JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
(Established by Govt. of A.P., ACT No.30 of 2008)
ANANTHAPURAMU – 515 002 (A.P) INDIA

M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

SEMESTER – I

S. No.	Course codes	Course Name	Category	Hours per week			Credits
				L	T	P	
1.	21DBS101	Probability and Statistics	PC	3	0	0	3
2.	21D21101	Construction Planning and Project Management	PC	3	0	0	3
3.	21D21102a 21D21102b 21D21102c	**Program Elective Course - I** Construction Practices Human Resource Development for Construction Value Engineering	PE	3	0	0	3
4.	21D21103a 21D21103b 21D21103c	**Program Elective Course – II** Advanced Concrete Technology Construction Economics and Finance Construction Technology for Tunnels	PE	3	0	0	3
5.	21D35105	CAD Laboratory	PC	0	0	4	2
6.	21D21104	Building information modeling Laboratory	PC	0	0	4	2
7.	21DRM101	Research Methodology and IPR	MC	2	0	0	2
8.	21DAC101a 21DAC101b 21DAC101c	**Audit Course – I** English for Research paper writing Disaster Management Sanskrit for Technical Knowledge	AC	2	0	0	0
			Total				**18**

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SEMESTER – II

S.No.	Course codes	Course Name	Category	Hours per week			Credits
				L	T	P	
1.	21D21201	Quantitative Methods in Construction	PC	3	0	0	3
2.	21D21202	Construction Techniques, Methods &Equipment	PC	3	0	0	3
3.	21D21203a 21D21203b 21D21203c	**Program Elective Course – III** Quality & Safety Management Strategic Management in Construction Form Work Design	PE	3	0	0	3
4.	21D21204a 21D21204b 21D35104b	**Program Elective Course – IV** High Rise Building Technologies Maintenance & Rehabilitation of Engineering Structures Design Prestressed concrete	PE	3	0	0	3
5.	21D21205	Project Management Software Lab	PC	0	0	4	2
6.	21D21206	Construction Project Studio	PC	0	0	4	2
7.	21D21207	Technical seminar	PR	0	0	4	2
8.	21DAC201a 21DAC201b 21DAC201c	**Audit Course – II** Pedagogy Studies Stress Management for Yoga Personality Development through Life Enlightenment Skills	AC	2	0	0	0
		Total					**18**

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SEMSTER - III

S.No.	Course codes	Course Name	Category	Hours per week			Credits
				L	T	P	
1.	21D21301a 21D21301b 21D21301c	**Program Elective Course – V** Low Cost Housing Techniques Building Services Earthquake Resistant Design of Structures	PE	3	0	0	3
2.	21DOE301a 21DOE301b 21DOE301c	**Open Elective** Cost Management of Engineering Project Industrial Safety Business Analytics	OE	3	0	0	3
3.	21D21302	Dissertation Phase – I	PR	0	0	20	10
4.	21D21303	Co-curricular Activities					2
		Total					**18**

SEMESTER - IV

S.No.	Course codes	Course Name	Category	Hours per week			Credits
				L	T	P	
1.	21D21401	Dissertation Phase – II	PR	0	0	32	16
		Total					**16**

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Course Code	PROBABILITY AND STATISTICS	L	T	P	C
21DBS101		3	0	0	3
	Semester	**I**			

Course Objectives: This Course Will Enable Students:

- To impart knowledge in basic concepts and few techniques in probability and statistics in various applications in engineering.
- To familiarize with the statistical quality control and queuing theory

Course Outcomes (CO): Student will be able to

- explain the various concepts of probability and statistical distributions.
- able to test the hypotheses for large samples and small samples
- able to test the statistical quality control and fix the control limits.
- analyze the queuing theory models.

UNIT - I	**Probability and Random variable**	Lecture Hrs:8

Basic Concepts of Probability – Random Variables – Expectation – Discrete And Continuous Distributions – Distribution Functions. Binomial and Poison Distributions Normal Distribution – Related Properties.

UNIT - II	**Test of Hypothesis**	Lecture Hrs:8

Test of Hypothesis: Population and Sample - Confidence Interval of Mean from Normal population - Statistical Hypothesis - Null and Alternative Hypothesis - Level of Significance.
Test of Significance - Test based o Normal Distribution - Z Test For Means and Proportions.

UNIT - III	**Tests of significance**	Lecture Hrs:

Small Samples - t- Test For One Sample and Two Sample Problems and Paired t-Test, F-Test and Chi-Square Test (Testing Of Goodness of Fit and Independence).

UNIT - IV	**Statistical Quality Control**	Lecture Hrs:8

Statistical Quality Control: Concept of Quality of a Manufactured Product -Defects and Defectives - Causes of Variations - Random and Assignable - The Principle of Shewhart Control Chart-Charts For Attribute and Variable Quality Characteristics- Constructions and Operation of - Chart, R-Chart, p - Chart and C-Chart.

UNIT - V	**Queuing Theory**	Lecture Hrs:8

Queuing Theory: Pure Birth And Death Process, M/M/1 & M/M/S & Their related simple Problems.

Textbooks:

1. Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2. Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers

Reference Books:

1. Probability & Statistics by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publications.
2. Statistical methods by S.P. Gupta, S.Chand publications.
3. Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.
4. Probability and Statistics for Engineering and Sciences by Jay L. Devore, CENGAGE.
5. Probability and Statistics by R.A. Jhonson and Gupta C.B.

Online Learning Resources:

Students will be able to

- Explain the concepts of probability and their applications
- Apply discrete and continuous probability distributions in practical problems

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- Use the statistical inferential methods based on small and large sampling tests.
- Apply the statistical quality control charts and fix the control limits.
- apply the queuing theory techniques to minimize the traffic.

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COURSE STRUCTURE & SYLLABI

Course Code	CONSTRUCTION PLANNING AND PROJECT MANAGEMENT	L	T	P	C
21D21101		3	0	0	3
	Semester	**I**			

Course Objectives: This Course Will Enable Students:

- To prepare work breakdown plan and estimate resources requirements
- Study the elements of cost of project
- Understand the principles of project management, resource management

Course Outcomes (CO): Student will be able to

- Plan and develop project organization for executing construction projects.
- Prepare work break down plan and estimate resources requirements
- Solve problems of resource allocation and levelling using network diagrams
- Implement project monitoring and control in construction projects.

UNIT - I	Lecture Hrs:10

BASICS OF PROJECT MANAGEMENT: Modern Scientific Management, Management Functions, Management Styles. Basic Forms Of Organization With Emphasis On Project And Matrix Structures; Project Life Cycle, Planning For Achieving Time, Cost, Quality, Project Feasibility Reports Based On Socio-Techno-Economic-Environmental Impact Analysis, Project Clearance Procedures And Necessary Documentation For Major Works.

UNIT - II	Lecture Hrs:10

CONSTRUCTION PLANNING AND MANAGEMENT: 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;Site Mobilization – Demobilization Aspects, Various Resources Management Based On Funds Availability. Co-Coordinating, Communicating & Reporting Techniques. Application Of MIS To Construction. Training Of Construction Managers. Qualities, Role And Responsibilities Of Project Manager, Role Of Project Management Consultants.

UNIT - III	Lecture Hrs:10

SCHEDULING PROCEDURES AND TECHNIQUES: Construction Schedules – Critical Path Method – Scheduling Calculations – Float – Presenting Project Schedules – Scheduling For Activity-On-Node And With Leads, Lags, And Windows – 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	Lecture Hrs:9

QUALITY CONTROL AND SAFETY DURING CONSTRUCTION: Quality And Safety Concerns In Construction – Organizing For Quality And Safety – Work And Material Specifications – Total Quality Control – Quality Control By Statistical Methods – Statistical Quality Control With Sampling By Attributes – Statistical Quality Control With Sampling By Variables – Safety.

UNIT - V	Lecture Hrs:9

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.

WORK STUDY METHODS AND MEASUREMENT TECHNIQUES : Definition, Objectives, Basic Procedure, Method Study And Work Measurement, Work Study Applications In Civil Engineering. Method Study – Definition, Objective, Procedure For Selecting The Work, Recording Facts, Symbols, Flow Process Charts, Multiple Activity Charts, String Diagrams. Work

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Measurement – Time And Motion Studies, Concept Of Standard Time And Various Allowances, Time Study, Equipment Performance Rating. Activity Sampling, Time-Lapse Photography Technique, Analytical Production Studies.
Textbooks:
1. Construction Project Management: Planning, Scheduling And Control BY Chitkara, K.K. , Tata Mcgraw-Hill Publishing Company, New Delhi. 2. Construction Planning & Management By P S Gahlot & B M Dhir , New Age International Limited Publishers 3. Construction Project Administration By Fisk, D.R, Prentice Hall International, London.
Reference Books:
1. Construction Project Management Theory & Practice - Kumar Neeraj Jha, Pearson,2012 2. Project Management – K Nagrajan – New Age International Ltd. 3. Construction Management Fundamentals By Knutson, Schexnayder, Fiori, Mayo, Tata Mcgraw Hill, 2nd Edition, 2010 4. Construction Management And Planning By Sengupta And Guha-Tata Mcgraw Hill Publication. 5. Construction Project Scheduling By Callahan, M.T., Quackenbush,D.G.,And Rowing,J.E, Mcgraw-Hill ,New York,1992

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Course Code	CONSTRUCTION PRACTICES	L	T	P	C
21D21102a	(PE-I)	3	0	0	3
	Semester	I			

Course Objectives: This Course Will Enable Students:

- To know the various conventional construction materials, properties and their uses
- To know the various latest and modern construction materials, properties and their uses
- To know and understand the general construction processes and their sequences
- To know and understand the various techniques which are useful for the substructure construction
- To know and understand the various techniques which are useful for the superstructure construction

Course Outcomes (CO): Student will be able to

- Identify various construction techniques and their limitations.
- Analyze productivity and economics in construction techniques.
- Implement modular construction practices
- Apply reliable proportioning concepts in construction techniques.

UNIT - I	Lecture Hrs:10

INTRODUCTION: Introduction To Construction Techniques- Applications – Advantages – Disadvantages – Measures.
MECHANIZED METHODS OF EARTHWORK: Tractors And Attachments, Dozers, Tippers, Scrapers, Shovels And Trenching Machines, Dumpers, Rollers And Compactors, Estimation Of Quantities Of Earthwork In Grading, Grading Of Sites With Bulldozers And Scrapers, Drilling, Blasting Methods, Labour Protection In Drilling And Blasting.

UNIT - II	Lecture Hrs:10

FORMWORK: Requirements Of Formwork, Loads Carried By Formwork, Types Of Formwork: Timber, Steel, Modular Shuttering, Slip Forms, Scaffolding.
REINFORCED CONCRETE CONSTRUCTION: Introduction, Fabrication Of Reinforcement And Transportation Of Erected Reinforcement, Concreting, Special Methods For Concreting Construction.

