuum concrete, Gunite and shotcrete Epoxy injection, Mortar repair for cracks, shoring and underpinning.

UNIT – V Examples of repairs to structures: - Repairs to overcome low member strength, Deflection, cracking, chemical disruption, weathering, wear, fire leakage, marine exposure.

Text Books:

1.Dension Campbell, allen and Harold Roper, Concrete Structures, Materialsa, Maintenance and Repair, Longman Scientific and Technical, U.K. 1991.

2. RT. Allen and S.C Edwards, Rapair of concrete Structures, Blakie and sons, UK, 1987.

 MS. Shetty, Concrete Technology – Theory and practice, S, chand and Company, New Delhi,
Santhakumar, S.R Training course notes on damage assessment and Repair in low cost housing RHDC-NBO Anna University, Madras, July, 1992.

Reference Books:

1. Raikar, R.N. learning from failures – deficiencies in Design, construction and service – R& D centre (SDCPL), Raikar Bhavan, Bombay, 1987.

2. N.Palaniappan, estate Management, Anna Institute of Management, Madras Sep. 1992.

3. F.K. Garas, J.L Clarke, GST Armer, Structural Assessment, Butterworths, UK. April, 1987.

4. A. R santhakumar, concrete Chemicals – Theory and applications, Indian society for Construction Engineering and Technology, Madras.

B.Tech IV Year I Sem

BRIDGE ENGINEERING (ELECTIVE-I)

L	Т	С
3	1	3

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

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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.

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

UNIT V 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 IV Year I Sem

TRAFFIC ENGINEERING (ELECTIVE - II)

L	Т	С
3	1	3

UNIT-I

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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- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics-Road Accidents-Causes and Preventive measures-

Accident Data Recording - Condition Diagram and Collision Diagrams

UNIT-III

PARKING STUDIES: Types of parking facilities – On street and Off Street Parking Facilities-Parking

Studies- Parking Inventory Study – Parking Survey by Patrolling Method- Analysis of Parking Data and parking characteristics-Multi Story Car Parking Facility-Design standards.

UNIT-IV

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

TRAFFIC SIGNS AND ROAD MARKINGS: Types of Traffic Signs cautionary, Regulatory and Informative Signs- Specifications- Pavement markings- Types of Markings – Lane markings and Object markings-Standards and Specifications for Road Markings.

UNIT-V

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

TEXT BOOK:

1. Traffic Engineering and Transportation planning – LK kadiyali – Khanna publishers.

B.Tech IV Year I Sem CONSTRUCTION PLANNING AND PROJECT MANAGEMENT (ELECTIVE - II)

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3	1	3

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.

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 II

Site-Set up And Day to Day working: Introduction-General site Rules-Responsibilities of site staff, storekeeper, 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 III

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 IV

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 V

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

WATERSHED MANAGEMENT

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3	1	3

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UNIT - 1 WATERSHED HYDROLOGY:

Basic characteristics – Rainfall analysis – Runoff analysis – Estimation of design storm and the design flood – Flood routing – Flood mitigation through planning of reservoir capacities and operation of reservoirs.

UNIT II

WATERSHED MANAGEMENT:

Classification of effective watershed management methods – Factors affecting integrated watershed management – Watershed inventory – Problem definition and scope – Consultation process Developing workable management options – Evaluation of constraints and criteria – Simple assessment methods.

UNIT III

SOIL CONSERVATION:

Soil loss estimation – Universal soil loss equation – Soil erosion principles – Gully erosion – Design of permanent gully control structures – Stream bank erosion – Erosivity and erodability – Engineering measures and control practices.

UNIT IV

WATER HARVESTING TECHNIQUES:

Farm ponds - percolation tanks - Drop spillway chutes and flumes - Pipe spillways.

UNIT V

ARTIFICIAL GROUNDWATER RECHARGE TECHNIQUES:

Artificial recharge – Considerations – Methods – Induced infiltration – Water spreading – Flooding – Artificial recharge basins and ditches – Natural channel modifications – Recharge pits and shafts – Recharge wells.

TEXT BOOKS:

1. Prof. R. Suresh, "Watershed Hydrology "Standard Publishers.

- 2. Isobel W. Heathiote. "Integrated Watershed Management Principles and Practices".
- 3. Schwab, G.O. & others, "Soil and water Conservation Engineering".
- 4. Prof. R. Suresh, "Soil and water Conservation Engineering".(Standard Publishers).
- 5. Wayne A. Pettyjohu, "Introduction to Artificial Ground Water Recharge" Scientific Publishers, Jodhpur.
- 6. Murthy J. V. S., "Watershed Management".

