JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR ANANTHAPURAMU-515002 (A.P) INDIA

ACADEMIC REGULATIONS COURSE STRUCTURE
AND
DETAILED SYLLABI
OF
MASTER OF TECHNOLOGY
IN
STRUCTURAL ENGINEERING & CONSTRUCTION MANAGEMENT

Regular Two Year P.G. Degree Course
(Applicable for the batches admitted from 2013-14)

Academic Regulations-M.Tech. 2013-14

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
Academic Regulations For The Award Of Full Time M.Tech. P.G. Degree
(WITH EFFECT FROM THE ACADEMIC YEAR 2013-14)

The Jawaharlal Nehru Technological University Anantapur shall confer M.Tech. Post Graduate degree to candidates who are admitted to the Master of Technology Programs and fulfill all the requirements for the award of the degree.

1.0   ELIGIBILITY FOR ADMISSIONS:
Admission to the above programme shall be made subject to the eligibility, qualifications and specialization prescribed by the University for each programme, from time to time.
Admissions shall be made either on the basis of merit rank obtained by the qualified candidates at an Entrance Test conducted by the University or on the basis of GATE / PGECET score, subject to reservations prescribed by the University or Government policies from time to time.

2.0   **COURSE WORK:**

2.1   A Candidate after securing admission must pursue the M.Tech. course of study for Four semesters duration.
2.2   Each semester shall be of 20 weeks duration including all examinations.
2.3   A candidate admitted to a programme should complete it within a period equal to twice the prescribed duration of the programme from the date of admission.

3.0   ATTENDANCE:
3.1   A candidate shall be deemed to have eligibility to write end semester examinations if he has put in atleast 75% of attendance on cumulative basis of all subjects/courses in the semester.
3.2   Condonation of shortage of attendance up to 10% i.e., from 65% and above and less than 75% may be given by the college on the recommendation of the Principal.
3.3   Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the candidate with supporting evidence.
3.4   If the candidate does not satisfy the attendance requirement he is detained for want of attendance and shall reregister for that semester. He / she shall not be promoted to the next semester.

4.0. EVALUATION:

The performance of the candidate in each semester shall be evaluated subject wise, with a maximum of 100 marks for Theory and 100 marks for practicals, on the basis of Internal Evaluation and End Semester Examination.

4.1 For the theory subjects 60% of the marks will be for the External End Examination. While 40% of the marks will be for Internal Evaluation, based on the better of the marks secured in the two Mid Term-Examinations held, one in the middle of the Semester (I-IV units) and another immediately after the completion of instruction (V-VIII) units with Three questions to be answered out of four in 2hours, evaluated* for 40 marks.

*Note: All the Questions shall be of equal weightage of 10 marks and the marks obtained for 3questions shall be extrapolated to 40 marks, any fraction rounded off to the next higher mark

4.2 For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks will be for internal evaluation based on the day to day performance.

4.3 For Seminar there will be an internal evaluation of 50 marks. A candidate has to secure a minimum of 50% to be declared successful. The assessment will be made by a board consisting of HOD and two internal experts at the end of IV semester instruction.

4.4 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.

4.5 In case the candidate does not secure the minimum academic requirement in any of the subjects (as specified in 4.4.) he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the course when next offered or do any other specified subject as may be required.

5.0 RE-REGISTRATION FOR IMPROVEMENT OF INTERNAL EVALUATION MARKS:

Following are the conditions to avail the benefit of improvement of internal evaluation marks.

5.1 The candidate should have completed the course work and obtained examinations results for I & II semesters.

5.2 He should have passed all the subjects for which the Internal evaluation marks secured are more than 50%.

5.3 Out of the subjects the candidate has failed in the examination due to Internal evaluation marks secured being less than 50%, the candidate shall be given one chance for each Theory subject and for a maximum of **three** Theory subjects for Improvement of Internal evaluation marks.

5.4 The candidate has to re-register for the chosen subjects and fulfill the academic requirements.

5.5 For each subject, the candidate has to pay a fee equivalent to one third of the semester tuition fee and the amount is to be remitted in the form of D.D. in favour of the

Registrar, JNTUA payable at Anantapur along with the requisition through the Principal of the respective college.

5.6 In the event of availing the Improvement of Internal evaluation marks, the internal evaluation marks as well as the End Examinations marks secured in the previous attempt(s) for the reregistered subjects stand cancelled.

6.0 EVALUATION OF PROJECT WORK:

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the college/ institute.

6.1 Registration of Project work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses of I & II Sem)

6.2 An Internal Departmental Committee (I.D.C) consisting of HOD, Supervisor and one internal senior expert shall monitor the progress of the project work.

6.3 The work on the project shall be initiated in the penultimate semester and continued in the final semester. The duration of the project is for two semesters. The candidate can submit Project thesis with the approval of I.D.C. after 36 weeks from the date of registration at the earliest and one calendar year from the date of registration for the project work. Extension of time within the total permissible limit for completing the programme is to be obtained from the Head of the Institution.

6.4 The student must submit status report at least in three different phases during the project work period. These reports must be approved by the I.D.C before submission of the Project Report.

6.5 A candidate shall be allowed to submit the thesis / dissertation only after passing in all the prescribed subjects (both theory and practical) and then take viva voce examination of the project. The viva-voce examination may be conducted once in two months for all the candidates submitted during that period.

6.6 Three copies of the Thesis / Dissertation certified in the prescribed from by the supervisor & HOD shall be presented to the HOD One copy is to be forwarded to the University and one copy to be sent to the examiner.

6.7 The college shall submit a panel of three experts for a maximum of 5 students at a time. However, the thesis / dissertation will be adjudicated by one examiner nominated by the University.

6.8 If the report of the examiner is favorable viva-voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the examiner who adjudicated the thesis / dissertation. The board shall jointly report candidates work as:

1.	Very Good	Grade	A
2.	Good	Grade	B
3.	Satisfactory	Grade	C
4.	Not satisfactory	Grade	D

If the report of the viva-voce is not satisfactory (Grade D) the candidate will retake the viva-voce examination after three months. If he fails to get a satisfactory report at the second viva-voce examination he will not be eligible for the award of the degree unless the candidate is permitted to revise and resubmit the thesis.

7.0 AWARD OF DEGREE AND CLASS:

A candidate shall be eligible for the award of respective degree if he satisfies the minimum academic requirements in every subject and secures 'satisfactory' or higher grade report on his thesis/dissertation and viva-voce. Based on overall percentage of marks obtained, the following class is awarded.

First class with Distinction:	70% or more
First class	below 70% but not less than 60%
Second class	below 60% but not less than 50%

8.0 WITH – HOLDING OF RESULTS:

If the candidate has not paid dues to the university or if any case of in-discipline 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.