UNIT - III	Lecture Hrs:10

PRESTRESSED CONCRETE CONSTRUCTION: Introduction To Prestressed Concrete, Advantages Of Prestressed Concrete, Types Of Pre-Stressing, Methods Of Pre-Stressing, Equipment For Pre-Stressing Operation.
PREFABRICATED STRUCTURES: Introduction To Prefabricated Structures, Planning For Pre-Casting, Selection Of Equipment For Fabrication, Transport And Erection Of Prefabricated Components, Quality Measures, Design Considerations Of Precast Elements, Safety Measure During Erection.

UNIT - IV	Lecture Hrs:9

READY MIX CONCRETE: Production Of Ready Mixed Concrete, Site Mixed Vs. Ready Mixed Concrete, Equipment For RMC Plant, IS Code Provision For RMC, Quality Measures Of Ready Mixed Concrete, RMC Productivity Analysis, Productivity Analysis-Case Study.

UNIT - V	Lecture Hrs:9

MODULAR CONSTRUCTION PRACTICES: Introduction To Modular Construction, Modular Coordination, Modular Standardization, Modular System Building, Limitation And Advantages Of Modular Construction

Textbooks:

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COURSE STRUCTURE & SYLLABI

1. Funadamentals Of Building Construction Material And Method By Allen E, Iano.J. John Wiely And Sons,2013.
2. Principals And Practices Of Commercial Construction, By Cameron K.Andres.Ronald C.Smith 8th Edition, Prentice Hall,2009
3. Fundamentals Of Residential Constructions By Edward Allen, John Wiely And Sons,2011.

Reference Books:

1. Fundamentals Of Residential Constructions By Edward Allen, John Wiely And Sons,2011.
2. Design Of Concrete Mixes By N.Krishna Raju, CBS Publishers.
3. Formwork For Concrete Structures By Kumar Neeraja Jha, TMH Publishers.
4. Concrete For Construction Facts And Practice, 2nd Edition By Dr.V.K.Raina,Shroff Publishers
5. Professional Practices By K.G.Krishna Murthy And Ravindra S.V., PHI Publishers

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COURSE STRUCTURE & SYLLABI

Course Code	HUMAN RESOURCE DEVELOPMENT FOR CONSTRUCTION (PE-I)	L	T	P	C
21D21102b		3	0	0	3
	Semester	I			

Course Objectives: This Course Will Enable Students:

- Discuss principles of management and its functions in construction organization.
- Knowledge of organization's working procedures and organizational developments and group decision making.
- Identify quality of team leader and qualities of project leader.
- Carry out organization and execute work in group in an organization

Course Outcomes (CO): Student will be able to

- Plan and manage key human resource functions within organizations.
- Analyze current issues, trends, practices, and implement processes in HRM
- Contribute to employee performance management and organizational effectiveness.
- Develop employability skills.

UNIT - I	Lecture Hrs:10

ORGANIZATION AND MANAGEMENT THEORY: Challenges Of Managing People In Construction, Contemporary Management Theory, Production Efficiency: The Classical Approach, Human Behavior Theory, Manager's Attitude Towards People In Construction, Expectations Of The Employment Relationship.

UNIT - II	Lecture Hrs:10

HUMAN BEHAVIOUR: Introduction To The Field Of Management-Basic Individual Psychology-Motivation-Job Design And Performance Management-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 - III	Lecture Hrs:10

STRATEGIC HRM APPROACHES AND OPERATIONAL HRM APPROACHES: Models Of HRM, Employee Resourcing, Recruitment & Selection, Case Study Discussion, Training & Development, Appraisal Systems, Reward Management, Case Study Discussion, Mentoring, Career In Construction Management.

UNIT - IV	Lecture Hrs:9

MANPOWER PLANNING: Manpower Planning Process ,Organising, Staffing, Directing, And Controlling – Estimation, Manpower Requirement – Factors Influencing Supply And Demand Of Human Resources – Role Of HR Manager – Personnel Principle

TRAINING: Training Of Multi-Skilled Workforce, Quality, Productivity And Employee Relations In Construction, Training Of Engineers Related To Issues Such As Management Capabilities, Formation Of Joint Ventures, Privatization And BOT Type Of Systems. CIDC – IGNOU Training Programs.

UNIT - V	Lecture Hrs:9

EMPLOYEE RELATIONS AND EMPOWERMENT: Employees Relations, The Changing Role Of Trade Unions, The Effect Of Unions, Collective Bargaining, Case Study Discussion, The Evolution Of Empowerment Within HRM.

DIVERSITY AND WORK/LIFE BALANCE: Workforce Diversity, Equal Opportunities In Construction, Work-Life Balance.

EMPLOYEE WELFARE AND EMPLOYMENT LEGISLATIONS: Workplace Health And Safety Hazards, Employment Legislations.

Textbooks:

1. Human Resource Management In Construction By Langford D.A,, Longman Pubilishers.
2. Human Resource Management In Construction Projects: Strategic And Operational

Approaches, Taylor And Francis, 2010.
3. Human Resource Management – Aswathappa – TMH, 2010.

Reference Books:

1. Human Resource Management, Garry Dessler, And Biju Varkkey, PEA, 2011
2. Human Resource Management By S.S.Khanka,S.Chand Pubilishers,2003.
3. Personnel Management By Monappa A. – Tata Mcgraw Hill,New Delhi.
4. Managing Human Resources By Mutsuddi, New Age Publishers.
5. Harvard Business Review, "Appraising Performance Appraisal," Tata Mcgraw Hill.
6. Human Resources Management – Principles And Practices By P G Aquinas, Vikas Publishers.
7. Excellence Through Human Resource Development By, Nair,MRR, Tata Mcgraw Hill.

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Course Code	VALUE ENGINEERING	L	T	P	C
21D21102c	(PE-I)	3	0	0	3
	Semester	I			

Course Objectives: This Course Will Enable Students:

- To better understanding of an environmental impact assessment with value engineering approach in construction industry.
- Understand contemporary issues pertaining to construction methods by value engineering approaches
- Analysis of various structures using LCC methodology
- Evaluation of projects based on various management tools

Course Outcomes (CO): Student will be able to

- Acquaintance with the basic concepts of value engineering
- Ability to understand and apply the cost control methodology for various projects
- Knowledge of Life Cycle Cost methodology and its applications
- Comprehensive understanding about the various phases of Job and work plans
- Knack for the application of FAST and Delphi techniques for various projects

UNIT - I Lecture Hrs:10

CONCEPTS: Introduction, History Of Value Engineering, Value, Function, Cost, Worth, Case Study Discussions.
VALUE ENGINEERING: Definition And Concepts Of The Creative And Structured Phases Of Value Engineering. The Workshop Approach To Achieve Value- Procedures- Merits And Demerits- Detailed Analysis. Teambuilding Theory; Target Setting; Time Management.

UNIT - II Lecture Hrs:10

GENERAL TECHNIQUES IN INFRASTRUCTURE VALUATION: General Techniques - Brainstorming Technique, The Gordon Technique, Feasibility Ranking, The Morphological Analysis Technique, ABC Analysis, Probabilistic Approach, Make or Buy Technique, Case Study Discussions.

UNIT - III Lecture Hrs:10

SPECIAL TECHNIQUES IN INFRASTRUCTURE VALUATION I: Special Techniques - Function – Cost – Worth Analysis, Function Analysis System Technique - Technically Oriented Fast And Customer-Oriented Fast, Weighted Evaluation Method - Equal Importance Method, Descending Order Of Importance Method,
SPECIAL TECHNIQUES IN INFRASTRUCTURE VALUATION II: Numeric Analysis - Forced Distribution Technique, Quantitative Method, Predetermined Minimum Method. Evaluation Matrix. Break-Even Analysis. Life Cycle Cost (Lcc), Case Study Discussions

UNIT - IV Lecture Hrs:9

APPLICATIONS OF INFRASTRUCTURE VALUATION: Team Dynamics - Team Structure And Team Building, Definition Of The Creative And Structured Phases Of Value Engineering, The Workshop Approach To Achieving Value, Target Setting, Time Management, Case Study Discussions.

UNIT - V Lecture Hrs:9

LIFE CYCLE COSTING: Life Cycle Costing – Forecasting Of Capital As Well As Operating & Maintenance Costs, Time Value, Present Worth Analysis, DCF Methods, ROR Analysis, Sensitivity Analysis. Different Methods Of Performing Value Engineering.
PREPARATION OF VALUATION REPORT: Valuation Report, Contents, Standard Formats, Case Study Of Any One Report.

Textbooks:

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1. Value Engineering Concepts, Techniques And Applications By Anil Kumar Mukhopadhyaya,, Response Books, 2013.
2. Value Engineering By Iyer, S.S, New Age Pubilishers, 3rd Edition 2012Techniques
3. Value Analysis And Engineering By Lawrence D. Miles, Tata Mcgraw-Hill Book Company, 2009.

Reference Books:

1. Cost Analysis For Management Decisions By M.R.S. Murthy, Tata Mcgraw-Hill Publishing Company Ltd., 1988.
2. Industrial Engg. & Mgt.By O.P.Khanna, Dhanpat Rai Publishers.
3. Industrial Organization & Engg. Economics, T.R.Banga, S.C.Sharma, Khanna Publishers.
4. Estimating And Costing In Civil Engineering: Theory And Practice B.N Dutta Published S. Dutta & Company, Lucknow.
5. Estimating And Costing By Rangwala , Charotar Publishing House,
6. Practical Information For Quantity Surveyors, Property Valuers, Architects Engineers And Builders, P.T.Joglekar, Pune Vidyarthi Griha Prakashan, 2008 Reprint.

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Course Code	ADVANCED CONCRETE TECHNOLOGY	L	T	P	C
21D21103a	(PE-II)	3	0	0	3
	Semester	I			

Course Objectives: This Course Will Enable Students:

- To study the properties of concrete making materials
- To do mix design
- Famiiar with the methods of concrete
- Knowledge about advance tests on concrete

Course Outcomes (CO): Student will be able to

- To be familiar with the properties of concrete making materials
- Identify the influence and compatibility of chemcial,mineral admixtures in concrete
- Update the knowledge on recent advances in special concretes.
- Know about various methods of concrete
- Analyse the performance of concrete structure through microstructure analysis

UNIT - I Lecture Hrs:10

Cements And Admixtures: Portland Cement – Chemical Composition - Hydration, Setting And Finenesses Of Cement – Structures Of Hydrated Cement – Mechanical Strength Of Cement Gel - Water Held In Hydrate Cement Paste – Heat Of Hydration Of Cement – Influence Of Compound Composition On Properties Of Cement – Tests On Physical Properties Of Cement – I.S. Specifications – Different Types Of Cements – Admixtures.