B.Tech	Tech IV Year II Semester Course Structure					e
S.No.	Abbreviation	Subject	Periods / Week		Credits	
			L	Т	Р	
1	ESA	Experimental Stress Analysis	3	1	-	3
2	FEMCE	Finite Element Methods in Civil Engineering	3	1	-	3
3	MOOCs-I	Massive Open Online Courses-I	3		-	3
		1. Environmental Impact Assessment				
		2. Railways and Airport Engineering				
		3. Ground Water Development and Management				
4	MOOCs-II	Massive Open Online Courses-II	3		-	3
		1. Civil Engineering Professional Practice				
		2. Flood and Droughts their Management				
		3. Tunnel Engineering				
5	PW	Project Work	-	-	-	5
6	SMNR	Seminar	-	-	-	2
7	CV	Comprehensive Viva-Voce	-	-	-	3
		Total	12	2	-	22

B.Tech IV Year II Sem

EXPERIMENTAL STRESS ANALYSIS

L	Т	С
3	1	3

UNIT I

PRINCIPLES OF EXPERIMENTAL APPROACH: Merits of Experimental Analysis Introduction, uses of experimental stress analysis advantages of experimental stress analysis, Different methods – Simplification of problems.

UNIT II

STRAIN MEASUREMENT USING STRAIN GAUGES: Definition of strain and its relation of experimental

Determinations Properties of Strain Gauge Systems-Types of Strain – Gauge Systems-Types of Strain Gauges Mechanical, Acoustic and Optical Strain Gauges.

UNIT III

ELECTRICAL STRAIN GAUGES: Inductance strain gauges – LVDT – Resistance strain gauges – various

types – Gauge factor – Materials of adhesion base etc. **STRAIN ROSETTES:** Introduction – The three elements Rectangular Rosette – The Delta Rosette Corrections for Transverse Strain Gauge.

UNIT IV:

NON-DESTRUCTIVE TESTING: Ultrasonic Pulse Velocity method – Application to Concrete – hammer

Test Application to Concrete. **BRITTLE COATING METHODS:** Introduction – Coating Stress – Failure Theories – Brittle Coating Crack Patterns – Crack Detection – Types of Brittle Coating – Test Procedures for Brittle Coating Analysis – Calibration Procedures – Analysis of Brittle Coating Data.

UNIT V:

THEROY OF PHOTOELASTICITY: Introduction – Temporary Double refraction – The stress Optic Law –

Effects of stressed model in a polariscope for various arrangements – Fringe Sharpening. Brewster's Stress Optic law. **TWO DIMENSIONAL PHOTOELASTICITY:** Introduction – Isochramic Fringe patterns – Isoclinic Fringe patterns passage of light through plane Polariscope and Circular polariscope, Materials for photo – Elasticity Properties of Photo elastic Materials.

REFERENCE BOOKS :

- 1. Experimental stress analysis by J.W.Dally and W.F.Riley
- 2. Experimental stress analysis by Dr.Sadhu Singh.
- 3. Experimental stress analysis by Vazrani & Ratwani.

B.Tech IV Year II Sem FINITE ELEMENT METHODS IN CIVIL ENGINEERING

L	Т	С
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UNIT -I

Introduction: Concepts of FEM – Steps involved – merits & demerits – energy principles – Discretization –Rayleigh –Ritz method of functional approximation. **Principles of Elasticity:** Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT -II

One Dimensional FEM: Stiffness matrix for bar element - shape functions for one dimensional elements – one dimensional problems.

UNIT –III

Two Dimensional FEM: Different types of elements for plane stress and plane strain analysis – Displacement models – generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system .

UNIT –IV

Generation of element stiffness and nodal load matrices for 3-node triangular element and four node rectangular elements.

UNIT –V

Isoparametric formulation – Concepts of, isoparametric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements –Lagrangian and Serendipity elements. Formulation of 4-node iso-parametric axi-symmetric element

TEXT BOOK:

1. Finite Elements Methods in Engineering by Tirupati.R. Chandrepatla and Ashok D. Belegundu - Pearson Education Publications.

2. Finite element analysis by S.S. Bhavakatti-New age international publishers

3. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi

REFERENCES:

1. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers.

2. Text book of Finite Element analysis by P.Seshu – Prentice Hall of India.