9.0 TRANSITORY REGULATIONS:

Candidates who have discontinued or have been detained for want of attendance or who have failed after having undergone the course in earlier regulations 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 4.5 and 2.3 sections. Whereas they continue to be in the academic regulations they were first admitted.

10.0 GENERAL:
  i. **The academic regulations should be read as a whole for purpose of any interpretation**.
  ii. **Disciplinary action for Malpractice / improper conduct in examinations is appended**.
  iii. **There shall be no places transfer within the constituent colleges and affiliated colleges of Jawaharlal Nehru Technological University Anantapur.**
  iv. **Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".**
  v. **In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.**
  vi. **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 rolls with effect from the dates notified by the University.**

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APPROVED REVISION OF RULES FOR DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
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. 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 for four 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.** **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 four consecutive semesters from class work and all University examinations, if his involvement is established. Otherwise, The candidate is 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 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 only.
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	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. If the candidate physically assaults the invigilator/ officer-in-charge of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against

	indulges in any other act of misconduct or mischief which result in damage to or 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.	**them.**
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 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.	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.Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
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

8

		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 only or in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations, depending on the recommendation of the committee.**
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.	

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

Note: Whenever the performance of a student is cancelled in any subject/subjects due to Malpractice, he has to register for End Examinations in that subject/subjects consequently and has to fulfill all the norms required for the award of Degree.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
Course Structure and syllabi for
M.Tech- Structural Engineering & Construction Management
Offered by Department of Civil Engineering
for affiliated Engineering Colleges 2013-14

I YEAR   I Semester

S. No	Course code	Subject	Theory	Lab.	Credits
1.	13D91101	Higher Engineering Mathematics	4		4
2.	13D35102	Matrix Methods of Structural Analysis	4		4
3.	13D35103	Theory of Elasticity	4		4
4.	13D91102	Construction Management	4		4
5.	13D91103 13D91104 13D91105	Elective – I 1. Cost Effective Housing Techniques 2. Contract Laws & Regulations 3. Maintenance and Rehabilitation of Structures	4		4
6.	13D91106 13D91107 13D91108	Elective – II 1. Advanced Construction Techniques 2. Construction Methods and Equipments 3. Quality Control and Safety Management	4		4
7.	13D91109	Advanced Structural Engineering Laboratory		3	2
		Total Credits			26

I YEAR II Semester

S. No	Course code	Subject	Theory	Lab.	Credits
1.	13D35201	Structural Dynamics	4		4
2.	13D35202	Finite Element Analysis of Structures	4		4
3.	13D35110	Stability of Structures	4		4
4.	13D91201	Project Planning & Implementation	4		4
5.	13D35109 13D91202 13D91203	Elective – III 1. Prestressed Concrete 2. Construction Personnel Management 3. Construction Economics and Finance Management	4		4
6.	13D91204 13D91205 13D91206	Elective – IV 1. Construction Planning, Scheduling and Control 2. Civil Engineering Material Science 3. Environment and Pollution	4		4
7.	13D91207	CAD Laboratory		3	2
		Total Credits			26

II YEAR   (III & IV Semesters)

S. No	Course code	Subject		credits
1	13D91401	Seminar		2
2	13D91402	Project work		16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech I semester (SE & CM)

Th   C
4   4

(13D91101) HIGHER ENGINEERING MATHEMATICS

UNIT-I

Calculus of variation-Concepts of maxima and minima of functions-constraints and Lagrange's multipliers-Extreme value of functional-Euler's equations – solutions of Euler's equation.

UNIT-II
Hamilton principal- Lagrange equations generalized dynamic excitations – constraints in dynamical systems.

UNIT-III
Numerical solution of ordinary differential equations Taylor series method, Picard's method, Euler's method modified Euler's method & R.K.method.

UNIT-IV
Eigen values and Eigen vectors – general method – Power method, spectral method.

UNIT-V
Numerical solution of partial differential equations –Elliptical equations standard five points formula, diagonal five point formula

UNIT-VI
Solution of Laplace equation by Leibmann's iteration method, Poisson's equation and its applications.

UNIT-VII
Numerical solution of partial differential equations – Parabolic equations bender –Schmidt method-bender - Schmidt recurrence equation, crank-Nicholson difference method.

UNIT-VIII
Finite element method – weighted Residual methods, least square method Gelarkin's method – finite elements – Interpolating over the whole domain – one dimensional case, two dimensional case – application to boundary value problems.

REFERENCE BOOKS:

1. Numerical methods for Engineers by Steven C.Chapra and Raymond P.Canale – Mc Graw Hill Book Company.
2. Applied numerical analysis by Curtis. F.Gerald- Addeson Wesely Publishing Company.
3. Higher Engineering mathematics by B.S. Grewal Khanna Publishers.
4. C-Language and numerical methods by C-Xavier. New Age International publishers.
5. Computational methods for partial differential equations by M.K.Jain, SKR Lyengar, R.K.Jain.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech I semester (SE & CM)

Th C
4 4

(13D35102) MATRIX METHODS OF STRUCTURAL ANALYSIS

UNIT-I

INTRODUCTION:-Indeterminacy**-**Determination of static and kinematic indeterminacies of two-dimensional and three-dimensional portal frames, pin jointed trusses and hybrid frames-coordinate systems –structural idealization.

UNIT-II

Introduction To Matrix Methods Of Analysis-Flexibility and stiffness matrices-Force displacement relationships for axial force, couple, torsional moments – stiffness method of analysis and flexibility method of analysis.

UNIT-III & IV

ANALYSIS OF CONTINUOUS BEAMS- stiffness method and flexibility method of analysis –continuous beams of two and three spans with different end conditions-internal hinges.

UNIT-V

ANALYSIS OF TWO DIMENSIONAL PORTAL FRAMES & PINJOINTED TRUSSES – **a**) stiffness and flexibility method of analysis of 2D portal frames with different end conditions-plotting of bending moment diagrams.

UNIT- VI

b) Computation of joint displacement and member forces for pinjointed trusses.

UNIT-VII

TRANSFORMATION OF CO-ORDINATES - Local and Global co-ordinate systems-transformation of matrices from local to global coordinates of element stiffness matrix-direct stiffness method of analysis-assembly of global stiffness matrix from element stiffness matrices –static condensation-sub-structuring.

UNIT-VIII

EQUATION SOLVERS-solution of system of linear algebraic equations-direct inversion method-gauss elimination method-Cholesky method-banded equation solvers-frontal solution technique.

REFERENCE BOOKS :
1. Structural Analysis by Pundit & Gupta, Tata MC Graw Hill Book company.
2. Structural Analysis by C.S.Reddy, Tata MC Graw Hill Book company
3. Cotes, R.C., Couties, M.G., and Kong, F.K., Structural Analysis, ELBS.
4. MC.Guire, W.,and Gallagher, R.H., Matrix Structural analysis, John Wiley and sons.
5. John L.Meek., Matrix Structural Analysis, MC Graw Hill Book company.
6. Structural Analysis – R.C.Hibbeler, Pearson Education

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech I semester (SE & CM)

Th   C
4   4

(13D35103) THEORY OF ELASTICITY

UNIT-I

INTRODUCTION
Elasticity –Notation for forces and stresses-Components of stresses –components of strain –Hooke's law.

