
2009-10**Academic Regulations 2009 for B. Tech (Regular)**

(Effective for the students admitted into I year
from the Academic Year 2009-2010 onwards)

1. Award of B.Tech. Degree

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

- i. Pursue a course of study for not less than four academic years and in not more than eight academic years.
 - ii. Register for 220 credits and secure all 220credits
2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course and their admission is cancelled.

3. Courses of study

The courses of study are offered at present for specialization for the B. Tech. Course:

S.No.	Branch
1.	Aeronautical Engineering.
2.	Biotechnology.
3.	Civil Engineering.
4.	Computer Science and Engineering.
5.	Computer Science and System Engineering.
6.	Electrical and Electronics Engineering.
7.	Electronics and Communication Engineering.
8.	Electronics and Computer Engineering.
9.	Electronics and Control Engineering.
10.	Electronics and Instrumentation Engineering.
11.	Information Technology.
12.	Mechanical Engineering.

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

2009-10**4. Credits**

	I Year		Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03	06	03	04
	02	04	--	--
Practical	03	04	03	02
Drawing	06	06	03	02
			06	04
Seminar	--	--	6	02
Project	--	--	15	10

5. Distribution and Weightage of Marks

- i. The performance of a student in each semester / I year shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition seminar and project work shall be evaluated for 50 and 200 marks respectively.
- ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.
- iii. For theory subjects, during the semester there shall be Two midterm examinations. Each mid term examination consists of objective paper for 10 marks and subjective paper for 20 marks with duration of 1hour 50 minutes (20 minutes for objective and 90 minutes for subjective paper).

Objective paper is set for 20 bits for 10 marks. Subjective paper shall contain 5 questions of which student has to answer 3 questions evaluated* for 20 marks. First mid term examination shall be conducted for I-IV units of syllabus and second mid term examination shall be conducted for V -VIII units. The total marks secured by the student in each mid term examination for 30 marks is considered and the better of the two mid term examinations shall be taken as the final sessional marks secured by each candidate in the subject.

However for first year, there shall be Three midterm examinations as in the above pattern and the average marks of the best two midterm examinations secured in each subject shall be considered as final marks for sessionals.

2009-10

*Note 1: The subjective paper shall contain 5 questions of equal weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 20 marks, any fraction rounded off to the next higher mark

*Note 2: The mid term examination shall be conducted first by distribution of the Objective paper simultaneously marking the attendance, after 20 minutes the answered objective paper is collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet are distributed. After 90 minutes the answered booklets are collected back.

- iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Day-to-day work in the laboratory shall be evaluated for 25 marks by the concerned laboratory teacher based on the report of experiments/jobs. The end examination shall be conducted by the laboratory teacher and another examiner.
- v. For the subject having design and / or drawing, such as Engineering Drawing, Machine Drawing and estimation, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination. The Internal evaluation for sessionals will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm exams in a Semester for a duration of 2hrs each, evenly distributed over the syllabi for 15 marks and the better of the two shall be considered as internal test marks. The sum of day to day evaluation and the internal test marks will be the final sessionals for the subject. However in the I year class, there shall be three midterm exams and the average of best two will be taken into consideration.
- vi. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department before presentation. The report and the presentation shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar shall be evaluated for 50 marks and marks shall be submitted to the

2009-10

- University along with internal marks. There shall be no external examination for seminar.
- vii. Out of a total of 200 marks for the project work, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination (Viva-voce). The viva-voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner nominated by the University. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be made by the departmental committee, on the basis of two seminars given by each student on the topic of his project.
 - viii. Laboratory marks and the sessional marks awarded by the College are not final. They are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding.
 - ix. The laboratory records and internal test papers shall be preserved in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

6. Attendance Requirements:

- i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester/ I year.
- ii. **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**
- iii. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee.
- iv. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.
- v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester / I year, as applicable. They may seek readmission for that semester / I year when offered next.

2009-10

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

7. Minimum Academic Requirements:

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

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. In the Seminar he should secure 40%.
- ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of securing **40** credits from
 - a. One regular and one supplementary examinations of I year.
 - b. One regular examination of II year I semester irrespective of whether the candidate takes the end examination or not as per the normal course of study.
- iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing **68** credits from the following examinations,
 - a. Two regular and two supplementary examinations of I year.
 - b. Two regular and one supplementary examinations of II year I semester.
 - c. One regular and one supplementary examinations of II year II semester.
 - d. One regular examination of III year I semester. irrespective of whether the candidate takes the end examination or not as per the normal course of study.

And in case of getting detained for want of credits by sections ii and iii above, the student may make up the credits through supplementary exams of the above exams before the date of class work commencement of Third or Fourth year I semester respectively.

- iv. A student shall register and put up minimum attendance in all 220 credits and earn all the 220 credits. Marks obtained in all 220 credits shall be considered for the calculation of percentage of marks obtained.

2009-10

- v. Students who fail to earn 220 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Course pattern:

- i. The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years on semester pattern.
- ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
- iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations, whereas he continues to be in the academic regulations he was first admitted.

9. 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 2. and they continues to be in the academic regulations they were first admitted.

10. With-holding of results:

If the candidate has any dues not paid to the university or if any case of indiscipline or malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

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:

2009-10

Class Awarded	% of marks to be secured	From the aggregate marks secured for the best 220 Credits.
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)

12. Minimum Instruction Days:

The minimum instruction days including exams for each semester / I year shall be 90/180 days respectively.

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

14. There shall be no place transfer within the Constituent Colleges.

15. General:

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

ii. Malpractices rules- nature and punishments is appended

iii. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.

iv. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

v. 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 by the University.

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2009-10**ACADEMIC REGULATIONS FOR B. TECH.
(LATERAL ENTRY SCHEME)**

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2010-2011 and onwards)

1. Award of B.Tech. Degree

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

- i. Pursue a course of study for not less than three academic years and in not more than six academic years.
 - ii. Register for 168 credits and secure all 168 credits from II to IV year of Regular B.Tech. program
2. Students, who fail to fulfil the requirement for the award of the degree in six consecutive academic years from the year of admission, shall forfeit their seat.
 3. The regulations **3** to **6** are to be adopted as that of B. Tech. (Regular).

7. Minimum Academic Requirements :

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

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. For the Seminar he should secure 40% in the internal evaluation.
- ii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 42 credits from the following examinations.
 - a. Two regular and one supplementary examinations of II year I semester.
 - b. One regular and one supplementary examinations of II year II semester.
 - c. One regular examination of III year I semester.
irrespective of whether the candidate takes the end examination or not as per the normal course of study.
and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams

2009-10

before the date of class work commencement of Fourth year I semester.

8. Course Pattern

- i. The entire course of study is three academic years on semester pattern.
- ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
- iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations, whereas he continues to be in the academic regulations he was first admitted.

9. The regulations **9** to **10** are to be adopted as that of B. Tech. (Regular).

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:

First Class with Distinction	70% and above	From the aggregate marks secured for 168 Credits. (i.e. II year to IV year)
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)

12. The regulations **12** to **15** are to be adopted as that of B. Tech. (Regular). All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)

2009-10

**RULES FOR
DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER
CONDUCT IN EXAMINATIONS**

	Nature of Malpractices/Improper conduct	Punishment
	<i>If the candidate:</i>	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.

2009-10

		The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for

2009-10

		the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

2009-10

	destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The

2009-10

		candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	<p>Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.</p> <p>Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.</p>
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.

2009-10

12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	
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Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
 - (i) A show cause notice shall be issued to the college.
 - (ii) Impose a suitable fine on the college.

Shifting the examination centre from the college to another college for a specific period of not less than one year.