UNIT - II Lecture Hrs:10

Aggregates: Classification Of Aggregate – Particle Shape And Texture – Bond Strength And Other Mechanical Properties Of Aggregate Specific Gravity, Bulk Density, Porosity, Absorption And Moisture In Aggregate – Soundness Of Aggregate – Alkali – Aggregate Reaction, Thermal Properties – Sieve Analysis – Fineness Modulus – Grading Curves – Grading Requirements – Practical Grading – Road Note No.4 Grading Of Fine And Coarse Aggregates Gap Graded Aggregate – Maximum Aggregate Size.

UNIT - III Lecture Hrs:10

Fresh Concrete: Workability – Factors Affecting Workability – Measurement Of Workability By Different Tests – Effect Of Time And Temperature On Workability – Segregation And Bleeding – Mixing And Vibration Of Concrete – Quality Of Mixing Water.
Hardened Concrete: Water/Cement Ratio-Abram's Law – Gel Space Ratio – Effective Water In Mix – Nature Of Strength Of Concrete – Strength In Tension And Compression- Griffith's Hypothesis – Factors Affecting Strength – Autogeneous Healing –Relation Between Compression And Tensile Strength – Curing And Maturity Of Concrete Influence Of Temperature On Strength – Steam Curing – Testing Of Hardened Concrete – Compression Tests – Tension Tests – Factors Affecting Strength – Flexure Tests – Splitting Tests – Non Destructive Testing Methods.

UNIT - IV Lecture Hrs:9

Elasticity, Shrinkage And Creep: Modulus Of Elasticity – Dynamic Modulus Of Elasticity – Poisson's Ratio – Early Volume Changes – Swelling – Draying Shrinkage - Mechanism Of Shrinkage – Factors Affecting Shrinkage – Differential Shrinkage – Moisture Movement Carbonation Shrinkage-Creep Of Concrete – Factors Influencing Creep – Relation Between Creep And Time – Nature Of Creep – Effect Of Creep.

UNIT - V Lecture Hrs:9

Mix Design: Proportioning Of Concrete Mixes By Various Methods – Fineness Modulus, Trial And Error, Mix Density, Road Note. No. 4, ACI And ISI Code Methods – Factors In The Choice Of Mix Proportions – Durability Of Concrete – Quality Control Of Concrete – Statistical Methods – High Strength Concrete Mix Design.
Special Concretes: Light Weight Concretes –Light Weight Aggregate Concrete- Cellular Concrete - No Fines Concrete – High Density Concrete – Fiber Reinforced Concrete – Different Types Of

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Fibers - Factories Affecting Properties Of FRC – Applications Polymer Concrete – Types Of Polymer Concrete Properties Of Polymer Concrete and Applications
Textbooks:
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.R. Santha Kumar, Oxford University Press, New Delhi
Reference Books:
1. Concrete: Micro Structure, Properties And Materials – P.K.Mehta And J.M.Monteiro, Mc-Graw Hill Publishers 2. Design Of Concrete Mix By Krishna Raju, CBS Pubilishers. 3. Concrete Technology By A.M.Neville – Pearson Publication 4. Concrete Technology By M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 5. Non-Destructive Test And Evaluation Of Materials By J.Prasad & C.G.K. Nair , Tata Mcgraw Hill Publishers, New Delhi

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	CONSTRUCTION ECONOMICS AND FINANCE	L	T	P	C
21D21103b	(PE– II)	3	0	0	3
	Semester	I			

Course Objectives: This Course Will Enable Students:

- To cover the principles of engineering economy by following the basic methods for carrying out Economic studies.
- Learn about cost analysis and economics accounting
- To know about contract bidding and awards
- To understand different budgeting procedures

Course Outcomes (CO): Student will be able to

- Prepare income, profit and loss statements and implement construction accounting.
- Evaluate construction project economics, cost-benefit analysis and breakeven analysis.
- Analyze and evaluate construction risks and uncertainties.
- Manage working capital and employ budgeting and control.

UNIT - I Lecture Hrs:10

ECONOMICS: Role Of Civil Engineering In Industrial Development-Advances In Civil Engineering And Engineering Economics- Support Matters Of Economy As Related Top Engineering-Market Demand And Supply-Choice Of Technology- Quality Control And Quality Production-Audit In Economic Law Of Returns Governing Production

CONSTRUCTION ECONOMICS: Construction Development In Housing, Transport And Other Infrastructures-Economics Of Ecology, Environment, Energy Resources-Local Material Selection-Form And Functional Designs-Construction Workers-Urban Problems-Poverty-Migration-Unemployment-Pollution.

UNIT - II Lecture Hrs:10

PROJECT FORMULATION: Project – Concepts – Capital Investments - Generation And Screening Of Project Ideas - Project Identification – Preliminary Analysis, Market, Technical, Financial, Economic And Ecological - Pre-Feasibility Report And Its Clearance, Project Estimates And Techno-Economic Feasibility Report, Detailed Project Report – Different Project Clearances Required.

PROJECT APPRAISAL : NPV – BCR – IRR – ARR – Urgency – Pay Back Period – Assessment Of Various Methods – Indian Practice Of Investment Appraisal – International Practice Of Appraisal – Analysis Of Risk – Different Methods – Selection Of A Project And Risk Analysis In Practice

UNIT - III Lecture Hrs:10

FINANCING: 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-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 - IV Lecture Hrs:9

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.

LENDING TO CONTRACTORS: Loans To Contractors-Interim Construction Financing-Security And Risk Aspects - Work Pricing, Cost Elements Of Contract, Bidding And Award, Revision Due To On Forcing Causes, Escalation.

UNIT - V Lecture Hrs:9

COMPARING ALTERNATIVES PROPOSALS: Comparing Alternatives- Present Worth

Analysis, Annual Worth Analysis, Future Worth Analysis, Rate Of Return Analysis (ROR) And Incremental Rate Of Return (IROR)Analysis, Benefit/Cost Analysis, Break Even Analysis.Evaluating Alternative Investments: Real Estate - Investment Property, Equipment Replace Analysis, Depreciation – Tax Before And After Depreciation – Value Added Tax (VAT) – Inflation.

Textbooks:

1. Projects - Planning Analysis Selection Implementation & Review By Prasanna Chandra, Fourth Edition, Tata Mcgraw Hill Publishing Co., Ltd, New Delhi.
2. Financial And Cost Concepts For Construction Management By Halpin, D.W.John Wiley And Sons, New York.
3. Project Management By Nagarajan.K., New Age Pubilishers.

Reference Books:

1. A Text Book For Accounting For Management By S N Maheshwari, Vikas Pubilishers
2. Fundamentals Of Accounting And Financial Analysis By Anil Chowdhury , Pearson Education
3. Accounting For Management By Srinivasan , S.Chand Pubilishers.
4. Fundamental Of Construction Management And Organization By Kwaku A., Tenah And Jose M. Guevera, Prentice Hall Of India, 1995 .
5. Project Management- Strategic Financial Planning, Evaluation And Control By Patel, B M , Vikas Publishing House Pvt. Ltd. New Delhi.
6. Construction Planning And Management By Shrivastava,U.K.,2nd Edn. Galgotia Publications Pvt. Ltd. New Delhi.
7. Project Management By Bhavesh Patel, Vikas Pubilishers.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	CONSTRUCTION TECHNOLOGY FOR TUNNELS	L	T	P	C
21D21103c	(PE – II)	3	0	0	3
	Semester	I			

Course Objectives: This Course Will Enable Students:

- To understand the use of elastic and plastic analysis in the design of underground support system
- To explain the field tests generally conducted during and after construction of under structures
- To use of codes and standards in design of underground structures
- To classify the rock mass system and ground condition in tunneling

Course Outcomes (CO): Student will be able to

- Identify tunnel driving methods for a given ground conditions
- Design tunnel excavation.
- Identify and design tunnel support systems.
- Identify difficulties and remedies during tunnelling.

UNIT - I	Lecture Hrs:10

TUNNELS IN SOILS AND ROCKS: Benefits Of Tunnelling, Tunnels For Different Purposes, Site Investigation And Geophysical Methods Adopted For Tunnelling Purposes, Rock Rating And Classification, Instrumentation On Tunnels.
TUNNELLING METHODS: Drill And Blast Method, Tunnel Boring Machine, NATM, Shield Tunnelling, Earth Pressure Method, Application Of Compressed Air.

UNIT - II	Lecture Hrs:10

TUNNEL LINING AND SUPPORTS: Different Types Of Support Measures Adopted In Tunnelling, Analysis Of Stresses On The Tunnel Lining, Design Of Tunnel Lining And Support Measures.
TUNNELLING MECHANICS: Behaviour Of Soils And Rocks, Stress And Deformation Fields Around Tunnels, Analytical Equations Used And Derivations, Stability Problems In Tunnels.

UNIT - III	Lecture Hrs:10

NUMERICAL ANALYSIS OF TUNNELLING: Finite element analysis of tunnelling process, Constitutive models used, Development of longitudinal displacement curves and ground reaction curves, Ground surface settlement due to tunnelling in soft grounds.

UNIT - IV	Lecture Hrs:9

UNDERGROUND TUNNEL CONSTRUCTION : Underground And Underwater Construction – Tunnel-Shaft Sinking, Micro Tunneling, Tunnel Driving In Hard And Soft Strata, Bedding Of Conduits.
UNDER WATER TUNNEL CONSTRUCTION: Problems Encountered. Underwater Drilling, Blasting, Grouting Methods In Soft And Hard Soil Including Jet Grouting And Chemical Grouting, Dewatering In Shallow And Deep Excavations Using Different Methods, Vacuum Dewatering And Well Point System.

UNIT - V	Lecture Hrs:9

ON SITE WORKS FOR TUNNELING: Site Preparation, Temporary Roads, Side Drainage, Site Preparation Building Areas. Deep – Trench, Deep-Basement Excavations, Bulk Excavation, Stability Of Slopes To Open Excavations. Support Of Excavation By Timbering And Sheet Piling Retaining Walls And Sheet Pile Designing. Shoring And Underpinning – Requirements For Shoring And Underpinning, Methods Of Shoring And Underpinning

Textbooks:

1. Construction Of Marine And Offshore Structures, Ben C. Gerwick Jr., 3rd Edition, CRC Press, 2007.
2. Construction Dewatering: New Methods And Applications, Patrick Powers. J, John Wiley &

Sons, 1992.
3. Tunneling And Tunnel Mechanics, A Rational Approach To Tunnelling, Kolymbas D., Springer, 2005.

Reference Books:

1. Tunelling Through Weak Rocks, Singh B. And Goel R. K.,Elsevier, 2006.
2. Construction Technology By Roy Chudley And Roger Greeno, Prentice Hall, 2005.
3. Construction Technology: Analysis And Choice, Bryan, Wiley India
4. Construction Planning Equipment And Methods By RL Peurifoy Tata Mcgraw Hill
5. Modern Construction Equipment And Methods By Frank Harris John Wiley And Sons.
6. Construction Technology By Sankar, S.K. And Saraswati, S., Oxford University Press, New Delhi, 2008.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	CAD LABORATORY	L	T	P	C
21D35105		0	0	4	2
	Semester	I			

Course Objectives:

- To learn the software applications in structural engineering.
- To learn the analysis of plane, space truss and frames subjected to different types of loadings.
- To draw the detailing of RCC members and to learn the estimations.
- To study the design concepts of steel members like truss, beams and columns.