UNIT-II
PLANE STRESS AND PLANE STRAIN ANALYSIS:
Plane stress-plane strain-Differential equations of equilibrium- Boundary conditions-Compatability equations-stress function-Boundary conditions.

UNIT-III

TWO DIMENSIONAL PROBLEMS IN RECTANGULAR COORDINATES:
Solution by polynomials-Saint Venant's principle-Determination of displacements-bending of simple beams-application of Fourier series for two dimensional problems - gravity loading.

UNIT-IV& V

TWO DIMENSIONAL PROBLEMS IN POLAR COORDINATES :
General Equation in polar co-ordinates - stress distribution symmetrical about an axis – Pure bending of curved bars- strain components in polar coordinates-Displacements for symmetrical stress distributions-simple symmetric and asymmetric problems-General solution of two dimensional problem in polar coordinates-Application of the general solution of two dimensional problem in polar coordinates-Application of the general solution in polar coordinates.

UNIT-VI

ANALYSIS OF STRESS AND STRAIN IN THREE DIMENSIONS: Principle stress - ellipsoid and stress-director surface-Determination of principle stresses- Maximum shear stresses-Homogeneous deformation-principle axis of strain rotation.

UNIT-VII

GENERAL THEOREMS:
Balance laws - Differential equations of equilibrium- conditions of compatibility - Determination of displacement-Equations of equilibrium in terms of displacements-principle of superposition-Uniqueness of solution –the Reciprocal theorem.

UNIT-VIII

TORSION OF PRISMATICAL BARS:
Torsion of prismatic bars- Elliptical cross section-other elementary solutions-membrane anology-Torsion of rectangular bars-solution of torsional problems by energy method-use of soap films in solving torsionol problems-hydra dyanmical analogies-Torsion of shafts, tubes, bars etc.

REFERENCE BOOKS :

1. Theory of Elasticity and Plasticity by Timoshenko, S., MC Graw Hill Book company.
2. Advnced Strength of materials by Papoov, MC Graw Hill Book company.
3. Theory of Elasticity and Plasticity by Sadhu Singh. Khanna Publishers.
4. Chen, W.F. and Han, D.J.Plasticity for structural Engineers, Springer – Verlag, New York.
5. Lubliner, J., Plasticity theory, Mac Millan Publishing Co., New York.
6. Foundations of Solid Mechanics by Y.C.Fung, PHI Publications.
7. Advanced Mechanics of Solids by L.S. Srinath, Tata MC Graw Hill Book company.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech I semester (SE & CM)

	Th	C
	4	4

(13D91102) CONSTRUCTION MANAGEMENT

UNIT-I

Scientific Management: Contributions of pioneers in scientific Management - Basic principles of management with special reference to construction industry- construction organization setup.

UNIT-II

Computer capabilities in management: Methodology and Tools techniques for systematic identification, evaluation, Office and field administrative control reports and records- data processing.

UNIT-III

Management information systems: – Relatedness of MIS with management activities-Management functions and decision making- Concept of balance MIS effectiveness and efficiency criteria-modification of MIS, Simulation of alternatives.

UNIT-IV

Engineering economy: Cash flow- bases of comparison, decision making amongst alternatives- benefit cost analysis- rate of return- replacement analysis – break even analysis. Time value of money, discounted cash flow, Bases of comparison, Incremental analysis, Benefit-Cost analysis-Replacement analysis.

UNIT - V

Capital budgeting: Working capital management, Construction accounting-Appraisal through financial statements-ratio's analysis, Long term Financing-Practical problems and case studies.

UNIT-VI

Construction planning techniques: Introduction, Work scheduling, Basic steps in PERT/CPM techniques, Network diagram Presentation, Rules of drawing network diagram, Fulkerson's rule, Time estimates and Critical path in network analysis, Project evaluation and review technique, Application areas of PERT/CPM techniques– Application of Network Techniques.

UNIT-VII

Optimization Techniques: Linear, Dynamic and Integer Programming-Branch and Bound Techniques-Application to Production Scheduling, Equipment Replacement, Material Transportation and Work Assignment Problems.

UNIT-VIII

Optimization Techniques: Deterministic and Probabilistic Inventory Models-Software Development

REFERENCE BOOKS:

1. Srinath L. S. (2001), "PERT and CPM –Principles and Applications", 3rd edition Affiliated East- West Press Pvt Ltd., New Delhi
2. Kenneth C Laudon and Jane Price Laudon, "*Management Information Systems – Organization and Technology* ", Prentice Hall, 1996
3. Singh H. 'Construction Management and Accounts", Tata McGraw Hill, New Delhi.
4. Optimization techniques –S.S.Rao
5. Operations Research, S. D. Sharma –Kedarnath Ramnath & Co 2002.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech I semester (SE & CM)

Th C
4   4

(13D91103) COST EFFECTIVE HOUSING TECHNIQUES
(Elective –1)

UNIT-I

a) Housing Scenario
Introduction - Status of urban housing - Status of Rural Housing.
b) Housing Finance:
Introducing - Existing finance system in India - Government role as facilitator - Status of Rural Housing Finance - Impediments in housing finance and related issues.

UNIT-II
a) Land use and physical planning for housing
introduction - Planning of urban land - Urban land ceiling and regulation act - Efficiency of building bye lass - Residential Densities.
b) Housing the urban poor
Introduction - Living conditions in slums - Approaches and strategies for housing for urban poor.

UNIT-III

Development and adoption of low cost housing technology: Introduction - Adoption of innovative cost effective construction techniques - Adoption of precast elements in partial prefabrication - Adopting of total fabrication of mass housing in India- General remarks on pre cast roofing/flooring systems. Economical wall system - Single Brick thick load bearing wall - 19cm thick load bearing masonry walls - Half brick thick load bearing wall - Flyash gypsum thick for masonry - Stone Block masonry - Adoption of precast R.C. plank and joint system for roof/floor in the building.

UNIT-IV

Alternative building materials for low cost housing: Introduction - Substitute for scarce materials – Ferrocement - Gypsum boards – Timber substitutions - Industrial wastes - Agricultural wastes.

UNIT-V

Low cost Infrastructure services: Introduction - Present status - Technological options - Low cost sanitation - Domestic - Water supply and energy supply.

UNIT-VI

Rural Housing: Introduction to traditional practice of rural housing - Mud Housing technology Mud roofs - Characteristics of mud - Fire treatment for thatch roof - Soil stabilization - Rural Housing programs.