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech III - I Semester

S. No	Course code	Subject	Theor y	Lab.	Credits
1.	9AHS401	Managerial Economics & Financial Analysis	4	-	4
2.	9A01501	Design & Drawing of reinforced concrete structures	4	-	4
3.	9A01502	Concrete Technology	4	-	4
4.	9A01503	Water resources Engineering – I	4	-	4
5.	9A01504	Structural Analysis - II	4	-	4
6.	9A01505	Engineering Geology	4	-	4
7.	9A01506	Engineering Geology Lab	-	3	2
8.	9AHS601	Advanced English Communication Skills Lab	-	3	2
		contact periods/week	24	6	
Total/Week 30					
Total Credits (6 Theory + 2 Labs)					28

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech III - II Semester

S. No	Course code	Subject	Theor y	Lab.	Credits
1.	9A01601	Design & Drawing of Steel Structures	4	-	4
2.	9A01602	Geotechnical Engineering - I	4	-	4
3.	9A01603	Environmental Engineering - I	4	-	4
4.	9A01604	Water Resources Engineering - II	4	-	4
5.	9A01605	Estimation, Costing and valuation	4	-	4
6.	9A01606	Transportation Engineering	4	-	4
7.	9A01607	Geotechnical Engineering Lab	-	3	2
8.	9A01608	Environmental Engineering Lab	-	3	2
		contact periods/week	24	6	
Total/Week 30					
Total Credits (6 Theory + 2 Labs)					28

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech IV - I Semester

S. No	Course code	Subject	Theor y	Lab.	Credits
1.	9A01701	Finite Element Methods in Civil Engg.	4	-	4
2.	9A01702	Bridge Engineering	4	-	4
3.	9A01703	Geotechnical Engineering – II	4	-	4
4.	9A01704	Environmental Engineering - II	4	-	4
5.		Elective – I			
	9A01705	1. Earthquake Resistant Design	4	-	4
	9A01706	2. Air Pollution & Control			
	9A01707	3. Railways, Docks and Harbor Engineering			
6.		Elective – II			
	9A01708	1. Water resources System Planning & Management	4	-	4
	9A01709	2. Advanced Structural Analysis			
	9A01710	3. Construction Technology and Project Management			
7.	9A01711	CAD Lab	-	3	2
8.	9A01712	Concrete & Highway Materials Lab	-	3	2
		contact periods/week	24	6	
			Total/Week 30		
Total Credits (6 Theory + 2 Labs)					28

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech IV - II Semester

S. No	Course code	Subject	Theor y	Lab.	Credits
1.	9A01801	Advanced Structural Engineering	4	-	4
2.	9A01802	Design and Drawing of Irrigation Structures	4	-	4
3.	9A01803	Elective – III Advanced Foundation Engineering	4	-	4
	9A01804	Ground Improvement Techniques			
	9A01805	Remote Sensing & GIS			
4.	9A01806	Elective – IV Experimental Stress Analysis	4	-	4
	9A01807	Prestressed concrete			
	9A01808	Environmental Impact Assessment and Management			
5.	9A01809	Seminar			2
6.	9A01810	Project			10
		contact periods/week	16	-	-
			Total/Week 16		
Total Credits (4Theory + Seminar + Project Work)					28

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech III-I Sem. (C.E.)	T	P	C
	4	0	4

**(9AHS401) MANAGERIAL ECONOMICS & FINANCIAL
ANALYSIS**

(Common to BOT, CE, ECM, EEE, ME)

UNIT I: INTRODUCTION TO MANAGERIAL ECONOMICS

Definition, nature and scope of managerial economics- relation with other disciplines- 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: INTRODUCTION TO MARKETS AND PRICING POLICIES

Market structures: Types of competition, features of perfect competition, monopoly- monopolistic competition. Price-Output determination under perfect competition and monopoly - Methods of Pricing-cost plus pricing, marginal cost, limit pricing, skimming pricing, bundling pricing, sealed bid pricing and peak load pricing.

2009-10**UNIT V: BUSINESS ORGANISATIONS AND 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 VI: 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 proposal, methods of capital budgeting – payback method, accounting rate of return (ARR) and Net present value method (Simple problems).

UNIT VII: INTRODUCTION TO FINANCIAL ACCOUNTING

Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT VIII: FINANCIAL ANALYSIS THROUGH RATIOS

Computation, Analysis and Interpretation of financial statements through Liquidity Ratios (Current and Quick ratio), Activity ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt- Equity Ratio, Interest Coverage Ratio) and Profitability ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratios and EPS), Du Pont Chart.

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

REFERENCES

1. Premchand Babu, Madan Mohan: Financial Accounting and Analysis, Himalaya, 2009
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2009.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2009.
5. H.L.Ahuja: Managerial Economics, S.Chand, 3/e, 2009

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech. III - I sem (C.E.)	T	P	C
	4	0	4

**(9A01501) DESIGN & DRAWING OF REINFORCED CONCRETE
STRUCTURES**

UNIT –I

INTRODUCTION: Introduction to Materials, Constituents of concrete, recommendation in IS 456 – 2000, grades of concrete, working stress method, design constants; singly reinforced beam.

UNIT –II

INTRODUCTION OF LIMIT STATE DESIGN : Concepts of limit state design – Comparison between two methods- Basic statistical principles – Characteristic loads – Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance

UNIT –III

BEAMS : Limit state design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – IV

SHEAR, TORSION AND BOND : Limit state design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, including detailing.

UNIT – V

COLUMNS : Short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

2009-10**UNIT –VI**

FOOTINGS : Different types of footings – Design of isolated, square, rectangular and circular footings.

UNIT – VII

SLABS : Design of one way slab - Two-way slab, continuous slab Using I S Coefficients .

UNIT –VIII

SERVICEABILITY: Limit state design of serviceability for deflection, cracking and codal provision.

NOTE : All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, Two way and continuous slabs

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions on design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

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. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad
5. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
6. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.

2009-10

7. Design of concrete structures by J.N.Bandopadhyay – PHI Publications, New Delhi.
8. Relevant IS codes such as IS 456 – 2000 etc.

REFERENCES :

1. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
2. Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi
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. Design of concrete structures – Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.

Codes/Tables: IS 456-2000 and IS-800 code books to be permitted into the examinations Hall.

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech. III - I sem (C.E.)	T	P	C
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(9A01502) CONCRETE TECHNOLOGY

UNIT I

CEMENTS & ADMIXTURES: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrated cement – Test's on physical properties – Different grades of cement – Admixtures – Mineral and chemical admixtures.

UNIT – II

AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III

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

UNIT – IV

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

UNIT – V

TESTING OF HARDENED CONCRETE: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT – VI

2009-10

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – VII

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

UNIT – VIII

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Different types of fibres – Factors affecting properties of F.R.C – Applications – Polymer concrete – Types of Polymer concrete – Properties of polymer concrete – Applications – High performance concrete – Self consolidating concrete – SIFCON – Bacterial concrete(self healing concrete)

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Pearson publication – 4th edition
2. Concrete Technology by M.S.Shetty. – S.Chand & Co. ; 2004
3. Concrete Technology by A.M.Neville – Pearson publication

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
3. Non-Destructive Test and Evaluation of materials by J.Prasad & C.G.K. Nair , Tata Mcgraw hill Publishers, New Delhi

2009-10

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B.Tech. III - I sem (C.E.)

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(9A01503) WATER RESOURCES ENGINEERING-I

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 – I:-**

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-evapotranspiration-Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT-III**ABSTRACTION FROM RAINFALL – II:-**

Runoff-components of runoff, factors affecting runoff, stream gauging, effective rainfall, separation of base flow.

UNIT-IV**HYDROGRAPHY:-**

Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph, S-hydrograph, IUH, Synthetic Unit Hydrograph. Design Discharge, Computation of design discharge-rational formula, SCS method

UNIT-V**GROOUND WATER:-**

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, radial flow to wells in confined and unconfined aquifers.

2009-10

UNIT-VI**IRRIGATION-I:-**

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, preparation of land for Irrigation, standards of quality for Irrigation water.