Course Outcomes (CO):

- Understand the software usages for structural members.
- Able to analyse plane, space frames and dynamic response and natural frequency for beams and frames.
- Able to design, detailing and estimations of RC members.
- Able to design the steel members like truss, beams and columns.

List of Experiments:

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.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	BUILDING INFORMATION MODELING LABORATORY	L	T	P	C
21D21104		0	0	4	2
	Semester	I			

Course Objectives:

- Provide familiarity with current BIM technologies.
- Understand the shift from 2D representation to 3D simulation.
- Synthesize, link and maintain continuity of existing and designed BIM information and other vital information into the model.
- Explore new project delivery systems and technologies for _integrated practice‘

Course Outcomes (CO):

- Understand and apply the fundamental concepts of building information modeling (BIM)
- integrate construction processes through Building Information Modelling (BIM)
- Understand and manage information delivery cycle using BIM and related digital technologies
- Model a structure with building information modeling(BIM) software.

List of Experiments:

1. Level of Detail (LOD) BIM Concepts
2. Detailed Architectural BIM Modeling
3. Basic Introduction to Structural / MEP BIM Concepts
4. 3D Spatial Interference Analysis
5. Generating Good for Construction (GFC) Documentation
6. Material Take-Off(MTO)
7. Bill of Quantity (BOQ) Generation
8. Project Scheduling with BIM
9. 4D Simulation

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	**RESEARCH METHODOLOGY AND IPR**	**L**	**T**	**P**	**C**
21DRM101		**2**	**0**	**0**	**2**
	Semester	**I**			

Course Objectives:

- Identify an appropriate research problem in their interesting domain.
- Understand ethical issues understand the Preparation of a research project thesis report.
- Understand the Preparation of a research project thesis report
- Understand the law of patent and copyrights.
- Understand the Adequate knowledge on IPR

Course Outcomes (CO): Student will be able to

- Analyze research related information
- Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

UNIT - I		Lecture Hrs:

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, scope, and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

UNIT - II		Lecture Hrs:

Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.

UNIT - III		Lecture Hrs:

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT - IV		Lecture Hrs:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

UNIT - V		

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

Textbooks:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"

Reference Books:

1. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"
2. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
3. Mayall, "Industrial Design", McGraw Hill, 1992.
4. Niebel, "Product Design", McGraw Hill, 1974.
5. Asimov, "Introduction to Design", Prentice Hall, 1962.
6. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	QUANTITATIVE METHODS IN CONSTRUCTION MANAGEMENT	L	T	P	C
21D21201		3	0	0	3
	Semester	II			

Course Objectives: This Course Will Enable Students:

- To study the classical methods like monte-carlo simulation methods in construction.
- To gain knowledge of formulation of optimization models using L.P., D.P tools
- To understand transportation model utility in construction industry
- To Understand CPM / PERT methods and solve problems of construction field

Course Outcomes (CO): Student will be able to

- Formulate and solve the deterministic optimization problems
- Model risk and uncertainty in construction projects
- Apply stochastic optimization techniques
- Apply simulation techniques in construction projects

UNIT - I	Lecture Hrs:10

INTRODUCTION AND CONCEPTS OF PROBABILITY AND STATISTICS: Probability: Conditional Probability, Probability Distributions (Normal, Bayesian, Poisson And Exponential), Probability Density Functions.
PRELIMINARY DATA ANALYSIS: Testing Of Hypothesis- Concepts And Testing , Analysis Of Variance Techniques, Introduction To Non Parametric Tests, Validity And Reliability, Approaches To Qualitative And Quantitative Data Analysis.

UNIT - II	Lecture Hrs:10

LINEAR PROGRAMMING: Formulation Of LP Problems: Basic Variables, Constrains, Corner Points, Augmented Form, Maximization And Minimization Problems. Solution Methods: Graphical Method, Algebraic Method, Simplex Method (Tabular And Matrix Form). Integer Linear Programming. Transportation And Assignment Problems: Transportation Problem: Basic Feasible Solutions Using N-W Corner Rule, Minimum Cost Method, Vogel's Approximation Method. Optimal Solutions Using Stepping Stone Method, Modified Distribution Method.

UNIT - III	Lecture Hrs:10

DYNAMIC PROGRAMMING: Stage Coach Problem, Reliability Problem, Continuous Variables, Oil Exploration Problem, Manpower Planning Problem. Queuing Theory: Single Server Infinite Queue Length Model, Single Server Finite Queue Length Model, Multiple Server Infinite Queue Length Model, Multiple Server Infinite Queue Length Model. Queuing Theory - Decision Theory-Optimal Decision Strategy.

UNIT - IV	Lecture Hrs:9

FORECASTING: Quantitative Methods-Time Series (Average Method, Moving Average Method, Exponential Smoothing, Mean Square Error), Regression Analysis. Qualitative Methods.
GAMES THEORY SIMULATIONS APPLIED TO CONSTRUCTION: N X M Person Zero Sum Games With Finite Strategies, Maximin & Minimax Strategies, Saddle Points, Rule Of Dominance.
SOLUTION METHODOLOGIES: Algebraic Method, Graphical Method, Method Of Matrices, LP Method, Iterative Method Of Approximate Solution.

UNIT - V	Lecture Hrs:9

MODIFICATIONS AND IMPROVEMENT ON CPM/PERT TECHNIQUES: Beyond CPM/PERT: Overview Of The Pitfalls Of Making Traditional CPM/PERT Assumptions. PERT Technique Extended To Monte-Carlo Simulation Analyses. CPM: Advantages Of Circle Notation Diagram For The Presentation Of CPM Project Plans. Concept Of Dependent Operations Overlapping In Time.

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COURSE STRUCTURE & SYLLABI

Textbooks:

1. Probability And Statistics For Engineers By Freund,J.E.And Miller,I.R., Prentice Hall Of INDIA, New Delhi,1994.
2. Fundamentals Of Mathematical Statistics, Gupta,S.C.And Kapur,V.K., Sultan Chand And Sons New Delhi,1999.
3. Engineering And Managerial Economics By Agrawal, New Age Pubilications

Reference Books:

1. Engineering And Managerial Economics By Agrawal, New Age Pubilications
2. Mathematical Statistics By Saxena, S.Chand Publications
3. Operations Research: An Introduction, Taha,H.A., Prentice Hall INDIA,New Delhi,2010.
4. Quantitative Methods In Construction Management, James, A., Adrain, American Elsevier Publishing Co., Inc., 1973.
5. Managing The Construction Process-Estimating, Scheduling & Project Control", Frederick E Gould, Dorling Kindersely India Pvt. Ltd.,2012
6. Quantitative Techniques In Management , Vohra, N.D. Tata Mcgraw Hill Co., Ltd , New Delhi, 1990.
7. Managerial Economics By H.L.Ahuja, S.Chand Publications
8. Managerial Economics And Financial Analysis By Shailaja Gajjala, Universities Press.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	CONSTRUCTION TECHNIQUES, METHODS AND EQUIPMENT	L	T	P	C
21D21202		3	0	0	3
	Semester	II			

Course Objectives: This Course Will Enable Students:

- Understanding the various construction practices and properties
- Ability to evaluate damaged structure and understands the maintenance & strengthening techniques for concrete repair.
- Knowledge on Piling techniques - well and caisson, sheet piles

Course Outcomes (CO): Student will be able to

- Identify various construction techniques and their limitations.
- Analyze productivity and economics in construction techniques.
- Implement modular construction practices.
- Apply reliable proportioning concepts in construction techniques.

UNIT - I	Lecture Hrs:10

INTRODUCTION TO CONSTRUCTION EQUIPMENT : Construction Equipments – Understanding Basics And Functions Of Equipment Earthmoving Machinery, Concreting Equipment, Material Handling Equipment And Transportation Of Equipments.

CONSTRUCTION EQUIPMENTS AND MANAGEMENT : Identification – Planning Of Equipment – Selection Of Equipment - Equipment Management In Projects - Maintenance Management – Equipment Cost – Operating Cost – Cost Control Of Equipment - Depreciation Analysis – Replacement Of Equipment- Replacement Analysis - Safety Management

UNIT - II	Lecture Hrs:10

EQUIPMENT FOR EARTHWORK: Fundamentals Of Earth Work Operations - Planning For Earthwork Construction - Graphical Presentation Of Earthwork, Earthwork Quantities, Mass Diagram, Pricing Earthwork Operations. Earth Moving Operations - Types Of Earth Work Equipment - Tractors, Motor Graders, Scrapers, Front End Waders, Earth Movers-Compaction And Stabilization Equipment : Compaction Of Soil And Rock, Types Of Compacting Equipment, Dynamic Compaction, Stabilizing Soils With Lime, Cement Soil Stabilization

UNIT - III	Lecture Hrs: 10

DOZERS, SCRAPERS, EXCAVATORS: Introduction, Performance Characteristics Of Dozers, Pushing Material, Land Clearing, Scraper Types, Operation, Performance Charts, Production Cycle, Hydraulic Excavators, Shovels, Hoes.

MATERIAL HANDLING EQUIPMENT:- Trucks And Hauling Equipment, Finishing Equipment - Productivity, Performance Calculations, Gaders, Trimmers.

UNIT - IV	Lecture Hrs:9

EQUIPMENT FOR PRODUCTION OF AGGREGATE AND CONCRETING : Crushers – Feeders - Screening Equipment - Handling Equipment - Batching And Mixing Equipment - Hauling, Pouring And Pumping Equipment – Transporters.

EQUIPMET FOR PILE DRIVING AND DEWATERING : Pile Hammers, Selecting A Pile Hammer, Loss Of Energy Due To Impact, Energy Losses Due To Causes Other Than Impact. Vacuum Dewatering Of Concrete Flooring - For Underground Open Excavation.

UNIT - V	Lecture Hrs:9

OTHER CONSTRUCTION EQUIPMENTS : Equipment For Dredging, Trenching, Tunneling, Drilling, Blasting - Equipment For Compaction - Erection Equipment - Types Of Pumps Used In Construction - Equipment For Demolition.

Textbooks:

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COURSE STRUCTURE & SYLLABI

1. Construction Planning And Equipment Methods, Peurifoy,R.L., Ledbetter.W.B And Schexnayder,C, Mcgraw Hill, Singapore,1995.
2. Construction Equipment And Management, Sharma S.C..Khanna Publishers,New Delhi.
3. Construction Equipment And Job Planning, Deodhar, S.V. Khanna Publishers, New Delhi, 1988.