UNIT-VII

Housing in Disaster prone areas: Introduction – Earthquake - Damages to houses - Traditional prone areas - Type of Damages and repairs of non-engineered buildings - Repair and restoration of earthquake Damaged non-engineered buildings recommendations for future constructions.

UNIT –VIII

Requirements of structural safety of thin a roofing units against Earthquake forces-status of R&D in earthquake strengthening measures - Floods, cyclone, fire safety.

REFERENCE BOOKS:

1. Building materials for low –income houses – International council for building research studies and documentation.
2. Hand book of low cost housing by A.K.Lal – Newage international publishers.
3. Properties of concrete – Neville A.m. Pitman Publishing Limited, London.
4. Light weight concrete, Academic Kiado, Rudhai.G – Publishing home of Hungarian Academy of Sciences 1963.
5. Low cost Housing – G.C. Mathur.
6. Modern trends in housing in developing countries – A.G. Madhava Rao, D.S. Ramachandra Murthy & G.Annamalai.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech I semester (SE & CM)

Th C
4   4

(13D91104) CONTRACT LAWS AND REGULATIONS
(Elective – I)

UNIT-I

Construction contracts: Indian Contracts Act-Elements of Contracts-Types of contracts-Features-Suitability.

UNIT-II

Design of Contract Documents-International contract document-Standard contract Document-Law of Torts

UNIT-III

Tenders: Prequalification-Bidding-Acceptance-Evaluation of Tender from Technical, Contractual and commercial points of view-contract formation and interpretation.

UNIT-IV

Potential contractual problems-World Bank Procedures and Guidelines.

UNIT-V

Arbitration- Comparison of Actions and Laws-Agreements-subject matter-Violations-Appointment of Arbitrators-Conditions of Arbitrations-Powers and duties of Arbitrator-Rules of Evidence-Enforcement of Award-costs

UNIT-VI

Legal Requirements-Insurance and Bonding-Laws Governing Sale, Purchase and use of Urban and Rural land-Land Revenue codes.

UNIT-VII

Tax Laws-Income Tax, Sales Tax, Excise and customs duties and their influence on construction costs-Local Government Laws for Approval.

UNIT:VIII

Labour Regulations-Social Security-Welfare Legislation-Laws relating to wages and Bonus, Labour Administration- Insurance and Safety Regulations-Workmen's Compensation Act.

REFERENCE BOOKS:
1. Gajaria G.T., "*Laws Relating to Building and Engineering Contracts in India* ", M.M.Tripathi
   Private Ltd.,Bombay, 1982.
2. Jimmie Hinze, "*Construction Contracts* ", 2nd Edition, McGraw Hill, 2001.
3. Joseph T. Bockrath, " *Contracts and the Legal Environment for Engineers and Architects* ", 6th Edition, McGraw Hill, 2000.
4. Richard Hudson Clough, Glenn A. Sears, "*Construction Contracting*", J. Wiley, 21-Mar-2005.

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M.Tech I semester (SE & CM)

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(13D91105) MAINTENANCE AND REHABILITATION OF STRUCTURES
(Elective-I)

UNIT-I

Serviceability and Durability:- General : Quality assurance for concrete construction, Insitu built concrete properties, strength, permeability, volume changes, thermal properties, cracking.

UNIT-II

Effects due to climate, temperature, chemicals, wear and erosion, design and construction errors; corrosion mechanism, Effects of cover thickness and cracking-methods of corrosion protection, inhibitors, corrosion resistant steels, coatings, cathodic protection.

UNIT-III

Maintenance and Repair Strategies :- Inspection, Structural Appraisal, Economic appraisal, components of equality assurance, conceptual bases for quality assurance schemes.

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

UNIT-VI & VII
Techniques for Repair :- Rust eliminators and polymers - foamed concrete, mortar and dry pack, vacuum concrete, Gunite and shotcrete-Epoxy injection, Mortar repair for cracks, shoring and underpinning.

UNIT-VIII
Case Studies :- Repairs to overcome low member strength, Deflection, cracking, chemical disruption, weathering, wear, fire, leakage, marine exposure.

REFERENCE BOOKS:

1. Dension Campbell, Allen and Harold Roper, Concrete Structures, Materials, Maintenance and Repair, Longman Scientific and Technical, U.K. 1991.
2. RT.Allen and S.C. Edwards, Repair of concrete Structures, Blakie and sons, UK, 1987.
3. MS. Shetty, Concrete Technology – Theory and practice, S.Chand and company, New Delhi, 1992.
4. Santhakumar, A.R.Training Course notes on damage assessment and Repair in low cost housing RHDC-NBO Anna University, Madras, July, 1992.
5. Raikar, R.N.learning from failures – deficiencies in Design, construction and service – R&D centre (SDCPL), Raikar Bhavan, Bombay, 1987.
6. N.Palaniappan, Estate Management, Anna Institute of Management, Madras Sep. 1992.
7. F.K.Garas, J.L.Clarke, GST Armer, Structural Assessment, Butterworths, UK April 1987.
8. A.R. Santhakumar, Concrete chemicals – Theory and applications, Indian society for construction Engineering and Technology, Madras. 1993 (In press)
9. Rehabilitation of structures by S.K.Tukker.

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M.Tech I semester (SE & CM)

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(13D91106) ADVANCED CONSTRUCTION TECHNIQUES
(Elective-II)

Unit-I

Construction techniques: Box Jacking -pipe jacking - Under water construction of diaphragm walls and Basement. Tunneling techniques. piling techniques - driving well and caisson -sinking cofferdam - cable anchoring and grouting.

Unit-II

Construction techniques: Driving diaphragm walls sheet piles - laying operations for built up offshore system - shoring for deep - well points - dewatering and stand by plant equipment for underground open excavation - Trenchless Technology.

Unit-III

Techniques for concreting: Techniques of construction for continuous concreting operation in tall buildings of various Shapes and varying sections launching techniques - Slipform techniques- suspended form Work-.

Unit-IV

Techniques for concreting: Erection techniques of tall structures - launching techniques for heavy decks -in situ prestressing in high rise structures, aerial transporting handling erecting lightweight Components on tall structures - erection of lattice towers and rigging of transmission line structures.

Unit-V

Construction sequence and methods: Bow string bridges, cable stayed bridges. Launching and pushing of box decks. Construction sequence and methods in domes and prestressed domes. Vacuum dewatering of concrete flooring - concrete paving technology- erection of articulated structures.

Unit-VI

Construction techniques for foundation: Mud Jacking grout through slab foundation - micro piling for strengthening floor and shallow profile pipeline laying - protecting sheet plies, screw anchors - sub grade water proofing under pinning advanced techniques and sequence in demolition and dismantling.

Unit-VII

Fundamentals of energy: Energy Production Systems -Heating. Ventilating and Air. conditioning -Solar Energy and Conservation -Energy Economic Analysis -Energy conservation and audits

Unit-VIII

Domestic energy consumption -savings- challenges -primary energy use In buildings - Residential. Commercial -Institutional and public Buildings.