UNIT-VII**IRRIGATION-II:-**

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, estimation of consumptive use, Duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

UNIT-VIII**CANALS:-**

Classification of canals, design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, canal lining.

TEXT BOOKS:

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

REFERENCES:

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

2009-10

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B.Tech. III - I sem (C.E.)

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(9A01504) STRUCTURAL ANALYSIS – II

UNIT I

ARCHES : Three hinged arches, Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.

UNIT – II

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

UNIT-III

SLOPE DEFLECTION METHOD:-Analysis of single bay, single storey, portal frame including side sway.

UNIT – IV

MOMENT DISTRIBUTION METHOD – Stiffness and carry over factors – Distribution factors – Analysis of single storey portal frames – including Sway - Substitute frame analysis by two cycle method.

UNIT – V**KANI'S METHOD**:-

Analysis of continuous beams – including settlement of supports and single bay, single storey portal frames with side sway by Kani's method.

UNIT – VI**FLEXIBILITY METHODS**:-

Flexibility methods, Introduction, application to continuous beams including support settlements.

UNIT – VII**STIFFNESS METHOD** :-

Introduction, application to continuous beams including support settlements.

2009-10

UNIT – VIII**PLASTIC ANALYSIS:**

Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

TEXT BOOKS:

1. Analysis of Structures – Vol. I & 2 by Bhavikatti, 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
5. Structural Analysis by D.S.Prakasha Rao, Univ.Press, Delhi.
6. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi

REFERENCES :

1. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.
2. Theory of structures by Ramamuratam,jain book depot , New Delhi.
3. Structural analysis – Hibbler, 6th edition – Pearson publilcation.
4. Structural analysis by R.S.Khurmi, S.Chand Publications, New Delhi.
5. Analysis Of Structures By Dev Das Menon – John wiley publication

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B.Tech. III - I sem (C.E.)	T	P	C
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(9A01505) ENGINEERING GEOLOGY			

UNIT – I**INTRODUCTION:**

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

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

UNIT – II**MINERALOGY :**

Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar , Quartz , Flint , Jasper, Olivine , Augite , Hornblende , Muscovite , Biotite , Asbestos, Chlorite , Kyanite , Garnet, Talc , Calcite. Study of other common economic minerals such as Pyrite, Hematite , Magnetite, Chlorite , 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.

2009-10

UNIT – IV**STRUCTURAL GEOLOGY :**

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

UNIT – V**GROUND WATER ,EARTH QUAKE &LAND SLIDES:-**

Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. 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 ground water, earth quakes and land slides.

UNIT – VI**GEOPHYSICAL STUDIES:-**

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

UNIT – VII**GEOLOGY OF DAMS AND RESERVOIRS :**

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

UNIT – VIII**TUNNELS :**

Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (ie. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS:

- 1) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications
- 2) Engineering Geology by N.Chennkesavulu, Mc-Millan, India Ltd. 2005
- 3) 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 New Delhi.

2009-10

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B.Tech. III - I sem (C.E.)	T	P	C
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(9A01506) ENGINEERING GEOLOGY LAB.

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic description and identification of rocks referred under theory.
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
4. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech. III - I sem (C.E.)

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**(9AHS601) ADVANCED ENGLISH COMMUNICATION SKILLS
LAB
(Common to BOT, CE, CSE, CSSE, IT)**

1. Introduction

The Advanced English Language Skills Lab introduced at the 3rd year B.Tech level is considered essential for the student for focusing on his/her career. At this stage it is imperative for the student to start preparing for the ever growing competition in the job market. In this scenario, in order to be on par with the best, he/she needs to improve his/her Communication and soft skills

This course focuses on the practical aspects of English incorporating all the four (LRSW) skills relevant to the requirements of the prospective employers in view of globalization. The proposed course will enable the students to perform the following:

- Intensive reading to improve comprehension and communication
- Attentive listening for better understanding
- Write project/research/technical reports
- Write Resume' to attract attention
- Discuss ideas / opinions for better solutions
- Face interviews confidently
- Gather information, organize ideas, and present them effectively before an audience
- To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL,CAT, GMAT etc.

Objectives:

Keeping in mind the previous exposure of the student to English, this lab focuses on improving the student's proficiency in English at all levels.

2009-10

The lab intends to train students to use language effectively, to participate in group discussions, to help them face interviews, and sharpen public speaking skills and enhance the confidence of the student by exposing him/her to various situations and contexts which he/she would face in his/her career

Syllabus

The following course content is prescribed for the Advanced Communication Skills Lab:

Reading Comprehension -- Reading for facts, guessing meanings from context, speed reading, scanning, skimming for building vocabulary(synonyms and antonyms, one word substitutes, prefixes and suffixes, idioms and phrases.)

Listening Comprehension-- Listening for understanding, so as to respond relevantly and appropriately to people of different backgrounds and dialects in various personal and professional situations.

Technical Report Writing—Types of formats and styles, subject matter, organization, clarity, coherence and style, data-collection, tools, analysis

Resume' Writing—Structure, format and style, planning, defining the career objective, projecting one's strengths, and skills, creative self marketing, cover letter

Group Discussion-- Communicating views and opinions, discussing, intervening. providing solutions on any given topic across a cross-section of individuals,(keeping an eye on modulation of voice, clarity, body language, relevance, fluency and coherence) in personal and professional lives.

Interview Skills—Concept and process, pre-interview planning, mannerisms, body language, organizing, answering strategies, interview through tele and video-conferencing

Technical Presentations (Oral)— Collection of data, planning, preparation, type, style and format ,use of props, attracting audience, voice modulation, clarity, body language, asking queries.

Minimum Requirements

The English Language Lab shall have two parts:

2009-10

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a TV, A digital stereo-audio and video system ,Camcorder etc

System Requirement (Hardware Component):

Computer network with LAN with a minimum of 60 multimedia systems with the following specifications:

P-IV Processor
Speed-2.8 GHZ
RAM_512 MB minimum

Hard Disk-80 GB
Headphones

Prescribed Software: GLOBARENA

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. **Technical writing and professional communication, Huckin and Olsen** Tata Mc Graw-Hil 2009.
2. **Speaking about Science, A Manual for Creating Clear Presentations by Scott Morgan and Barrett Whitener, Cambridge University press, 2006**
3. **Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/Cambridge University Press.**
4. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008
5. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
6. **The ACE of Soft Skills** by Gopal Ramesh and Mahadevan Ramesh, Pearson Education, 2010
7. **Cambridge English for Job-Hunting** by Colm Downes, Cambridge University Press, 2008
8. **Resume's and Interviews** by M.Ashraf Rizvi, Tata Mc Graw-Hill, 2008

2009-10

9. **From Campus To Corporate** by KK Ramachandran and KK Karthick, Macmillan Publishers India Ltd, 2010
10. **English Language Communication : A Reader cum Lab Manual**
Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
11. **Managing Soft Skills** by K R Lakshminarayan and T.Muruguvel, Sci-Tech Publications, 2010
12. **Business Communication** by John X Wang, CRC Press, Special Indian Edition,2008

2009-10

**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech. III - II sem (C.E.)	T	P	C
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(9A01601) DESIGN & DRAWING OF STEEL STRUCTURES

UNIT – I

WELDED CONNECTIONS: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of welds fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints, beam to beam and beam to Column connections.

UNIT – II

BEAMS: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

UNIT –III

TENSION AND COMPRESSION MEMBERS : General Design of members subjected to direct tension and bending – effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.

UNIT – IV

DESIGN OF BUILT UP MEMBERS:- Design of Built up compression members – Design of lacings and battern. Design Principles of Eccentrically loaded columns splicing of columns.

UNIT – V

DESIGN OF COLUMN FOUNDATIONS: Design of slab base and gusseted bases. Column bases subjected to moment.

UNIT – VI

ROOF TRUSSES: Different types of trusses – Design loads – Load combinations IS Code recommendations, structural details – Design of

2009-10

simple roof trusses involving the design of purlins, members and joints – tubular trusses.