Reference Books:

1. Construction Management & Equipment By Saurabh Kumar Soni, SK Kataria Sons.
2. Heavy Construction Planning Equipment And Methods By Jagman Singh, Oxford And IBH.
3. Rock Engineering By John A Franklin And Maurice B Dusseault, Tata Mcgraw Hill
4. Modern Construction Equipment And Methods By Frank Harris, John Wiley And Sons.
5. Equipment Management By Krishna Chandra , Sarup Book Pubilishers.
6. Construction Technology By Roy Chudley And Roger Greeno, Prentice Hall, 2005.
7. Introduction To Material Handling By Ray Siddartha, New Age Pubilishers.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	**QUALITY AND SAFETY MANAGEMENT**	**L**	**T**	**P**	**C**
21D21203a	**(PE-III)**	**3**	**0**	**0**	**3**
	Semester	**II**			

Course Objectives: This Course Will Enable Students:

- To learn Quality management concept and its philosophies.
- To study quality management tools: Six Sigma and TQM
- To study the various construction safety problems and safety programs.
- To study the various laws related to safety in construction industry

Course Outcomes (CO): Student will be able to

- Distinguish different aspects of quality and apply related tools.
- Apply techniques of total quality assurance and quality control programme and cost implication.
- Plan various aspects of safety during construction activity.
- Apply principles of environmental safety to construction projects.

UNIT - I	Lecture Hrs:10

QUALITY MANAGEMENT: Quality Policy In Construction Industry-Consumer Satisfaction-Ergonomics ,Time Of Completion-Statistical Tolerance-Taguchi's Concept Of Quality- Contract And Construction Programming-Inspection Procedures.
QUALITY ASSURANCE AND CONTROL: Total QA/QC Program And Cost Implication. Different Aspects Of Quality-Appraisals, Failure Mode Analysis, Stability Methods And Tools, Influence Of Drawings, Detailing, Specification.Standardization-Bid Preparation-Construction Activity.

UNIT - II	Lecture Hrs:10

SAFETY PROGRAMMES AND ORGANIZATION: Environmental Safety, Social And Environmental Factors. Problem Areas In Construction Safety-Elements Of An Effective An Safety Program-Job Site-Safety Assessment-Safety Meetings-Safety Incentives
CONSTRUCTION ACCIDENTS: Accidents And Their Causes – Human Factors In Construction Safety – Costs Of Construction Injuries – Occupational And Safety Hazard Assessment – Legal Implications.

UNIT - III	Lecture Hrs:10

SAFETY PROGRAMMES: Problem Areas In Construction Safety – Elements Of An Effective Safety Programme – Job-Site Safety Assessment – Safety Meetings – Safety Incentives.
DESIGNING FOR SAFETY: Safety Culture – Safe Workers – Safety And First Line Supervisors – Safety And Middle Managers – Top Management Practices, Company Activities And Safety – Safety Personnel – Sub Contractual Obligation – Project Coordination And Safety Procedures – Workers Compensation.

UNIT - IV	Lecture Hrs:9

OWNERS' AND DESIGNERS' OUTLOOK: Owner's Responsibility For Safely – Owner Preparedness – Role Of Designer In Ensuring Safety – Safety Clause In Design Document.

UNIT - V	Lecture Hrs:9

QUALITY CONTROL AND SAFETY DURING CONSTRUCTION: Quality And Safety Concerns In Construction-Organizing For Quality And Safety-Work And Material Specifi Cations-Total Quality Control-Quality Control By Statistical Methods -Statistical Quality Control With Sampling By Attributes-Statistical Quality Control By Sampling And Variables-Safety.

Textbooks:

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COURSE STRUCTURE & SYLLABI

1. Productivity Improvement In Construction By Clarkson H.Oglesby, Mcgraw Hill.
2. Construction Inspection Handbook Quality Assurance And Quality Control, James,J.O Brain, Van Nostrand.

Reference Books:

1. Quality Planning And Analysis, Juran Frank, J.M. And Gryana, F.M., Tata Mcgraw Hill.
2. Fundamental Of Construction Management And Organization By Kwaku A., Tenah And Jose M.Guevera, PHI Pubilishers.
3. Construction Safety Manual Published By National Safety Commission Of India.
4. Safety Management In Construction Industry – A Manual For Project Managers. NICMAR Mumbai.
5. Construction Safety Handbook – Davies V.S.Thomasin K, Thomas Telford, London.
6. ISI For Safety In Construction – Bureau Of Indian Standrads.
7. Safety Management –Girimaldi And Simonds, AITBS, New Delhi.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	STRATEGIC MANAGEMENT IN CONSTRUCTION (PE- III)	L	T	P	C
21D21203b		3	0	0	3
	Semester	II			

Course Objectives: This Course Will Enable Students:

- Understand the principles of strategic management in construction.
- Understand the nature of alliances in construction businesses.
- Understand the strategic management business process.

Course Outcomes (CO): Student will be able to

- Analyze the importance of Strategic Management in a business organization.
- Identify environmental factors which influence business firm.
- Analyze the effect of competition on the business environment.
- Implement different models and strategies used by organizations.

UNIT - I	Lecture Hrs:10

INTRODUCTION TO STRATEGIC MANAGEMENT CONCEPTS: Introduction To Strategy, Purpose, Objectives, Goals, Policies And Programs,7-S Frame Work, Board Of Directors-Roles, Responsibilities, Structure And Composition Role Of Top Management.
EXTERNAL AND INTERNAL ENVIRONMENT ANALYSIS: Strategic Management Process, SWOT Analysis Macro And Micro Environmental Factors. Importance Of Value Chain.

UNIT - II	Lecture Hrs:10

DECISION AND ANALYTICAL TOOLS: Competitive Environment-Five Forces Model, Factors Driving Industry Change. Key Factors For Success In Organization, Overall Cost Leadership, Focus And Differentiation Strategies.
FINANCIAL STRATEGIES: Growth Strategy, Stabilization Strategy And Retrenchment Strategy. Portfolio Strategies G.E, B.C.G & Arthur D.Little's Model.

UNIT - III	Lecture Hrs:10

CORPORATE STRATEGIC: Events: Corporate Parenting Strategy, Ansoffs Product Market Grid-Product Development, Market Development And Market Penetration And Diversification Strategies.
STRATEGIC MANAGEMENT EVALUATION AND CONTROL: Strategy Implementation And Evaluation Control Of Strategic Performance-Performance Gap, ROI, Budget And Financial Ratios, Strategy Audit.

UNIT - IV	Lecture Hrs:9

STRATEGIC BEHAVIOUR OF CONSTRUCTION FIRMS : Introduction - Core Business And Core Competencies In Construction-Levels Of Strategy - Managing The Diversified Construction Firm Strategies At The Operating Core In Contracting Firms - Project Portfolios And Potential Capacity - Sub-Contracting As A Production Strategy Within Project – Portfolios- The Managcmcnt Rcsourcc In Construction Firrns As A Source Of Competitive Advantage - Resolving A Strategic Paradox.

UNIT - V	Lecture Hrs:9

TECHNIQUES FOR THE STRATEGIC PLANNER: Portfolio Management, Delphi Techniques And Scenarios - Marketing And Promotional Strategies In Construction - Marketing Orientation And Relationship Marketing Service Quaiity And Customer Satisfaction Internal Marketing Internal Customer Satisfaction - Synthesis Of Strategic Management In Construction

Textbooks:

1. Strategic Management in Construction By David Langford, Steven Male, John-Wiley And Sons, 2008.
2. Construction Management in Practice. By Richard Fellows, Blackwell Science.

3. Strategic Cost Analysis For Project Managers And Engineers By Creese, Robert's., New Age Pubilishers.
Reference Books:
1. Strategic Cost Analysis For Project Managers And Engineers By Creese, Robert's., New Age Pubilishers. 2. Strategic Management By Michael A.Hitt, Cengage Publishers. 3. Strategic Management By Hriyappa.B., New Age Publishers. 4. Strategic Management By Garth Saloner, John Wiley Publications.

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ANANTHAPURAMU – 515 002 (A.P) INDIA

M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	FORM WORK DESIGN (PE- III)	L	T	P	C
21D21203c		3	0	0	3
	Semester	II			

Course Objectives: This Course Will Enable Students:

- To study and understand the overall and detailed planning of formwork
- To understand the Design and erection of forms for various elements such as slabs, beams, columns, walls
- To know the latest methods of form construction.

Course Outcomes (CO): Student will be able to

- Design form work.
- Plan the sequence of construction of civil engineering structures
- Plan the safety steps involved in the design of form work and false work.
- Select a right material for manufacturing false work and form work suiting specific requirements.

UNIT - I	Lecture Hrs:10

INTRODUCTION: Formwork And False Work, Temporary Work Systems, Construction Planning And Site Constraints, Materials And Construction Of The Common Formwork And False Work Systems, Special And Proprietary Forms.
FORM MATERIALS: Lumber – Types – Finish – Sheathing Boards Working Stresses – Repetitive Member Stress – Plywood – Types And Grades – Textured Surfaces And Strength – Reconstituted Wood – Steel – Aluminum Form Lining Materials – Hardware And Fasteners – Nails In Plywood Concrete Density – Height Of Discharge – Temperature – Rates Of Placing – Consistency Of Concrete – Live Loads And Wind Pressure – Vibration Hydrostatic Pressure And Pressure Distribution – Examples – Vertical Loads - Uplift On Shores – Adjustment For Non Standard Conditions.

UNIT - II	Lecture Hrs:10

PLANNING AND SITE EQUIPMENT & PLANT FOR FORM WORK: At Tender Stage – Development Of Basic System – Planning For Maximum Reuse – Economical Form Construction – Planning Examples – Crane Size, Effective Scheduling Estimate–Recheck Plan Details – Detailing The Forms. Overall Planning – Detail Planning – Standard Units–Corner Units – Schedule For Column Formwork – Formwork Elements–Planning Crane Arrangements–Site Layout Plan–Transporting Plant – Formwork Beams – Formwork Ties – Wales And Ties – Scaffold Frames From Accessories – Vertical Transport Table Form Work.

UNIT - III	Lecture Hrs:10

FORMWORK – DESIGN AND PLANNING: Concrete Pressure On Forms, Design Of Timber And Steel Forms, Loading And Moment Of Formwork. Overall Planning -Detailed Planning - Standard Units - Corner Units - Schedule -Planning At Tender Stage - Development Of Basic System - Planning For Maximum Reuse – Planning Examples - Site Layout Plan-Crane Arrangements - Recheck Plan Details - Planning For Safety- Transporting Plant -Wales And Ties - Vertical Transportable Form Work.