REFERENCE BOOKS:
1. Jerry Irvine, Advanced Construction Techniques, CA Rocketr, 1984
2. Sarkar, S.K. and Saraswati, S., Construction Technology, Oxford University Press, New Delhi,
3. 2008.Peter.H.Emmons, "Concrete repair and maintenance illustrated", Galgotia Publications Pvt.Ltd., 2001.Press, 2008
4. Robertwade Brown, "Practical foundation engineering hand book", McGraw Hill Publications, 1995
5. Patrick Powers .J, "Construction Dewatering: New Methods and Applications", John Wiley & Sons, 1992

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M.Tech I semester (SE & CM)

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(13D91107) CONSTRUCTION METHODS AND EQUIPMENTS
(Elective-II)

UNIT-I

Modern Construction Methods:
a) Open excavation, shafts and tunnels-Construction methods for pile, pier and caisson foundations.

UNIT-II

b) Basement construction – construction methods for supporting the excavations – control of ground water - shoring and underpinning – basement waterproofing.

UNIT-III

Construction Methods-I: Construction Method in brief for: Bridges, roads, railways, dams, harbors, river works and pipelines.

UNIT-IV

Construction Methods-II: Construction of power generating structures – Atomic Power stations, Thermal power stations. Windmills, transmission towers

UNIT-V

Construction equipment and techniques:
a) Construction equipment and techniques for: Earth moving, excavating, drilling, blasting, tunneling and hoisting and erection.

UNIT-VI

b) Factors affecting selection of equipment - technical and economic, construction engineering fundamentals-Analysis of production outputs and costs.

UNIT-VII & VIII

Equipment for production of aggregate and concrete: Crushers – feeders – screening equipment – batching and mixing equipment – hauling, pouring and pumping equipment – transporters.

REFERENCE BOOKS:
1. Antil J.M., (1982) "Civil Engineering Construction", McGraw Hill Book Co.
2. Peurifoy, R.L., Ledbette. W.B. (2000), "Construction Planning, Equipment and Methods", McGraw Hill Co.
3. Ratay, R.T. (1984), "Hand Book of Temporary Structures in Construction", McGraw Hill.
4. Koerner, R.M. (1984), "Construction & Geotechnical Methods in Foundation Engineering", McGraw Hill.
5. Varma,M. (1979), "Construction Equipment and its Planning & Applications", Metropolitain Book Co.
6. Smith, R.C, Andres, C.K. (1986), "Principles and Practive of Heavy Construction", Prentice Hall

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M.Tech I semester (SE & CM)

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(13D91108) QUALITY CONTROL AND SAFETY MANAGEMENT
(Elective-II)

UNIT-I

Types of organizations: Inspection. control and enforcement -Quality Management Systems and method - Responsibilities and authorities In quality assurances and quality Control- Architects, engineers, contractors, and special consultants, Quality circle.

UNIT-II

Quality Systems : Introduction - Quality system standard – ISO 9000 family of standards – Requirements – Preparing Quality System Documents – Quality related training – Implementing a Quality system – Third party Certification.

UNIT-III

Quality policy: Objectives and methods In Construction Industry -Consumers satisfaction, Economics- Time of Completion -Statistical tolerance -Taguchi's concept of quality

UNIT-IV

Quality policy: Codes and Standards -Documents -Contract and construction programming -Inspection procedures - Processes and products -Total QA I QC programme and cost implication.

UNIT-V

Objectives: Regularity agent, owner, design, contract and construction oriented objectives, methods -Techniques and needs of QA/QC -Different aspects of quality - Appraisals, Factors influencing construction quality.

UNIT-VI

Critical, major failure aspects and failure mode analysis -Stability methods and tools, optimum design -Reliability testing- reliability coefficient and reliability prediction –

UNIT-VII

Selection of new materials -Influence of drawings detailing, specification, standardization-Bid preparation- Reliability Based Design.

UNIT-VIII

Construction activity and environmental safety: Social and environmental factors-Natural causes and speed of Construction -Life cycle costing- Reliability and Probabilistic methods-Value engineering and value analysis

REFERENCE BOOKS:
1. Total Quality Management, Besterfield, pearson publications 2010 3rd Edition
2. Kwaku A., Tenah and Jose M.Guevera, Fundamental of Construction Management and Organization,Prentice Hall of India 1995
3. John L.Ashford, " *The Management of Quality in Construction* ", E & F.N Spon, New York, 1989
4. Steven McCabe, Quality Improvement Techniques in Construction, Addison Wesley Longman Ltd, 1998.

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M.Tech I semester (SE & CM)

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(13D91109) ADVANCED STRUCTURAL ENGINEERING LABORATORY

List of Experiments:

1. Mix Design of Concrete and Casting of Specimen.
2. Young's Modulus of Concrete
3. Accelerated curing test on Concrete cubes.
4. Non destructive tests on concrete.
5. Mix design of high strength concrete including casting and testing of specimens.
6. Mix design of fly ash concrete including casting and testing of specimens.
7. Bending test on a RCC beam under.
   a)   single point load
   b)   Three point load

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M.Tech II semester (SE & CM)

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(13D35201) STRUCTURAL DYNAMICS

UNIT-I
Theory of Vibrations: Introduction –Elements of a vibratory system – degrees of freedom-continuous systems –lumped mass idealization –Oscillatory motion –Simple harmonic motion –pictorial representation of S.H.M - free vibrations of single degree of Freedom (SDOF) systems –undamped and Damped –Critical damping –Logarithmic decrement –Forced vibrations of SDOF systems-Harmonic excitation –Dynamic magnification factor- Bandwidth.

UNIT-II

Fundamental objective of dynamic analysis-types of prescribed loading- Methods of discretization- Formulation of the equations of motion.

UNIT-III

Single degree of Freedom System: Formulation and solutions of the equation of motion - free Vibration response –response to harmonic, periodic, Impulsive and general Dynamic loading –Duhamel integral.

UNIT-IV & V

Multi Degree of Freedom System: selection of the degree of freedom –Evaluation of structural property matrices-Formulation of the MDOF equations of motion –Undamped free vibrations-Solution of Eigen value problem for natural frequencies and mode shapes-Analysis of dynamic response –Normal coordinates –Uncoupled equations of motion – Orthogonal properties of normal modes-mode superposition procedure

UNIT-VI

 Practical vibration analysis: Stodola method- Fundamental mode analysis –analysis of second and higher modes –Holzer's method –basic procedure –transfer matrix procedure

UNIT-VII

Introduction to Earthquake analysis: Introduction –Excitation by rigid base translation –Lumped mass approach -SDOF and MDOF system- I.S code methods of analysis.