UNIT – VII

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

UNIT – VIII

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.

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions on design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

TEXT BOOKS

1 Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad

2.Design of Steel Structures by Ramachandra. Vol – 1, Universities Press. Hyderabad

3.Steel Structures by Subramanyam.N, Oxford Higher Education, New Delhi

4. Limit State Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi.

5. Design of Steel Structures by K.S.Sai Ram , Pearson PUBLISHERS.

6. Design of steel structures by Bhavikatti.

2009-10**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
5. Design of Steel Structures by Edwin Gaylord, Charles Gaylord, James Stallmeyer, Tata Mc.Graw-Hill, New Delhi.

Codes/Tables:**IS Codes:**

- 1) IS -800 – 2007
- 2) IS – 875 – Part III
- 3) Steel Tables.
- 4) Railway Design Standards Code.

and **steel tables** to be permitted into the examination hall.

2009-10

**JAWAHARLAL NEHRU
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B.Tech. III - II sem (C.E.)

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(9A01602) GEOTECHNICAL ENGINEERING – I

UNIT – I

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

UNIT – II

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

UNIT –III

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

UNIT –IV

SEEPAGE THROUGH SOILS: Total, neutral and effective stresses – quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT – V

STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart .

UNIT – VI

COMPACTION: Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compaction Equipment – compaction control.

2009-10**UNIT – VII**

CONSOLIDATION : stress history of clay; e-p and e-log p curves – magnitude and rate of 1-D consolidation – Terzaghi's Theory.

UNIT – VIII

SHEAR STRENGTH OF SOILS : 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 Brijee.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.

2009-10

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B.Tech. III - II sem (C.E.)

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(9A01603) ENVIRONMENTAL ENGINEERING – I**UNIT – I**

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

UNIT-II

WATER TREATMENT : Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants – feeding arrangements

UNIT –III

FILTRATION AND CLORINATION : Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – theory of chlorination, chlorine demand, other disinfection practices- Miscellaneous treatment methods.

UNIT-IV

WATER DISTRIBUTION NETWORK ANALYSIS : Distribution systems – Requirements, Layout of Water distribution systems - Design procedures- Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT V

WASTE WATER COLLECTION AND CHARACTERSTICS : Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined

2009-10

flow – characteristics of sewage – cycles of decay – decomposition of sewage, examination of sewage – B.O.D. – C.O.D. equations.

UNIT VI

HOUSE PLUMBING : Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing – ultimate disposal of sewage – sewage farming – dilution.

UNIT – VII

WASTE WATER TREATMENT : Layout and general out line of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – biological treatment – trickling filters – standard and high rate – Construction and design of Oxidation ponds.

UNIT-VIII

SLUDGE TREATMENT : Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks and Imhoff Tanks working principles and design – soak pits.

TEXT BOOKS:

1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi
3. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers.
4. Water supply and sanitary Engineering by S.A.Garg,

REFERENCs :

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel
3. Water and Waste Water Engineering by Fair Geyer and Okun
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
5. Waste water Engineering by Metcalf and Eddy.

2009-10

6. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age International
7. Environmental Engineering by georad.Kiely TMH Publications.
8. Introduction to Environmental Engineering by Mackenzie, Devis and David.A.Cornwell, TMH Publications, New Delhi.

2009-10

**JAWAHARLAL NEHRU
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B.Tech. III - II sem (C.E.)	T	P	C
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(9A01604) WATER RESOURCES ENGINEERING-II

UNIT-I

DAMS : Types of dams, merits and demerits, factors affecting selection of type of dam, factors governing selecting site for dam, types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve.

UNIT-II

GRAVITY DAMS: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.

UNIT-III

EARTH DAMS: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

UNIT-IV

SPILLWAYS: types of spillways, design principles of Ogee spillways, types of spillway gates.

UNIT-V

DIVERSION HEAD WORKS: Types of Diversion head works- diversion and storage head works, weirs and barrages, layout of diversion head works, components. Causes and failure of hydraulic structures on permeable foundations, Bligh's creep theory, Khosla's theory, determination of uplift pressure, impervious floors using Bligh's and Khosla's theory, exit gradient, functions of U/s and d/s sheet piles.

UNIT-VI

CANAL STRUCTURES I: types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall.

2009-10

UNIT-VII

CANAL STRUCTURES II: canal regulation works, principles of design of distributory and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

UNIT-VIII

CROSS DRAINAGE WORKS: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation engineering by K.R.Arora
3. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers
4. Irrigation and Water Power Engineering by Punmia and Lal, Laxmi Publications, New Delhi

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Concrete dams by Varshney.
3. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
4. Water resources engineering by Satyanarayana Murthy. Challa, New Age International Publishers

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**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B.Tech. III - II sem (C.E.)	T	P	C
	4	0	4

(9A01605) ESTIMATION, COSTING AND VALUATION

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.

UNIT – II

ESTIMATION OF BUILDINGS : Detailed Estimates of Buildings

UNIT – III

EARTHWORK ESTIMATION : Earthwork for roads and canals.

UNIT – IV

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

UNIT-V

REINFORCEMENT ESTIMATION : Reinforcement bar bending and
bar requirement schedules.

UNIT – VI

CONTRACTS AND TENDERS : Contracts – Types of contracts –
Contract Documents – Conditions of contract – Types of Tenders –
Requirement of Tendering.

UNIT – VII

VALUATION : Valuation of buildings.

UNIT – VIII

STANDARDS SPECIFICATIONS : Standard specifications for
different items of building construction.

2009-10

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie
3. Contracts and estimations by B.S.Patil, Univ.Press, New Delhi.

REFERENCES :

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. National Building Code

Note : Standards scheduled of rates is permitted in the examination hall.

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B.Tech. III - II sem (C.E.)	T	P	C
	4	0	4

(9A01606) TRANSPORTATION ENGINEERING

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 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 – III

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 – IV

TRAFFIC REGULATION AND MANAGEMENT:

Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Specifications - Design of Traffic Signals –Webster Method –IRC Method – Numerical problems.

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UNIT – V**INTERSECTION DESIGN:**

Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelisation: Objectives –Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT – VI**PAVEMENT DESIGN :**

Types of pavements – Difference between flexible and rigid pavements – Pavement Components – Sub grade, Sub base, base and wearing course – Functions of pavement components – Design Factors – Flexible pavement Design methods – G.I method, CBR Method, Triaxial method – Numerical examples – 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 – VII**INTRODUCTION TO AIR PORT ENGINEERING :**

Factors affecting airport site selection – Surveys for site selection – Aircraft characteristics and their influence on design elements – Planning of Terminal area – Typical Air port layouts.

UNIT – VIII**RUNWAY AND TAXIWAY DESIGN:**

Orientation of runway – Use of wind rose diagram – Runway length and corrections to be applied – Numerical examples for computation of runway length – Geometric elements of runway – Design standards and specifications – Geometric design of Taxiways – Standards and specifications – Runway lighting system.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).

2009-10

2. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
3. Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.
4. Airport Engineering by Rangwala, Charoter Publications, Anand.
5. A Text book of Transportation Engineering by S.P.Chandola, S.Chand Publications, New Delhi.

REFERENCES:

1. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981)
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 6th Edition – 1997.
3. Air Transportation Planning & design – Virendhra Kumar & Statish Chandhra – Gal Gotia Publishers (1999).
4. Introduction to Transportation Engineering by James.H.Banks, Tata Mc.Grawhill Edition, New Delhi
5. Traffic and Highway Engineering Nicholas.J.Garber & Lester A.Hoel
6. High way engineering by Paul .H.Wright & Karen K.Dixon,wiley india limited

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**JAWAHARLAL NEHRU
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B.Tech. III - II sem (C.E.)	T	P	C
	0	3	2

(9A01607) GEOTECHNICAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Atterberg's Limits.
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant and variable head test
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Any eight experiments may be completed.