UNIT - IV	Lecture Hrs:9

BUILDING AND ERECTING THE FRAMEWORK: Location Of Job Mill -Storage -Equipment-Form For Wall Footings -Column Footings -Slab On Grade And Paving Work -Highway And Airport Paving - External Vibration -Prefabricated Panel Systems - Giant Forms -Curved Wall Forms

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

–Erections Practices -Column Heads-Beam Or Girder Forms - Suspended Forms- Concrete Joint Construction- Flying System Forms.		
UNIT - V		Lecture Hrs:9
CAUSES OF FAILURES: Case Studies- Finish Of Exposed Concrete –Design Deficiencies -Safety Factors -Stripping Sequence - Reshore Installation -Advantages Of Reshoring. **DESIGN OF DECKS AND FALSE WORKS**: Types Of Beam, Decking And Column Formwork, Design Of Decking, False Work Design, Effects Of Wind Load, Foundation And Soil On False Work Design. **CONSTRUCTION SEQUENCE AND SAFETY IN USE OF FORMWORK**: Sequence Of Construction, Safety Use Of Formwork And False Work.		
Textbooks:		
1. Formwork For Concrete. By Austin, C.K., , Cleaver - Hume Press Ltd. 2. Formwork For Concrete Structures. By Robert L. Peurifoy, Mcgraw-Hill. 3. Slip Form Techniques. Bytudor Dinescu And Constantin Radulescu, Abacus Press.		
Reference Books:		
1. Slip Form Techniques. Bytudor Dinescu And Constantin Radulescu, Abacus Press. 2. Insulating Concrete Forms Construction By Pieter A Vanderwe, TMH Publications. 3. Concrete And Formwork By T.W.Love, Craftsman Book Company 4. Form Work For Concrete Structures By Kumar Neeraj Jha, TMH Publications. 5. Concrete And Concrete Materials For Practicing Engineers By Vinod K Mehrotra, Standards Publishers.		

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	**HIGH RISE BUILDING TECHNOLOGIES**	**L**	**T**	**P**	**C**
21D21204a	**(PE-IV)**	**3**	**0**	**0**	**3**
	Semester	**II**			

Course Objectives: This Course Will Enable Students:

- To study the behaviour of tall structures.
- To enhance competence in understanding the various structural systems of high rise buildings
- To familiarize with the methods of analysis of tall-steel and concrete buildings under various loading conditions

Course Outcomes (CO): Student will be able to

- Understand structural systems of tall buildings.
- Implement latest construction practices and processes for structural systems.
- Analyse and design high rise structures.
- Design fire protection systems in tall buildings.

UNIT - I	Lecture Hrs:10

EVOLUTION OF TALL BUILDINGS: Introduction, Design Criteria For Structural Design Of Tall Building, Concept Of Premium For Height, Development Of High Rise Architecture.
ASSEMBLY OF BUILDING: Building Performance –Cost, Quality And Time, Environmental Requirements, Industrialization& Robotics In Construction, Introduction To Safety And Health Management System.

UNIT - II	Lecture Hrs:10

SITE INVESTIGATION: Stages Of Site Investigation, Site Reconnaissance & Ground Investigation-Field Tests & Laboratory Tests.
FOUNDATION SYSTEMS: Foundation Systems.Material Handling And Mechanization: Material Handling Considerations, Earthmoving Equipment's, Horizontal And Vertical Movements, Selection & Utility Of Cranes (Tower Cranes & Climbing Cranes).

UNIT - III	Lecture Hrs:10

WIND EFFECTS ON BEHAVIOUR OF TALL STRUCTURES: Outlook Of Design Considerations And Characteristics Of Wind, Codal Wind Loads And Cladding Pressures On Behavior Of Tall Buildings.

UNIT - IV	Lecture Hrs:9

SEISMIC EFFECTS ON BEHAVIOUR OF TALL STRUCTURES: Introduction To Tall Building Behavior During Earthquakes And Seismic Design Philosophy – Building Behaviour – Seismic Design Concept – Dynamic Response Concept – Dynamic Analysis Theory – Design Techniques.

UNIT - V	Lecture Hrs:9

STRUCTURAL FORMS & FLOORING SYSTEMS: Introduction Of Various Structural Forms And Their Importance To High Rise Architecture, Introduction To Various Flooring Systems In Concrete & Steel.
MODELING FOR ANALYSIS: Approaches For Analysis, Assumptions Involved In Modelling, Reduction Techniques, Application Using Structural Engineering Software.

Textbooks:

1. Concrete And Composite Design Of Tall Buildings. By Taranath, B, Steel, 2nd Edition, Mcgraw Hill, 1998.
2. Building Structural Design Handbook .By White And Salmon, John Wiley & Sons.

3. Tall Buildings Structures Analysis And Design By Bryan S,Smith And Alex Coull, Wiley India Pvt Ltd.

Reference Books:

1. The Design Of Building Structures. By Wolfgang Schueller, , Prentice Hall India,
2. Reinforced Concrete Design Of Tall Buildings By S.Taranath.B, CRC Press.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	MAINTENANCE AND REHABILITATION OF	L	T	P	C
21D21204b	ENGINEERING STRUCTURES (PE-IV)	3	0	0	3
	Semester	II			

Course Objectives: This Course Will Enable Students:

- To judge the rate of corrosion in various exposure conditions
- To conduct non destructive testing of structural elements
- To select a suitable bonding technique
- To judge the effect of fire and earthquake loads on discontinuities

Course Outcomes (CO): Student will be able to

- Estimate the causes for distress and deterioration of structures
- Apply the NDT for condition assessment of structures ,identify damages in RC structures
- Select repair material and retrofitting strategy suitable for distress
- Formulate guidelines for repair management of deteriorated structures
- Strengthening of earthquake and fire damaged elements using various techniques.

UNIT - I	Lecture Hrs:10

Influence On Serviceability And Durability:- General : Quality Assurance For Concrete Construction, As Built Concrete Properties, Strength, Permeability, Volume Changes, Thermal Properties, Cracking. Effects Due To Climate, Temperature, Chemicals, Wear And Erosion, Design And Construction Errors, Corrosion Mechanism, Effects Of Cover Thickness And Cracking Methods Of Corrosion Protection, Inhibitors, Resistant Steels, Coatings Cathodic Protection.

UNIT - II	Lecture Hrs:10

Maintenance And Repair Strategies :- Inspection, Structural Appraisal, Economic Appraisal, Components Of Equality Assurance, Conceptual Bases For Quality Assurance Schemes.

UNIT - III	Lecture Hrs:10

Materials For Repair :- Special Concretes And Mortar, Concrete Chemicals, Special Elements For Accelerated Strength Gain, Expansive Cement, Polymer Concrete, Sulphur Infiltrated Concrete, Ferro Cement, Fibre Reinforced Concrete.

UNIT - IV	Lecture Hrs:9

Techniques For Repair :- Rust Eliminators And Polymers Coating For Rebars During Repair, Foamed Concrete, Mortar And Dry Pack, Vacuum Concrete, Gunite And Shotcrete Epoxy Injection, Mortar Repair For Cracks, Shoring And Underpinning.

UNIT - V	Lecture Hrs:9

Case Studies :- Repairs To Overcome Low Member Strength, Deflection, Cracking, Chemical Disruption, Weathering, Wear, Fire, Leakage, Marine Exposure.

Textbooks:

1. Concrete Structures, Materials, Maintenance And Repair, Dension Campbell, Allen And Harold Roper, Longman Scientific And Technical, U.K. 1991.
2. Repair Of Concrete Structures, RT.Allen And S.C. Edwards, Blakie And Sons, UK, 1987.
3. Concrete Technology – Theory And Practice, MS. Shetty, S.Chand And Company, New Delhi, 1992.

Reference Books:

1. Training Course Notes On Damage Assessment And Repair In Low Cost Housing RHDC-NBO, Santhakumar, A.R. Anna University, Madras, July, 1992.
2. Learning From Failures – Deficiencies In Design, Construction And Service – R&D Centre (SDCPL), Raikar, R.N, Raikar Bhavan, Bombay, 1987.
3. Estate Management, N.Palaniappan, anna Institute Of Management, Madras Sep. 1992.
4. Structural Assessment, F.K.Garas, J.L.Clarke, GST Armer, Butterworths, UK Aporil 1987.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	DESIGN OF PRESTRESSED CONCRETE	L	T	P	C
21D35104b	(PE- IV)	3	0	0	3
	Semester	II			

Course Objectives: This Course Will Enable Students:

- Familiarize students with concept of pressurising and analysis of prestress
- Design and analysis of pretension and post tensioned concrete members
- Determination of deflections of prestressed members
- To calculate the losses of prestress, creep and shrinkage.

Course Outcomes (CO): Student will be able to

- To understand the basic concepts about prestressed concrete and analysis of prestress
- Estimate the effective losses in prestress
- Analyse the effect of prestressing force in the behaviour of beams in flexure
- To design shear, torsion and transmission length in prestressed concrete members
- Design of compression and tension members as per codes of practice

UNIT - I	Lecture Hrs:10

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	Lecture Hrs:10

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	Lecture Hrs:10

FLEXURE & DEFLECTIONS: 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. Introduction-Factors Influencing Deflections-Short Term And Long Term Deflections Of Un-cracked And Cracked Members.

UNIT - IV	Lecture Hrs:9

SHEAR, BOND, BEARING AND ANCHORAGE: Shear In PSC Beams –Principal Stresses – Conventional Elastic Design For Shear-Transfer Of Prestress In Pre-tensioned Members-Transmission Length –Bond Stresses-Bearing At Anchorage –Anchorage Zone Stresses In Post-Tensioned Members-Analysis And Design Of End Blocks By Guyon, Magnel And Approximate Methods –Anchorage Zone Reinforcements.

UNIT - V	Lecture Hrs:9

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.

Textbooks:

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.

Reference Books:

1. Design Of Prestressed Concrete Structures, T.Y.Lin, Asian Publishing House, Bombay, 1953.
2. Prestressed Concrete, Vol.I&II, Y.Guyon, Wiley And Sons, 1960.
3. Prestressed Concrete Design And Construction, F.Leohhardt, Wilhelm Ernst And Shon, Berlin, 1964.

4. Reinforced concrete designers hand bood, A view point publication, C.E.Reynolds and J.C. Steedman, 1989.
5. Prestressed Concrete, Edward P.Nawy, Prentice Hall –.
6. Prestressed Concrete – by Raj Gopal, Narsoa Pubilications.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	PROJECT MANAGEMENT SOFTWARE LABORATORY	L	T	P	C
21D21205		0	0	4	2
	Semester	II			

Course Objectives:

- Enrich the concepts of the construction techniques, equipment, project feasibility and project planning through site visits.
- Illustrate the work flow of construction activities and cash flow analysis
- Generate time and motion study, work measurement and prepare models for various construction techniques, equipment.
- Apply the process of tendering and bidding for a project and its valuation

Course Outcomes (CO):

- Understanding of MS-Project.
- Developing hands on Primavera.
- Prepare contract drawings and estimates for civil engineering works.
- Develop detailed item wise specification of the project.