UNIT-VIII

Continuous system: Introduction –Flexural vibrations of beams- Elementary case-Equation of motion –Analysis of undamped free shapes of simple beams with different end conditions-principles of application to continuous beams.

REFERENCE BOOKS:

- A.K.Chopra, "Structural Dynamics for Earthquake Engineering", Pearson Publications
- Dynamics of structures by Clough & Penziem
- Structural dynamics by Mario Paz
- I.S:1893(latest)" code of practice for earthquakes resistant design of structures"
- Anderson R.A fundamentals of vibration, Amerind Publishing Co.,1972.

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M.Tech II semester (SE & CM)

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(13D35202) FINITE ELEMENT ANALYSIS OF STRUCTURES

UNIT-I
Introduction-Concepts of FEM –steps involved –merits &demerits –energy principles –Discretization –Rayleigh –Ritz method of functional approximation.

UNIT-II
Elastic formulations: Stress equations-strain displacement relationships in matrix form-plane stress, plane strain and Axi-symmetric bodies of revolution with axi symmetric loading

UNIT-III
One Dimensional FEM-Stiffness Matrix for Beam and Bar elements shape functions for ID elements –static condensation of global stiffness matrix-solution –Initial strain and temperature effects.

UNIT-IV & V
Two Dimensional FEM-Different types of elements for plane stress and plane strain analysis –Displacement models –generalized coordinates-shape functions-convergent and compatibility requirements –Geometric Invariance –Natural coordinate system-area and volume coordinates-Generation of element stiffness and nodal load matrices –static condensation.

UNIT-VI
Isoparametric formulation-Concept, Different isoparametric elements for 2d analysis-Formulation of 4-noded and 8-noded isoparametric quadrilateral elements –Lagrangian elements-serendipity elements.

UNIT-VII
Axi symmetric analysis –bodies of revolution-axi symmetric modelling –strain displacement relationship-formulation of axi symmetric elements.

UNIT-VIII
Three Dimensional FEM-Different 3-D elements, 3D strain –displacement relationship- formulation of hexahedral and isoparametric solid element.

REFERENCE BOOKS:

1. Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla and Ashok D. Belegundu – Pearson Education Publications.
2. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla, Universities Press India Ltd. Hyderabad.
3. Finite element method and its application by Desai ,2012, Pearson Pubilications.
4. Finite element methods by Darrel W.Pepper, Vikas Pubilishers
5. Finite element analysis and procedures in engineering by H.V.Lakshminaryana, 3rd edition, universities press, Hyderabad.
6. Finite element analysis in Engineering Design by S.Rajasekharan, S.Chand Publications, New Delhi.
   Finite element analysis by S.S. Bhavakatti-New age international publishers

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M.Tech II semester (SE & CM)

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(13D35110) STABILITY OF STRUCTURES

UNIT-I
Formulations related to beam columns : Concept of Stability, Differential equation for beam columns –Beam column with concentrated loads –continuous lateral load – couples -beam column with built in ends –continuous beams with axial load –application of Trignometric series –Determination of allowable stresses.

UNIT-II & III
Elastic Buckling of Bars: Elastic buckling of straight columns –Effect of shear stress on buckling-Eccentrically and laterally loaded columns –energy methods –Buckling of a bar on elastic foundation, Buckling of a bar with intermediate compressive forces and distributed axial loads –Buckling of bars with change in cross section –Effect of shear force on critical load –Built up columns.

UNIT-IV
Inelastic Buckling: Buckling of straight bars-Double modulus theory –Tangent modulus theory.
UNIT-V
Torsional Buckling: Pure torsion of thin walled bar of open cross section-Non – Uniform torsion of thin walled bars of open cross section-Torsional buckling –Buckling under Torsion and Flexure.

UNIT-VI
Mathematical Treatment of Stability Problems: Buckling problem orthogonality realation –Ritz method-Timoshenko method, Galerkin method

UNIT-VII
Lateral Buckling of simply supported Beams: Beams of rectangular cross section subjected for pure bending.
UNIT-VIII
Buckling of simply rectangular plates : Derivation of equation of rectangular plate subjected to constant compression in two directions and one direction.

REFERENCE BOOKS:

1. Stability of metalic structure by Bleich –Mc Graw hill
2. Theory of Beam columns Vol I by chen & Atsuta Mc.Graw Hill
3. Smitses,Elastic stability of structures, Prentice Hall,1973.
4. Timoshenko, S., and Gere., theory of Elastic stability, Mc Graw Hill Book company, 1973.
5. Brush and Almorth., Buckling of bars plates and shells, Mc Graw Hill book company ,1975.
6. Chajes, A., Principles of Structural Stability Theory, Prentice Hall,1974
7. Ashwini Kumar, stability theory of structures, TATA Mc Graw Hill publishing company Ltd, New Delhi,1985.

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M.Tech II semester (SE & CM)

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(13D91201) PROJECT PLANNING AND IMPLEMENTATION

UNIT-I

Project planning
    a) Project reports – sanctions – tendering – contracts

UNIT-II

    b) Execution of works – measurements –payment – disputes – compensation – arbitration.

UNIT-III

Construction Scheduling – Work break down structure, activity cost and time estimation in CPM,PERT, RPM (Repetitive Project Modelling) techniques.

UNIT-IV

Work and productivity analysis
    a) Work study – factors influencing productivity – tools to assess productivity – productivity improvement techniques

UNIT-V

    b) behavioral science aspects – motivation of individuals –management of groups – leadership – communication.

UNIT-VI

Quality in construction
    a) Planning and control of quality during design of structures – quality standards and codes
    in design and construction

UNIT-VII

b) concept and philosophy of Total Quality Management..

UNIT-VIII

Concept of safety in construction
Factors affecting safety – site management with regard top safety recommendations – safety legislation, standards and codes with regard to safety recommendations.

REFERENCE BOOKS:

1. Chitkara. K.K(1998) "Construction Project Management: Planning Scheduling and Control", Tata McGraw Hill Publishing Company, New Delhi
2. *Construction Project Management,   Dr. Neeraj Kumar Jha Pearson Publications*
3. Halpin,D.W., " *Financial and cost concepts for construction Management ",* John Wiley and Sons, New york 1985.
4. Chris Hendrickson and Tung Au(2000), "Project Management for Construction -Fundamental Concepts for Owners, Engineers, Architects and Builders", PrenticeHall Pittsburgh.

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M.Tech II semester (SE & CM)

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(13D35109) PRESTRESSED CONCRETE
(Elective-III)

UNIT-I

INTRODUCTION: Development of prestressed concrete –Advantages and Disadvantages of PSC over RCC –General principles of pre-stressing-pre tensioning and post tensioning –Materials used in PSC-high strength concrete –High tension steel-Different types /methods/systems of prestressing.

UNIT-II

Losses of prestress: Estimation of the loss of prestress due to various causes like elastic shortening of concrete ,creep of concrete, shrinkage of concrete, relaxation of steel, slip in anchorage, friction etc.