LIST OF EQUIPMENT:

1. Casagrande's liquid limit apparatus.
2. Apparatus for plastic and Shrinkage limits
3. Field Density apparatus for
 - a) Core cutter method
 - b) Sand Replacement method
4. Set of sieves: 4.75mm, 2mm, 1mm, 0.6mm, 0.42mm, 0.3mm, 5.15mm, and 0.075mm.
6. Hydrometer
7. Permeability Apparatus for
 - a) Constant Head test
 - b) Variable Head test
8. Universal Auto compactor for I.S light and heavy compaction tests.
9. Apparatus for CBR test
10. Sampling tubes and sample extractors.

2009-10

11. 10 tons loading frame with proving rings of 0.5 tons and 5 tons capacity
12. One dimensional consolidation test apparatus with all accessories.
13. Tri-axial cell with provision for accommodating 38 mm dia specimens.
14. Box shear test apparatus
15. Laboratory vane shear apparatus.
16. Hot Air ovens (Range of Temperature 50-150⁰C)
17. Moisture cans – 2 dozens.
18. Electronic balances pf 500 g capacity with 0.01g least count and 5 kg capacity with least count of 1gm
19. Measuring Jars - 1000CC- 6
 - 100CC- 4
20. Mercury - 500 g
21. Rammers - 2
 Crow bars - 2

TEXT BOOKS:

1. Soil Testing Lab Manual by K.V.S. Appa Rao & V.C.C.Rao, University Science Press , Laxmi Publication.
2. Soil Testing for Engineers by S.Mittal and J.P.Shukla, Kahna Publishers, New Delhi.
3. Relevant IS Codes.

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B.Tech. III - II sem (C.E.)	T	P	C
	0	3	2

(9A01608) ENVIRONMENTAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids.
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination and Estimation of total solids, organic solids and inorganic solids.
6. Determination of iron.
7. Determination of Dissolved Oxygen.
8. Determination of Nitrogen.
9. Determination of total Phosphorous.
10. Determination of B.O.D
11. Determination of C.O.D
12. Determination of Optimum coagulant dose.
13. Determination of Chlorine demand.
14. Presumptive coliform test.

NOTE: At least 8 of the above experiments are to be conducted.

LIST OF EQUIPMENT

- 1) pH meter,
- 2) Turbidity meter,
- 3) Conductivity meter,
- 4) Hot air oven,
- 5) Muffle furnace,
- 6) Dissolved Oxygen meter,
- 7) U – V visible spectrophotometer,
- 8) Reflux Apparatus,
- 9) Jar Test Apparatus,
- 10) BOD incubator.
- 11) COD Extraction apparatus

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TEXT BOOKS:

1. Chemistry for Environmental Engineering by Sawyer and Mc. Carty
2. Standard Methods for Analysis of water and Waste Water – APHA
3. Environmental Engineering Lab Manual by Dr.G.Kotaiah and Dr.N.Kumara Swamy, Charotar Publishers, Anand.

REFERENCE

1. Relevant IS Codes.

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B.Tech. IV - I sem (C.E.)	T	P	C
	4	0	4
(9A01701) FINITE ELEMENT METHODS IN CIVIL ENGINEERING			

UNIT –I

INTRODUCTION: Concepts of FEM – Steps involved – merits & demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

UNIT –II

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 –III

ONE DIMENSIONAL ELEMENTS: Stiffness matrix for bar element – shape functions for one dimensional elements – one dimensional problems.

UNIT –IV

TWO DIMENSIONAL ELEMENTS: 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 – area and volume coordinates

UNIT –V

GENERATION OF ELEMENT : Generation of element stiffness and nodal load matrices for 3-node triangular element and four noded rectangular elements.

2009-10**UNIT –VI****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.

UNIT-VII

AXI-SYMMETRIC ANALYSIS: Basic principles-Formulation of 4-noded iso-parametric axi-symmetric element

UNIT-VIII

SOLUTION TECHNIQUES: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOK:

1. Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla and Ashok D. Belegundu – Pearson Education Publications.
2. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. Finite Element methods for Engineers by U.S.Dixit, Cengage Publishers, New Delhi.
4. Finite element analysis in Engineering Design by S.Rajasekharan, S.Chand Publications, New Delhi.
5. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy-Tata Mc.Graw Hill Publishers

REFERENCES:

1. Concepts and Applications of Finite Element Analysis by Robert D.Cook, David S. Malkus and Michael E.Plesha. Jhon Wiley & Sons.
2. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi
3. Applied Fem by Rammurthy, I.K.International Publishers PVt. Ltd., New Delhi.
4. Fem by J.N.Reddy, Mcjraw, TMH Publications, New Delhi.

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B.Tech. IV - I sem (C.E.)	T	P	C
	4	0	4
(9A01702) BRIDGE ENGINEERING			

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.

UNIT - II

BOX CULVERT : General aspects. Design loads, Design of Box culvert subjected to RC class AA tracked vehicle only.

UNIT - III**DECK SLAB BRIDGE :**

Introduction – Effective width method of Analysis Design of deck slab bridge (Simply supported) subjected to class AA Tracked Vehicle only.

UNIT – IV**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 – V**PLATE GIRDER BRIDGE :**

Introduction – elements of a plate girder and their design. Design of a Deck type welded plate girder – Bridge of single line B.G.

UNIT – VI**COMPOSITE BRIDGES :**

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

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

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B.Tech. IV - I sem (C.E.)	T	P	C
	4	0	4

(9A01703) GEOTECHNICAL ENGINEERING – II

UNIT – I

SOIL EXPLORATION: Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

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

UNIT – III

EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Rebhann's and Culmann's graphical method

UNIT-IV

RETAINING WALLS: Types of retaining walls – stability of retaining walls.

UNIT – V

SHALLOW FOUNDATIONS: Types – choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi's, Meyerhoff's and Skempton's Methods

UNIT-VI

ALLOWABLE BEARING PRESSURE : Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures – Settlement Analysis

2009-10**UNIT –VII**

PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT-VIII

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions and Design Design Criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Soil Mechanics and Foundation Engineering by Arora, Standard Publishers and Distributors, Delhi
2. Geotechnical Engineering by C.Venkataramaiah,
3. Foundation Engineering by V.N.S.Murthy, CRC Press, New Delhi.
4. Soil Mechanics and Foundations by – by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:

1. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
2. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
3. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).
4. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
5. Teng,W.C – Foundation Design , Prentice Hall, New Jersy
6. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.

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B.Tech. IV - I sem (C.E.)	T	P	C
	4	0	4

(9A01704) ENVIRONMENTAL ENGINEERING – II

UNIT – I

INTRODUCTION: Air Pollution – sources of pollution – Classification – effects on human beings, Plants and Materials – Global effects of Air pollution – Air emissions standards.

UNIT – II**AIR POLLUTION CONTROL METHODS AND DEVICES :**

Air pollution Control Methods – Particulate control devices – General Methods of Controlling Gaseous Emission.

UNIT – III

TREATMENT METHODS : Special Treatment Methods – Adsorption – Reverse Osmosis – Defluoridation – Ion exchange – Ultra Filtration.

UNIT –IV

THEORIES INDUSTRIAL WASTE TREATMENT : Theories industrial waste treatment – Volume reduction – strength reduction – Neutralization – Equalization – Proportioning – Nitrification and Denitrification – Removal of Phosphates – Effluent standards

UNIT – V

SOLID WASTE MANAGEMENT : Solid waste Management – sources, composition and properties of solid waste – collection and handling – separation and processing.

UNIT – VI

SOLID WASTE DISPOSAL METHODS : Solid waste disposal methods – Land filling and Composting – Incineration.

2009-10**UNIT – VII**

HAZARDOUS WASTE : Hazardous Waste – Nuclear waste – Biomedical wastes – chemical wastes – Effluent – disposal and Control methods.