List of Experiments:

- Quantity Takeoff, Preparation And Delivery Of The Bid Or Proposal Of An Engineering Construction Project.
- Design Of A Simple Equipment Information System For A Construction Project.
- Scheduling Of A Small Construction Project Using Primavera Scheduling Systems Including Reports And Tracking.
- Scheduling Of A Small Construction Project Using Tools Like MS Project Scheduling Systems Including Reports And Tracking.
- Simulation Models For Project Risk Analysis.
- Break Up Of Activities For Construction Of Residential Building
- Time Estimate For Activities And Expected Time Calculation
- Estimation For Apartment With Framed Structure

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	**CONSTRUCTION PROJECT STUDIO**	**L**	**T**	**P**	**C**
21D21206		**0**	**0**	**4**	**2**
	Semester	**II**			

Course Objectives:

- Prepare contract drawings and estimates for civil engineering works.
- Develop detailed item wise specification of the project.
- Identify and estimate resources for the items of the project and prepare detailed project schedule.
- Conduct a case study on overall project management of constructions using construction management tools.

Course Outcomes (CO):

- Prepare work break down plan and estimate resources required in a construction project.
- Prepare precedence diagram and network diagrams.
- Implement resource allocation and levelling using MSP.
- Build architectural plan and material take-off

List of Experiments:

1. Selection of real time project development of 2D and 3D model of Project using Auto CAD and AutodeskRevit Tool.
2. Development of Work breakdown structure, planning, scheduling and resource allocation using MSP andPrimavera P6 tool.
3. Estimation and Quantity Take off from Autodesk Revit tool.
4. Integrate of 3D model and project planning, scheduling of project in Navisworks tool.
5. Simulation of project model for 4D (time) and 5D (cost) in Navisworks tool.
6. Application of BIM approach to adopt 6D to 10D in the real time project through case studies.
7. Demonstration on IT tools used in construction projects

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	LOW COST HOUSING TECHNIQUES (PE- V)	L	T	P	C
21D21301a		3	0	0	3
Semester		III			

Course Objectives: This course will enable students:

- To possess comprehensive knowledge of planning, design, evaluation, construction and financing of housing projects.
- To focuses on cost effective construction materials and methods.
- To understand on the principles of sustainable housing policies and programmes.
- to adopt the suitable techniques in rural and disaster prone areas by using locally available materials.

Course Outcomes (CO): Student will be able to

- Development of construction technology and innovative techniques as tools to address demand mass construction
- Knowledge of eco friendly material with their application
- Learn the use of locally available material according to their availability and maintenance

UNIT - I		Lecture Hrs:10

Housing Scenario
Introduction - Status of Urban Housing - Status of Rural Housing
Housing Finance:
Introducing - Existing Finance System in India - Government Role As Facilitator - Status At Rural Housing Finance - Impedimently in Housing Finance and Related Issues
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
Housing The Urban Poor
Introduction - Living Conditions in Slums - Approaches and Strategies for Housing Urban Poor

UNIT - II		Lecture Hrs:10

Development and Adoption of Low Cost Housing Technology
Introduction - Adoption of Innovative Cost Effective Construction Techniques - Adoption of Precast Elements in Partial Prefatroices - Adopting of Total Prefactcation of Mass Housing in India- General Remarks on Pre Cast Rooting/Flooring Systems -Economical Wall System - Single Brick Thick Loading Bearing Wall - 19cm Thick Load Bearing Masonery Walls - Half Brick Thick Load Bearing Wall - Flyash Grypsym Thick for Masonry - Stone Block Masonery - Adoption of Precast R.C. Plank and Join System for Roof/Floor in The Building

UNIT - III		Lecture Hrs:10

Alternative Building Materials for Low Cost Housing
Introduction - Substitute for Scarce Materials – Ferrocement - Gypsum Boards - Timber Substitutions - Industrial Wastes - Agricultural Wastes - Fitire Starateru; for ,P,Topm of Alternative Building Maintenance
Low Cost Infrastructure Services:
Introduce - Present Status - Technological Options - Low Cost Sanitation - Domestic Wall - Water Supply, Energy

UNIT - IV		Lecture Hrs:9

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Rural Housing: Introduction Traditional Practice of Rural Housing Continuous - Mud Housing Technology Mud Roofs - Characteristics of Mud - Fire Treatment for Thatch Roof - Soil Stabilization - Rural Housing Programs		
UNIT - V		Lecture Hrs:9
Housing in Disaster Prone Areas: Introduction – Earthquake - Damages To Houses - Traditional Prone Areas - Type of Damages and Railways of Non-Engineered Buildings - Repair and Restore Action of Earthquake Damaged Non-Engineered Buildings Recommendations for Future Constructions. Requirement's of Structural Safety of Thin Precast Roofing Units Against Earthquake Forces, Status of R&D in Earthquake Strengthening Measures - Floods, Cyclone, Future Safety		
Textbooks:		
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. Modern Trends in Housing in Developing Countries – A.G. Madhava Rao, D.S. Ramachandra Murthy & G.Annamalai.		
Reference Books:		
1. Properties of Concrete – Neville A.M. Pitman Publishing Limited, London. 2. Light Weight Concrete, Academic Kiado, Rudhai.G – Publishing Home of Hungarian Academy of Sciences 1963. 3. Low Cost Housing – G.C. Mathur.		

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	BUILDING SERVICES (PE - V)	L	T	P	C
21D21301b		3	0	0	3
	Semester	III			

Course Objectives: This Course Will Enable Students:

- Understand functional planning aspects in buildings.
- Understanding of water requirement and distribution aspects in buildings
- Conceptualization of solid waste disposal, fire fighting and codal practices of electrical fixtures in building.
- Preparation of layout plan for water distributions and drainages.

Course Outcomes (CO): Student will be able to

- Design residential buildings from the point of view of grouping and circulation, lighting and ventilation and fire protection.
- Design vertical transportation in buildings.
- Analyse and design prefabrication systems in buildings.
- Plan and design building services

UNIT - I — Lecture Hrs:10

GENERAL BUILDING ORIENTATION AND PLANNING REQUIREMENTS: Selection Of Site, Orientation Of Building, Design Of Residential Buildings With Particular Reference To Grouping And Circulation. Open Spaces In And Around Buildings For Lighting And Ventilation, Minimum Sizes And Height Of Roofs, Rat And Termite Proofing Of Buildings, Lightning Protection Of Buildings. Factors Affecting Selection Of Services/Systems, Provision Of Space In The Building To Accommodate Building Services, Structural Integrity Of Building Services Equipment.Sound And Vibration Attenuation Features, Provisions For Safe Operation And Maintenance,

UNIT - II — Lecture Hrs:10

WATER SUPPLY & SEWAGE SYSTEM: Water Quality, Purification And Treatment- Water Supply Systems-Distribution Systems In Small Towns -Types Of Pipes Used- Laying Jointing, Testing-Testing For Water Tightness Plumbing System For Building-Internal Supply In Buildings-Municipal Bye Laws And Regulations - Rain Water Harvesting - Sanitation In Buildings- -Pipe Systems- Storm Water Drainage From Buildings -Septic And Sewage Treatment Plant - Collection, Conveyance And Disposal Of Town Refuse Systems.

VENTILATION: Ventilation And Its Importance-Natural And Artificial Systems-Window Type And Packaged Air-Conditioners-Chilled Water Plant -Fan Coil Systems-Water Piping -Cooling Load –Air Conditioning Systems For Different Types Of Buildings -Protection Against Fire To Be Caused By A.C. Systems.

UNIT - III — Lecture Hrs:10

ELECTRICAL SYSTEM: Types Of Wires , Wiring Systems And Their Choice -Planning Electrical Wiring For Building -Main And Distribution Boards -Transformers And Switch Gears - Modern Theory Of Light And Colour -Synthesis Of Light -Luminous Flux -Candela- Lighting Design-Design For Modern Lighting. Electrical Appliances And Electrical Service Bye-Laws Pertaining To Electrical Installations. Different Types Of Artificial Lighting Systems, Lighting Systems For Residential Buildings, Public Buildings, Hotels, Cinemas, Hospital Exhibition, Halls, Libraries, Schools, College, Scientific Laboratories Etc.

UNIT - IV — Lecture Hrs:9

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

SAFETY AGAINST FIRE IN BUILDINGS: Safety-Ability Of Systems To Protect Fire-Preventive Systems-Fire Escape System Design-Planning For Pollution Free Construction Environmental-Hazard Free Construction Execution Safety Regulations-NBC-Planning Considerations In Buildings Like Noncombustible Materials, Construction, Staircases And A.C. Systems-Heat And Smoke Detectors-Dry And Wet Risers-Automatic Sprinklers - Capacity Determination Of OHT And UGT For Firefighting Needs. Fire Training Equipment Different Methods Of Fire Fighting Fire Protection.

UNIT - V		Lecture Hrs:9

ACOUSTICS : Basic Problems Criteria And Terminology, Transmission Of Sources In Rooms, Speech Privacy Between Offices, Co-Efficient Of Source Absorption, Noise Reduction Co-Efficient, Classification Selection Of Accoustical Materials, Design And Installation Of Accoustical Treatment For Of Auditorium, Schools Religtion Buildings.

LIFTS AND ESCALATORS: Classification Types Of Lifts, Lift Codes And Rules. Traffic Analysis And Selection Of Lifts, Quantity Of Service, Quality Service, Car Speed. Provision Form Fire Safety Angle Arrangements Of Lifts, Details Of Information To Be Given To Manufacturers, Escalators, Types And Their Installation.

Textbooks:

1. Building Services & Equipment , Fred Hall, Longman Scientific and Technical.
2. Building Services, Technology and Design, Roger Greeno, Longman Scientific and Technical.
3. Maintenance of Buildings by A.C. Panchadari, New Age International (P) limited Publishers

Reference Books:

1. Building Maintenance Management, Chanter, Wiley India
2. Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.
3. Fire safety in Buildings by Jain, New age Pubilishers.
4. Building Construction, Arora and Bindra, Dhanpat Rai, 2012.
5. National Building Code of India, Bureau of Indian Standards, 2005.
6. Electrical & Mechanical Services In High Rise Buildings Design & Estimation Manual by AK Mittal, CBS Pubilishers.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	EARTH QUAKE RESISTANT DESIGN OF STRUCTURES (PE-V)	L	T	P	C
21D21301c		3	0	0	3
	Semester	III			

Course Objectives: This Course Will Enable Students:

- To understant effects of earthquakes on engineering structures and its measurement
- to apply dynamics loadson various structures
- to design buildings for earthquake loads as per IS Codes
- to understand and implement the concept of ductility in Earthquake Resistant Design

Course Outcomes (CO): Student will be able to

- Illustrate the measurement of earthquakes and their effect on engineering structures
- Analyse the free and forced vibration response of single degree and multi degree of freedom and continuous systems
- Apply the basic principles of conceptual design of Earthquake Resistant buildings
- Learn the various seismic control methods

UNIT - I Lecture Hrs:10

Engineering Seismology :
Earthquake – Causes Of Earthquake – Earthquakes And Seismic Waves – Scale And Intensity Of Earthquakes – Seismic Activity – Measurements Of Earth Quakes – Seismometer- Strong Motion Accelerograph / Field Observation Of Ground Motion – Analysis Of Earthquakes Waves – Earth Quake Motion – Amplification Of Characteristics Of Surface Layers – Earthquake Motion On The Ground Surface;

UNIT - II Lecture Hrs:10

Vibration Of Structures Under Ground Motion:
Elastic Vibration Of Simple Structures – Modelling Of Structures And Equations Of Motion – Free vibrations Of Simple Structures – Steady State Forced Vibrations – Non Steady State Forced Vibrations – Response Spectrum Representations; Relation Between The Nature Of The Ground Motion And Structural Damage.