UNIT-III
Flexure:

Analysis of sections for flexure in accordance with elastic theory-Allowable stresses-Design criteria as per I.S code of practice –Elastic design of Beams (rectangular, I and T sections) for Flexure –Introduction to partial prestressing.

UNIT-IV
Deflections:

Introduction-Factors influencing deflections-short term and long term deflections of uncracked and cracked members.

UNIT-V
Shear, bond, Bearing and Anchorage:

a) Shear in PSC beams –Principal stresses –Conventional elastic design for shear-transfer of prestress in pretensioned members-transmission length –Bond stresses-bearing at anchorage –Anchorage zone stresses in post-tensioned members.

UNIT-VI

b) Analysis and design of end blocks by Guyon, Magnel and approximate methods – Anchorage zone reinforcements.

UNIT-VII

Statistically indeterminate structures: Introduction –advantages and disadvantages of continuity –Layouts for continuous beams-primary and secondary moments –Elastic analysis of continuous beams-Linear transformation-Concordant cable profile-Design of continuous beams.

UNIT-VIII
Circular prestressing: Introduction –Circumferential prestressing Design of Prestressed concrete tanks –vertical prestressing in tanks-Dome prestressing.

REFERENCE BOOKS:
1. Prestressed Concrete by S. Krishna raju, TMH Pubilishers.
2. Prestressed Concrete by S. Ramamrutham, Dhanpati Rai Pubilicartions.
3. Prestressed concrete design by Praveen Nagarajan, Pearson Pubilications.
4. T.Y.Lin, Design of Prestressed Concrete Structures, Asian Publishing house, Bombay, 1953.
5. Y.Guyon, Prestressed Concrete, Vol.I&II, Wiley and Sons, 1960.
6. F.Leohhardt, Prestressed concrete Design and construction, Wilhelm Ernst and shon, Berlin, 1964.
7. C.E.Reynolds and J.C. Steedman, Reinforced concrete designers hand bood, A view point publication, 1989.
8. Edward P.Nawy, Prentice Hall – Prestressed Concrete.
9. Prestressed Concrete – by Raj Gopal, Narsoa Pubilications.

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M.Tech II semester (SE & CM)

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(13D91202) CONSTRUCTION PERSONNEL MANAGEMENT
(Elective-III)

UNIT- I

Manpower Planning: Manpower Planning, Organizing, Staffing, directing and Controlling-Personnel Principles-case studies.

UNIT-II

Organization:
a) Organization-Span of control-Organization charts-Staffing plan-Development and Operation of Human resources.

UNIT- III

b) Managerial Staffing-Recruitment-Selection-Placement, Training and Development.

UNIT- IV

Human Behaviour:
a) Introduction to the Field Of Management-basic individual psychology motivation-job design and performance management.

UNIT V
b) Managing groups at work-self managing work teams-Inter group behavior and conflict in organizations-Leadership Behavioral aspects of decision-making; and communication for people management.

UNIT- VI

Management and Development Methods :
a) Compensation-Wages and Salary, Employee Benefits, employee appraisal and assessment-Employee services- Safety and Health Discipline and Discharge.

UNIT- VI I

b) Special human resource problems, Performance appraisal Employee Hand Book And Personnel Manual-Job descriptions and organization structure and Human relations-Productivity of Human resources.

UNIT V III

WELFARE MEASURES
Compensation – Safety and health – GPF – EPF – Group Insurance – Housing - Pension – Laws related to welfare measures.

REFERENCE BOOKS:
1. Carleton Counter II and Jill Justice Coulter, "*The Complete Standard Hand Book of Construction Personnel Management* ", Prentice Hall, Inc., New Jersey, 1989.
2. Memoria, C.B., *" Personnel Management* ", Himalaya Publishing Co., 1992.
3. Josy.J Familaro, " *Handbook of Human Resources Administration* ", McGraw Hill International Edition, 1987.
4. Justin Gooderl Longenecker, Charles D. Pringle, " *Management* " C.E. Merrill, 1981.
5. R.S.Dwivedi, *" Human Relations and Organizational Behaviour* ", B.H - 1987.
6. Shamil Naoum, "*People and Organizational Management in Construction*",Thomas Telford,2001
7. Stephen Bach & Keith Sissons,"*A Comprehensive Guide to Theory and Practice*", John Wiley & Sons,2000.
8. Andrew Dainty, Martin Loosemore, "Human Resource Management in Construction Projects", Routledge,2012.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech II semester (SE & CM)

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(13D91203) CONSTRUCTION ECONOMICS AND FINANCE MANAGEMENT
(Elective-III)

UNIT- I

Economics:

a) Role of Civil Engineering in Industrial Development-Advances in Civil Engineering and engineering economics- Support matters of Economy as related top Engineering.

UNIT- II

b) Market demand and supply-Choice of technology- Quality control and Quality Production-Audit in economic law of returns governing production

UNIT- III

Construction Economics:

a) Construction development in housing, Transport and other infrastructures-Economics of Ecology, environment, energy resources-Local material selection.

UNIT- IV

b) Form and Functional designs-Construction workers-Urban problems-Poverty-Migration-Unemployment-pollution.

UNIT-V

Financing:

a) The need for financial management-Types of financing-Short term borrowing-Long term borrowing-Leasing - Equity financing-Internal generation of funds-External commercial borrowings-Assistance from Government Budgeting support and International finance corporations.

UNIT-VI

b) Analysis of financial statements-Balance sheet-Profit and loss account-Cash flow and fund flow analysis-Ratio analysis-Investment and financing decision-Financial control-Job control and Centralized management

UNIT- VII

Accounting Method- General Overview-Cash basis of an accounting-Accrual basis of accounting-Percentage completion method- Completed contract method-Accounting for Tax reporting purposes and financial reporting purposes.

UNIT-VIII

Lending to Contractors- Loans to Contractors-Interim Construction Financing-Security and Risk Aspects.

REFERENCE BOOKS:
1. Prasanna Chandra, "*Projects - Planning Analysis Selection Implementation & Review* ", Fourth Edition, Tata McGraw Hill Publishing Co., Ltd, New Delhi, 1995.
2. Kwaku A., Tenah and Jose M. Guevera, "*Fundamental of Construction Management and Organization* ", Prentice Hall of India, 1995 .
3. Halpin, D.W., " *Financial and cost concepts for construction Management* ", John Wiley   and Sons, New York, 1985.
4. Madura J. and Veit, E.T., *"Introduction to Financial Management* ", WestPublishing Co., 1988

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech II semester (SE & CM)

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(13D91204) CONSTRUCTION PLANNING, SCHEDULING AND CONTROL
(Elective-IV)

UNIT-I

CONSTRUCTION PLANNING: Basic Concepts in the Development of Construction Plans – Choice of Technology and Construction Method – Defining Work Tasks – Defining Precedence Relationships among Activities – Estimating Activity Durations – Estimating Resource Requirements for Work Activities – Coding Systems.