UNIT – VIII

NOISE POLLUTION : Noise Pollution – effects of noise and control methods – Environmental Audit – ISO – 14000, Water (prevention and control) Act, Air (prevention and control) Act.

TEXT BOOKS:

1. Environmental Science and Engineering by J.G.Henry and G.W.Heinke – Person Education.
2. Environmental Engineering and Management – Dr.Suresh K.Dhameja – S.K.Kartarai & Sons 2nd Edition 2005.
3. Environmental Engineering by Basak, Tata Mc.Graw Hill Edition, New Delhi.
4. Environmental Pollution Control Engineering by C.S Rao

REFERENCES:

1. Physico – Chemical process for waster quality control by Weber
- 2.Solid Waste Engineering by Paarne Vesilind, Willaiam, Cengage Publications, New Delhi.
3. Air Pollution and Control by MN Rao & H.N.Rao.
4. Environmental Engineering by Gerard Kiely, Tata Mc.Graw Hill Edition, New Delhi.
5. Air Quality by Thod godish, Levis Publishers, Special India Edition, New Delhi.
- 6.Introduction to Environmental Engineering by Mackenzie.L.Davis, Devid.A.Cornwell, Tata Mc.Graw Hill Edition, New Delhi.

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B.Tech. IV - I sem (C.E.)	T	P	C
	4	0	4

**(9A01705) EARTHQUAKE RESISTANT DESIGN
(ELECTIVE – I)**

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

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

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

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

UNIT – V Earthquake Engineering : - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc – Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelegrams.

2009-10

UNIT – VI Codal Detailing Provisions : - Review of the latest Indian Seismic codes IS:4326 and IS:13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

UNIT – VII Aseismic Planning : - Plan Configurations – Torsion Irregularities – Re-entrant corners – Non-parallel systems – Diaphragm Discontinuity – Vertical Discontinuities in load path – Irregularity in strength and stiffness – Mass Irregularities – Vertical Geometric Irregularity – Proximity of Adjacent Buildings.

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

TEXT BOOKS:

1. Dynamics of Structures – Clough & Penzien, McGraw Hill – International Edition.
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi
3. Earthquake Resistant Design of Structures by S.K.Duggal, Oxford University press, New Delhi

REFERENCES:

1. Dynamics of Structures by A.K.Chopra – Pearson Education, Indian Branch, Delhi.
2. Earthquake Tips by C.V.R.Murty, I.I.T. Kanpur.
3. Structural Dynamics by Mario Paaz.
4. Earthquake Hazardous Mitijation by R.Ayothiraman and Hemanth Hazarika, I.K.International Publishing House Pvt.Ltd., New Delhi.

Codes/Tables:

IS Codes: IS:1893, IS:4326 and IS:13920 to be permitted into the examinations Hall.

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B.Tech. IV - I sem (C.E.)	T	P	C
	4	0	4

**(9A01706) AIR POLLUTION AND CONTROL
(ELECTIVE –I)**

UNIT – I

INTRODUCTION : Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources.

UNIT – II

EFFECTS OF AIR POLLUTION : Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT-III**THERMODYNAMIC OF AIR POLLUTION:**

Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like Sox, Nox, CO, HC etc., air-fuel ratio. Computation and Control of products of combustion.

UNIT – IV

PLUME BEHAVIOUR : Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams.

UNIT-V

POLLUTANT DISPERSION MODELS : Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

2009-10**UNIT-VI**

CONTROL OF PARTICULATES : Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control, Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – VII

CONTROL OF GASEOUS POLLUTANTS : General Methods of Control of Nox and Sox emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT – VIII

AIR QUALITY MANAGEMENT : Air Quality Management – Monitoring of SPM, SO₂; NO and CO Emission Standards.

TEXT BOOKS:

1. Air Quality by Thod godish, Levis Publishers, Special India Edition, New Delhi
2. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
3. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE:

1. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.
2. Air Pollution and Control by K.V.S.G.Murali Krishna, Kousal & Co. Publications, New Delhi.
3. Environmental meteorology by S.Padmanabham murthy , I.K.Internationals Pvt Ltd,New Delhi.

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B.Tech. IV - I sem (C.E.)	T	P	C
	4	0	4

**(9A01707) RAILWAYS, DOCKS & HARBOR ENGINEERING
(ELECTIVE –I)**

UNIT – I**INTRODUCTION TO RAILWAY ENGINEERING:**

Permanent way components – Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density.

UNIT – II**GEOMETRIC DESIGN OF RAILWAY TRACK:**

Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs .

UNIT- III**STATIONS AND YARDS**

Introduction-purposes of a rail way station – selection of a site for a railway station – types of railway station ,PLAT FORMS – Definition of a yard – types of yards – level crossing— signaling systems and inter locking – staff quarters – goods traffic at way side stations

UNIT – IV**TUNNELLING**

Definition – types of tunneling – Drainage in tunnels – ventilation of tunnels – lining of tunnels – underground railways – tube railways – maintenance of rail way tunnels

UNIT – V**HISTORICAL DEVELOPMENT OF PORTS HARBOURS AND DOCKS**

Introduction – Early Period of Travellers – Mediterranean Harbours – Cretan Harbours – Phasor Harbours Phoenician Harbours – Greek

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harbours – Roman Harbours – Eighteenth Century Harbours – Slipways and Dry Docks – Dredging Machines – Historical Development of Bombay Port.

UNIT – VI**HARBOURS , DOCKS AND BREAK WATER:**

Introduction – Natural Harbours – Artificial Harbours – Size of Harbours – Open Berths – Docks Shape of Docks and Basins – Design and Construction of Basin or Dock Walls – Dock Entrances and Entrance Locks – Classification of Breakwaters – Upright Wall Breakwater – Mound With Super structure Water Breaker – Mound Breakwaters.

UNIT – VII**JETTIES, LANDING STAGES AND WHARVES :**

Jetties – Piled and Open Jetties – Piled and Cylinder Jetties – Scrded Cylinder Jetties – Scrded Cylinders in Jetties – Spring Fenders – Dolphins – Floating Landing Stages – Wharves – Masonry or Mass Concrete Walls – Wall on Wells – Wall of precast block.

UNIT – VIII**DREDGING AND MAINTENANCE :**

Introduction – Types of Dredgers – Bucket or Ladder Dredger – Sand Pump or Hydraulic Dredger or Cutter Dredger – Grab Dredger – Rock Dredger – Dipper Dredger – Hopper Barge –Maintenance of Buildings – Protection of Timber Piles – Maintenance of Lock Gates and Caissans – Maintenance Fresh Water, Hydraulic and Electric Mains – soundings – Organization of Maintenance.

TEXT BOOKS :

1. Railway Engineering by Rangwala Chrotar Publishihing House, Anand.
2. Railway Engineering – A text book Transportation Engineering by S.P.Chandola , S. Chand and Co Ltd.
3. Docks and Harbour Engineering – Text book of Transport Engineering Vol.II by V.N. Vazirani and S.P. Chandola , Khanna Publishers, New Delhi.
4. Railway Engineering by Chandra and Agrawal, Oxford Publishers, New Delhi.

2009-10

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B.Tech. IV - I sem (C.E.)	T	P	C
	4	0	4

**(9A01708) WATER RESOURCES SYSTEM PLANNING AND
MANAGEMENT
(ELECTIVE –II)**

UNIT – I

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

UNIT – V

NON-LINEAR OPTIMATIZATION TECHNIQUES: Classical method optimization, Kun-Tecker, gradient based research techniques for simple unconstrained optimization.

UNIT – VI

SIMULATION: application of simulation techniques in water resources.

2009-10**UNIT – VII**

WATER –RESOURCES ECONOMICS: Principles of Economics analysis, benefit cost analysis socio economic intuitional and pricing of water resources.