UNIT-II

SCHEDULING PROCEDURES AND TECHNIQUES :

a) Construction Schedules – Critical Path Method – Scheduling Calculations – Float – Presenting Project Schedules – Scheduling for Activity-on-Node and with Leads, Lags, and Windows.

UNIT-III
b) Scheduling with Resource Constraints and Precedence's – Use of Advanced Scheduling Techniques – Scheduling with Uncertain Durations – Calculations for Monte Carlo Schedule Simulation – Crashing and Time/Cost Tradeoffs – Improving the Scheduling Process.

UNIT-IV

COST CONTROL, MONITORING AND ACCOUNTING:
a) The Cost Control Problem – The Project Budget – Forecasting for Activity Cost Control – Financial Accounting Systems and Cost Accounts.

UNIT-V
b) Control of Project Cash Flows –Schedule Control – Schedule and Budget Updates – Relating Cost and Schedule Information.

UNIT-VI

QUALITY CONTROL AND SAFETY DURING CONSTRUCTION :

a) Quality and Safety Concerns in Construction – Organizing for Quality and Safety – Work and Material Specifications – Total Quality Control

UNIT-VII
b) Quality Control by Statistical Methods – Statistical Quality Control with Sampling by Attributes – Statistical Quality Control with Sampling by Variables – Safety.

UNIT-VIII

ORGANIZATION AND USE OF PROJECT INFORMATION: Types of Project Information –Accuracy and Use of Information – Computerized Organization and Use of Information – Organizing Information in Databases – Relational Model of Databases – Other Conceptual Models of Databases – Centralized Database Management Systems – Databases and Applications Programs – Information Transfer and Flow.

REFERENCE BOOKS:
1. Chitkara. K.K(1998) "Construction Project Management: Planning Scheduling and Control", Tata McGraw Hill Publishing Company, New Delhi
2. *Construction Project Management,   Dr. Neeraj Kumar Jha Pearson Publications*
3. Halpin,D.W., " *Financial and cost concepts for construction Management ",* John Wiley and Sons, New york 1985
4. Chris Hendrickson and Tung Au(2000), "Project Management for Construction - Fundamental Concepts for Owners, Engineers, Architects and Builders", PrenticeHall Pittsburgh
5. Moder, J., C. Phillips and E. Davis (1983) "Project Management with CPM, PERT and Precedence Diagramming", Van Nostrand Reinhold Company, Third Edition, Willis, E. M., Scheduling Construction Projects

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech II semester (SE & CM)

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(13D91205) CIVIL ENGINEERING MATERIAL SCIENCE
(Elective-IV)

UNIT-I

Introduction: Classification of engineering materials, Atomic structure and bonding, The architecture of solids, Crystal structure, Mechanical properties.

UNIT-II

Phase transformation, Alloys and their phase diagrams, Equilibrium microstructure of steel alloys, Heat treatment of steel alloys, Stainless steel, Cast iron.

UNIT-III

Introduction to concrete:
a) Hydraulic cements, Aggregates for concrete, Proportioning of concrete mixes, properties of fresh cement.

UNIT-IV
b) Microstructure of cement paste, Strength of concrete .

UNIT-V

c) Elastic behavior-Shrinkage and creep.

UNIT-VI

Durability of concrete: Physical and chemical causes, Temperature effects in concrete, Environmental impact of concrete, Corrosion of steel reinforcement.

UNIT-VII

Supplementary cementing materials: Silica fume, fly ash, metakaolin, ground granulated blast furnace slag, rice-husk ash etc. Polymers, plastics, rubber and composite

materials.

UNIT-VIII

Nanomaterials, self healing concrete, bacterial concrete.

REFERENCE BOOKS:
1. Young. J. F; Mindess, S; Bentuer, "The Science and Technology of Civil Engineering Materials", Presntice Hall, New York.

2. Ashby, M.F and Jones, D.R.H (2005), "Engineering materials – An Introduction to properties, Applications and design".

3. Mehta, P.K and Monteiro. P.J.M, "Concrete: Microstructure, properties and materials".

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech II semester (SE & CM)

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(13D91206) ENVIRONMENT AND POLLUTION
(Elective-IV)

UNIT-I

Introduction to environment: Components of environment – man and environment
Natural resources – water, land, forest, mineral, energy, food

UNIT-II

Introduction to environmental pollution:
a) General pollutants; types of pollutants. Pollution – Air, Water, Land, Noise, Thermal, Marine, Pesticide, Radioactive, Plastic Pollution Case studies.

UNIT-III
b) Population and the Environment. Environmental ethics, disaster Management.

UNIT-IV

Industrial scenario in India:
a) Industrial activity and Environment - Uses of Water by industry - Sources and types of industrial wastewater - Industrial wastewater and environmental impacts - Regulatory requirements for treatment of industrial wastewater .

UNIT-V

b) Industrial waste survey - Industrial wastewater generation rates, characterization and variables - Population equivalent - Toxicity of industrial effluents and Bioassay tests.

UNIT-VI

Prevention of Industrial Pollution:
a) Benefits and Barriers - Source reduction techniques - Waste Audit - Evaluation of Pollution prevention options

UNIT-VII

b) Environmental statement as a tool for pollution prevention - Waste minimization Circles.

UNIT-VIII

Pollution Control and Role of Human beings.

REFERENCE BOOKS:

1. P. Aarne Vesilind (1997), "Introduction to Environmental Engineering", PWS Publishers.
2. Dr. Arumugam & Prof. Kumaresan, " Environmental Studies", Saras Publication
3. Surinder Deswal & Dr. Anupama Deswal, " A Basic Course in Environmental Studies", Dhanpat Rai and Co (P) Ltd
4. Eckenfelder, W.W. (1999), "Industrial Water Pollution Control", McGraw-Hill.
5. Arceivala, S.J. (1998), "Wastewater Treatment for Pollution Control", Tata McGraw-Hill.
6. Butterworth Heinemann (2001), "Frank Woodard Industrial waste treatment Handbook" , New Delhi.
7. World Bank Group "Pollution Prevention and Abatement Handbook - Towards Cleaner Production', World Bank and UNEP, Washington D.C.1998
8. Paul L. Bishop (2000) "Pollution Prevention: - Fundamentals and Practice", McGraw-Hill International.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
M.Tech II semester (SE & CM)

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3   2

(13D91207) CAD LABORATORY

1. Analysis of cantilever, simply supported beam, fixed beams, continuous beams for different loading conditions.
2. Design of R.C.C. beams, slabs, foundations.
3. Design of steel tension Members
4. Reinforcement detailing in beam using graphics.
5. Reinforcement detailing in slabs using graphics.
6. Reinforcement detailing in foundation using graphics.