UNIT – VIII

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

TEXT BOOKS:

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

REFERENCES:

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

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**(9A01709) ADVANCED STRUCTURAL ANALYSIS
(ELECTIVE –II)**

UNIT - I**MOMENT DISTRIBUTION METHOD:**

Application to the analysis of portal frames with inclined legs.

UNIT – II**STRAIN ENERGY METHOD:**

Application to the analysis of continuous beams and simple portal frames.

UNIT – III**ARCHES:-**

Analysis of two hinged and three hinged arches using influence lines.

UNIT – IV**FLEXIBILITY METHOD:-**

Analysis of portal frames by flexibility method - Drawing of bending moment diagram

UNIT – V**STIFFNESS METHOD:-**

Analysis of portal frames by stiffness method – Drawing of bending moment diagram up to 3X3 stiffness matrix.

UNIT - VI**CABLE AND SUSPENSION BRIDGES :-**

Introduction – equilibrium of cable under a given system of loading - equation of the cable – Horizontal thrust on the cable – Tension in the cable – Anchor cable – Length of the cable.

2009-10**UNIT - VII****PLASTIC ANALYSIS:**

Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

UNIT – VIII**APPLICATIONS OF PLASTIC ANALYSIS:**

Application of plastic analysis to single bay, single storey, steel portal frames – design of sections of the portal frame (excluding gable frame).

TEXT BOOKS:

1. Matrix methods of Structural Analysis by Pandit and Gupta – Tata Mc.Graw Hill
2. Analysis of structures Vol. I & II by Vazrani and Ratwani. Khanna publications.
3. Comprehensive Structural Analysis Vol.1 & 2 by Dr. Vaidyanathan and Dr. P.Perumal - by Laxmi, publications Pvt. Ltd., New Delhi.
4. Fundamentals of Structural Analysis by Sujith Kumar Roy and Subratha Chakraborty, S.Chand Publications, New Delhi.

REFERENCES:

1. Structural Analysis by D.S.Prakash Rao - Sagar books
2. Structural Analysis Vol. I & II by Bhavi Katti Vikas Publications.
3. Matrix structural analysis by T.N.Gayl; Tata Mc.Graw Hill company

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B.Tech. IV - I sem (C.E.)	T	P	C
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**(9A01710) CONSTRUCTION TECHNOLOGY AND PROJECT
MANAGEMENT
(ELECTIVE –II)**

1. FUNDAMENTALS OF CONSTRUCTION**TECHNOLOGY :**

Definitions and Discussion – Construction Activities – Construction Processes - Construction Works – Construction Estimating – Construction Schedule – Productivity and Mechanized Construction – Construction Documents – Construction Records – Quality – Safety – Codes and Regulations.

2. PREPARATORY WORK AND IMPLEMENTATION

Site layout – Infrastructure Development – Construction Methods – Construction Materials – Deployment of Construction Equipment – Prefabrication in Construction – Falsework and Temporary Works.

3. EARTHWORK :

Classification of Soils – Project Site – Development – Setting Out - Mechanized Excavation – Groundwater Control – Trenchless (No-dig) Technology – Grading – Dredging.

4. EXCAVATION BY BLASTING :

Rock Excavation – Basic Mechanics of Breakage – Blasting Theory – Drillability of Rocks – Kinds of Drilling – Selection of the Drilling Method and Equipment – Explosives – Blasting Patterns and Firing Sequence – Smooth Blasting – Environmental Effect of Blasting.

5. PROJECT MANAGEMENT AND BAR CHARTS AND MILESTONE CHARTS :

Introduction – Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives Operation research – Methods of planning and programming problems –

2009-10

Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT network problems.

6. ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK :

Introduction – Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems – Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure – Hierarchies – Illustrative examples – Problems.

7. PERT: TIME ESTIMATES & TIME COMPUTATIONS :

Introduction – Uncertainties : Use of PERT – Time estimates – Frequency distribution – Mean, variance and standard deviation – Probability distribution – Beta distribution – Expected time Problems – Earliest expected time – Formulation for T_E - Latest allowable occurrence time – Formulation for T_L - Combined tabular computations for T_E and T_L problems.

8. PERT AND CPM: NETWORK ANALYSIS:

Introduction - Slack – Critical path – Illustrative examples – Probability of meeting scheduled date Problems – CPM : process – CPM : Networks – Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for T_E and T_L - Start and finish times of activity – Float – Critical activities and critical path – Illustrative examples Problems.

TEXT BOOKS :

1. Construction Technology by Subir K.Sarkar and Subhajit Saraswati – Oxford Higher Education- Univ.Press, Delhi.
2. Project Planning and Control with PERT and CPM by Dr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi.
3. Construction project management by Jha ,Pearson publications, New Delhi.

2009-10

REFERENCES:

1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Operations research by P.Sankar Iyer, TMH Publications, New Delhi.
3. Operations research by N.Ramanathan, TMH Publications, New Delhi.
4. Total Project management , the Indian context- by : P.K.JOY- Mac Millan Publishers India Limited.

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(9A01711) CAD LAB.**CAD:****SOFTWARE:**

1. STAAD PRO or Equivalent

EXCERCISIIES:

1. 2-D Frame Analysis and Design
2. Steel Tabular Truss Analysis and Design
3. 3-D Frame Analysis and Design
4. Retaining Wall Analysis and Design
5. Simple tower Analysis and Design
6. One Way Slab Analysis & Design
7. Two Way Slab Analysis & Design
8. Column Analysis & Design

TEXT BOOK:

1. Computer Aided Design Lab Manual by Dr.M.N.Sesha Prakash And Dr.C.S.Suresh

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B.Tech. IV - I sem (C.E.)

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(9A01712) CONCRETE AND HIGHWAY MATERIALS LAB

I. ROAD AGGREGATES:

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS :

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES :**TESTS ON CEMENTS :**

1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration)

LIST OF EQUIPMENT:

1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Deval's Attrition test machine
6. Length and elongation gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.

2009-10

9. Ring and ball apparatus
10. Penskey – Morten's apparatus
11. Vicat's apparatus
12. Specific gravity bottle.
13. Lechatlier's apparatus.
14. Slump and compaction factor setups
15. Longitudinal compresso meter and 16. Rebound hammer, Pulse velocity machine.
16. Relevant IS Codes

TEXT BOOKS:-

1. Lab manual in High way Engineering by Ajay.K.Duggal & Vijay .P.Puri, New Age publications,New Delhi

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B.Tech. IV -II sem (C.E.)	T	P	C
	4	0	4

(9A01801) ADVANCED STRUCTURAL ENGINEERING

1. Design of a flat slab(Interior panel only)
2. Design of concrete bunkers of circular shape – (excluding staging)
– Introduction to silos
3. Design of concrete chimney
4. Design of Intz water tank excluding staging
5. Design of circular and rectangular water tank resting on the ground
6. Design of cantilever and counter forte retaining wall with
horizontal back fill
7. Design of grid floor
8. (A) Design of slab less tread – riser stair case.
(B) Design of Cinema balcony

TEXT BOOKS :-

1. Advanced R.C.C by Krishnam Raju, CBS Publishers & distributors , New Delhi.
2. Structural Design and drawing (RCC and steel) by Krishnam Raju, Univ.Press , New Delhi
3. R.C.C Structures by [Dr. B. C. Punmia](#), [Ashok Kumar Jain](#), [Arun Kumar Jain](#), Laxmi Publications, New Delhi
4. Advanced RCC by Varghese , PHI Publications, New Delhi.
5. Design of RCC structures by M.L.Gambhir P.H.I. Publications, New Delhi.

Reference books :-

1. R.C.C Designs by Sushil kumar , standard publishing house.
2. Fundamentals of RCC by N.C.Sinha and S.K.Roy, S.Chand Publications, New Delhi.

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B.Tech. IV -II sem (C.E.)	T	P	C
	4	0	4

**(9A01802) DESIGN AND DRAWING OF IRRIGATION
STRUCTURES**

Design and drawing of the following irrigation structures.

1. Sloping glacis weir.
2. Tank sluice with tower head
3. Type III Syphon aqueduct.
4. Surplus weir.
5. Trapezoidal notch fall.
6. Canal regulator.

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

TEXT BOOKS:

1. Design of minor irrigation and canal structures by C.Satyanarayana Murthy, Wiley eastern Ltd.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

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B.Tech. IV -II sem (C.E.)	T	P	C
	4	0	4

**(9A01803) ADVANCED FOUNDATION ENGINEERING
(ELECTIVE –III)**

1. SHALLOW FOUNDATIONS-I:

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 (derivation of expressions and solution to problems based on these theories). Local shear and general shear failure and their identification.

2.SHALLOW FOUNDATIONS-II :

Bearing capacity of isolated footing subjected to eccentric and inclined loads. Bearing capacity of isolated footing resting on stratified soils-Button's theory and Siva Reddy analysis.

3.ANALYSIS AND STRUCTURAL DESIGN OF R.C.C. FOOTINGS:

Analysis and structural design of R.C.C. isolated, combined and strap footings.

4.DEEPFOUNDATIONS-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. Negative skin Friction, Pile load tests.

5.DEEP FOUNDATIONS – II :

Well foundations – elements of well foundation. Forces acting on a well foundation. Depth and bearing capacity of well foundation. Design of individual components of well foundation (only forces acting and principles of design). Problems associated with well sinking.

2009-10**6.SHEET PILE WALLS:**

Cantilever sheet piles and anchored bulkheads, Earth Pressure diagram, Determination of depth of embedment in sands and clays-Timbering of Trenches – Earth Pressure Diagrams – Forces in struts.

7.FOUNDATIONS IN PROBLEMATIC SOILS :

Foundations in black cotton soils- basic foundation problems associated with black cotton soils. Lime column techniques – Principles and execution. Use of Cohesive Non Swelling (CNS) layer below shallow foundations.

8.DESIGN OF UNDER REAMED PILES FOUNDATIONS:

Under reamed piles-principle of functioning of under reamed pile-Analysis and structural design of under reamed pile.

TEXT/ REFERENCE BOOKS :

1. Analysis and Design of Foundations and Retaining Structures- Shamsheer 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 Brijee.M.Das, Cengage publications,New Delhi.
3. Foundations Design and Construction – Tomlinson.

2009-10

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B.Tech. IV -II sem (C.E.)	T	P	C
	4	0	4

**(9A01804) GROUND IMPROVEMENT TECHNIQUES
(ELECTIVE –III)**

UNIT – I

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

UNIT –II

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

UNIT – III**DENSIFICATION METHODS IN GRANULAR SOILS:-**

In – situ densification methods in granular Soils:– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

UNIT – IV**DENSIFICATION METHODS IN COHESIVE SOILS:-**

In – situ densification methods in Cohesive soils:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – V

STABILISATION: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride,sodium silicate and gypsum

2009-10**UNIT – VI**

REINFORCED EARTH: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

UNIT – VII

GEOSYNTHETICS : Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

UNIT - VIII

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

TEXT BOOKS:

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

REFERENCES:

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

2009-10

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B.Tech. IV -II sem (C.E.)	T	P	C
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**(9A01805) REMOTE SENSING AND GIS
(ELECTIVE –III)**

UNIT – I**INTRODUCTION TO PHOTOGRAMMETRY:**

Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

UNIT – II**REMOTE SENSING – I:**

Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

UNIT – III**REMOTE SENSING – II:**

Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – IV**GEOGRAPHIC INFORMATION SYSTEM:**

Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

UNIT – V**TYPES OF DATA REPRESENTATION:**

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

2009-10**UNIT – VI****GIS SPATIAL ANALYSIS:**

Computational Analysis Methods(CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – VII**WATER RESOURCES APPLICATIONS-I:**

Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.

UNIT – VIII**WATER RESOURCES APPLICATIONS – II:**

Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

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

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yongng, Prentice Hall (India) Publications.
2. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

2009-10

3. The GIS book by Korte, cengage publications, New Delhi.
4. Fundamental of GIS by Mechanical designs John Wiley & Sons.
5. Remote sensing and GIS by M.Anji reddy
,B.S.Publiications, New Delhi.
6. Remote Sensing and its applications by LRA Narayana
University Press 1999.
7. Geoinformation for Development by Zeil/Kienberger (Eds) –
Univ.Science Press, New Delhi.

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B.Tech. IV -II sem (C.E.)

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**(9A01806) EXPERIMENTAL STRESS ANALYSIS
(ELECTIVE –IV)**

1.PRINCIPLES OF EXPERIMENTAL APPROACH :

Merits of Experimental Analysis Introduction, uses of experimental stress analysis advantages of experimental stress analysis, Different methods – Simplification of problems.

2.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.

3.ELECTRICAL STRAIN GAUGES :

Inductance strain gauges – LVDT – Resistance strain gauges – various types – Gauge factor – Materials of adhesion base etc.

4.STRAIN ROSETTES :

Introduction – The three element Rectangular Rosette – The Delta Rosette Corrections for Transverse Strain Gauge.

5.NON-DESTRUCTIVE TESTING :

Ultrasonic Pulse Velocity method – Application to Concrete – hammer Test Application to Concrete.

6.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.

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7.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.

8.TWO DIMENSIONAL PHOTOELASTICITY :

Introduction – Isochromic Fringe patterns – Isoclinic Fringe patterns passage of light through plane Polariscope and Circular polariscope Isoclinic Fringe patterns – Compensation techniques – Calibration methods – Separation methods – Scaling Model to prototype Stresses – Materials for photo – Elasticity Properties of Photoelastic 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.

2009-10

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B.Tech. IV -II sem (C.E.)	T	P	C
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(9A01807) PRESTRESSED CONCRETE

(ELECTIVE -IV)

UNIT – I

INTRODUCTION:

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

UNIT – II

METHODS OF PRESTRESSING:-

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

UNIT – III

LOSSES OF PRESTRESS:-

Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of stress in steel, slip in anchorage ,bending of member and wobble frictional losses.

UNIT – IV

ANALYSIS OF SECTIONS FOR FLEXURE;-

Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – V

DESIGN OF SECTIONS FOR FLEXURE :-

Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure – Kern – lines, cable profile.

2009-10

UNIT – VI**DESIGN OF SECTION FOR SHEAR :**

Shear and Principal Stresses – Design for Shear in beams.

UNIT – VII**COMPOSITE SECTION:**

Introduction – Analysis of stress – Differential shrinkage – General designs considerations.

UNIT – VIII**DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS:**

Importance of control of deflections – factors influencing deflections – short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS:

1. Prestressed Concrete by N. Krishna Raju; - Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.
3. Prestressed Concrete by Ramamrutham,Dhanpatrai Publications

REFERENCE:

1. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.
2. Pre stressed concrete by E.G.Nawy

Codes/Tables:

Codes: BIS code on prestressed concrete, IS 1343 to be permitted into the examination Hall.

2009-10

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**(9A01808) ENVIRONMENTAL IMPACT ASSESTMENT &
MANAGEMENT
(ELECTIVE –IV)**

UNIT – I**INTRODUCTION:-**

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

UNIT – II**EIA METHODOLOGIES:-**

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

UNIT – III**IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE:-**

Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives.

UNIT-IV**ENVIORNMENTAL IMPACT ASSEMENT :**

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

UNIT – V**ASSEMENT OF IMPACT ON VEGETATION AND WILDLIFE :**

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

UNIT – VI

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ENVIRONMENTAL AUDIT :

Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT-VII**ENVIRONMENTAL ACTS (PROTECTION AND PREVENTION)**

Post Audit activities, The Environmental protection Act, The water prevention Act, The Air (Prevention & Control of pollution Act.), Wild life Act.

UNIT-VIII**CASE STUDIES :**

Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES:

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