UNIT - III Lecture Hrs:10

Design Approaches: Methods Of Analysis – Selection Of Analysis – Equivalent Lateral Force Procedure Seismic Base Shear – Seismic Design Co-Efficient - Vertical Distribution Of Seismic Forces And Horizontal Shear – Twisting Moment - Over Turning Moment – Vertical Seismic Load And Orthogonal Effects Lateral Deflection – P- Δ Characteristics Effect – Soil Structure Interaction. Seismic – Graphs Study, Earthquake Records For Design – Factors Affecting Accelerogram Characteristics - Artificial Accelerogram – Zoning Map. Dynamic – Analysis Procedure: Model Analysis – Inelastic – Time History Analysis Evaluation Of The Results

UNIT - IV Lecture Hrs:9

Earthquake – Resistant Design Of Structural Components And Systems:
Introduction – Monolithic Reinforced – Concrete Structures – Precast Concrete Structures – Prestressed Concrete Structures – Steel Structures – Composite – Structures, Masonry Structures – Timber Structures.

UNIT - V Lecture Hrs:9

Fundamentals Of Seismic Planning: Selection Of Materials And Types Of Construction Form Of Superstructure – Framing Systems And Seismic Units – Devices For Reducing. Earthquake Loads,

Textbooks:

1. Design Of Earthquake Resistant Structures By Minoru Wakabayashi.
2. Strucutural Dynamics For Earthquake EngineeringA.K.Chopra, Pearson Pubilications.
3. Earthquake Resistant Design By Pankaj Agarwal.

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Reference Books:

1. Dynamics Of Structures,R.W.Clough Mc Graw – Hill, 2nd Edition,1992.
2. Fundamentals Of Earthquake Engineering,N.M Newmark And E.Rosenblueth, Prentice Hall,1971.
3. Earthquake Design Practice For Buildings. David Key, Thomas Telford,London,1988
4. Earthquake Engg, R.L. Wegel, Prentice Hall 12nd Edition 1989.
5. Design Of Multi –Storied Buildings For Earthquake Ground Motions', J.A. Blume, N.M. Newmark, L.H. Corning., Portland Cement Association, Chicago,1961
6. I.S.Codes No. 1893,4326,13920.

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AUDIT COURSE-I

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	ENGLISH FOR RESEARCH PAPER WRITING	L	T	P	C
21DAC101a		2	0	0	0
	Semester	I			

Course Objectives: This course will enable students:

- Understand the essentials of writing skills and their level of readability
- Learn about what to write in each section
- Ensure qualitative presentation with linguistic accuracy

Course Outcomes (CO): Student will be able to

- Understand the significance of writing skills and the level of readability
- Analyze and write title, abstract, different sections in research paper
- Develop the skills needed while writing a research paper

UNIT - I	Lecture Hrs:10

1Overview of a Research Paper- Planning and Preparation- Word Order- Useful Phrases - Breaking up Long Sentences-Structuring Paragraphs and Sentences-Being Concise and Removing Redundancy -Avoiding Ambiguity

UNIT - II	Lecture Hrs:10

Essential Components of a Research Paper- Abstracts- Building Hypothesis-Research Problem - Highlight Findings- Hedging and Criticizing, Paraphrasing and Plagiarism, Cauterization

UNIT - III	Lecture Hrs:10

Introducing Review of the Literature – Methodology - Analysis of the Data-Findings - Discussion-Conclusions-Recommendations.

UNIT - IV	Lecture Hrs:9

Key skills needed for writing a Title, Abstract, and Introduction

UNIT - V	Lecture Hrs:9

Appropriate language to formulate Methodology, incorporate Results, put forth Arguments and draw Conclusions

Suggested Reading

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books) Model Curriculum of Engineering & Technology PG Courses [Volume-I]
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

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COURSE STRUCTURE & SYLLABI

Course Code	DISASTER MANAGEMENT	L	T	P	C
21DAC101b		2	0	0	0
	Semester	I			

Course Objectives: This course will enable students:

- Learn to demonstrate critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Critically evaluate disaster risk reduction and humanitarian response policy and practice from Multiple perspectives.
- Developanunderstandingofstandardsofhumanitarianresponseandpracticalrelevanceinspecific types of disasters and conflict situations
- Criticallyunderstandthestrengthsandweaknessesofdisastermanagementapproaches,planningand programming in different countries, particularly their home country or the countries they work in

UNIT - I

Introduction:
Disaster:Definition,FactorsandSignificance;DifferenceBetweenHazardandDisaster;Naturaland Manmade Disasters: Difference, Nature, Types and Magnitude.

Disaster Prone Areas in India:
Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post- Disaster Diseases and Epidemics

UNIT - II

Repercussions of Disasters and Hazards:
Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes,Volcanisms,Cyclones,Tsunamis,Floods,DroughtsandFamines,Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

UNIT - III

Disaster Preparedness and Management:
Preparedness: Monitoring of Phenomena Triggering ADisasteror Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.

UNIT - IV

Risk Assessment Disaster Risk:
Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. TechniquesofRiskAssessment,GlobalCo-OperationinRiskAssessmentand Warning, People's Participation in Risk Assessment. Strategies for Survival.

UNIT - V

Disaster Mitigation:
Meaning,ConceptandStrategiesofDisasterMitigation,EmergingTrendsInMitigation.Structural Mitigationand Non-Structural Mitigation, Programs of Disaster Mitigation in India.

Suggested Reading

1. R.Nishith,SinghAK,"DisasterManagementinIndia:Perspectives,issuesandstrategies
2. "'New Royal book Company..Sahni,PardeepEt.Al.(Eds.),"DisasterMitigationExperiencesAndReflections",PrenticeHa

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ll OfIndia, New Delhi.
3. GoelS.L.,DisasterAdministrationAndManagementTextAndCaseStudies",Deep&Deep Publication Pvt. Ltd., New Delhi

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COURSE STRUCTURE & SYLLABI

Course Code	SANSKRITFOR TECHNICAL KNOWLEDGE	L	T	P	C
21DAC101c		2	0	0	0
	Semester	**I**			

Course Objectives: This course will enable students:

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- LearningofSanskrittodevelopthelogicinmathematics,science&othersubjects enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge
- Knowledge from ancientliterature

Course Outcomes (CO): Student will be able to

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science &technology can be understood
- Being a logical language will help to develop logic in students

UNIT - I

Alphabets in Sanskrit,

UNIT - II

Past/Present/Future Tense, Simple Sentences

UNIT - III

Order, Introduction of roots

UNIT - IV

Technical information about Sanskrit Literature

UNIT - V

Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics

Suggested Reading

1.“Abhyaspustakam” –Dr.Vishwas, Sanskrit-Bharti Publication, New Delhi
2.“Teach Yourself Sanskrit” Prathama Deeksha- VempatiKutumbshastri, RashtriyaSanskrit Sansthanam, New Delhi Publication
3.“India’s Glorious ScientificTradition” Suresh Soni, Ocean books (P) Ltd.,New Delhi

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

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AUDIT COURSE-II

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT
COURSE STRUCTURE & SYLLABI

Course Code	PEDAGOGY STUDIES	L	T	P	C
21DAC201a		2	0	0	0
	Semester	**II**			

Course Objectives: This course will enable students:

- Reviewexistingevidenceonthereviewtopictoinformprogrammedesignandpolicy making undertaken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Course Outcomes (CO): Student will be able to

Students will be able to understand:

- Whatpedagogicalpracticesarebeingusedbyteachersinformalandinformalclassrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- Howcanteachereducation(curriculumandpracticum)andtheschoolcurriculumand guidance materials best support effective pedagogy?

UNIT - I

Introduction and Methodology: Aims and rationale, Policy back ground, Conceptual frame work and terminology Theories oflearning,Curriculum,Teachereducation.Conceptualframework,Research questions**.** Overview of methodology and Searching.

UNIT - II

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

UNIT - III

Evidence on theeffectivenessofpedagogicalpractices,Methodologyfortheindepthstage:quality assessmen t of included studies. How can teacher education (curriculumandpracticum) andthescho curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of th body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

UNIT - IV

Professional development: alignment with classroom practices and follow-up support, Peer support, Support from the head teacherandthecommunity.Curriculumandassessment,Barrierstolearning:limitedresourcesand large class sizes

UNIT - V

Researchgapsandfuturedirections: Researchdesign**,**Contexts**,**Pedagogy**,**Teachereducation**,** Curriculum and assessment**,** Dissemination and research impact.

Suggested Reading

1. AckersJ,HardmanF(2001)ClassroominteractioninKenyanprimaryschools,Compare, 31 (2): 245-261.
2. AgrawalM(2004)Curricularreforminschools:Theimportanceofevaluation,Journalof
3. Curriculum Studies, 36 (3): 361-379.
4. AkyeampongK(2003) Teacher training in Ghana - does it count? Multi-site teachereducation

research project (MUSTER) country report 1. London: DFID.
5. Akyeampong K, LussierK, PryorJ, Westbrook J (2013)Improving teaching and learning of basic maths and reading in Africa: Does teacherpreparation count?International Journal Educational Development, 33 (3): 272–282.
6. Alexander RJ(2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
Chavan M (2003)ReadIndia: A mass scale, rapid, 'learning to read'campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

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COURSE STRUCTURE & SYLLABI

Course Code		L	T	P	C
21DAC201b	**STRESSMANAGEMENT BY YOGA**	2	0	0	0
	Semester	**II**			

Course Objectives: This course will enable students:

- To achieve overall health of body and mind
- To overcome stres

Course Outcomes (CO): Student will be able to

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency

UNIT - I		
Definitions of Eight parts of yog.(Ashtanga)		
UNIT - II		
Yam and Niyam.		
UNIT - III		
Do`sand Don't'sin life. i) Ahinsa,satya,astheya,bramhacharyaand aparigrahaii) Shaucha,santosh,tapa,swadhyay,ishwarpranidhan		
UNIT - IV		
Asan and Pranayam		
UNIT - V		
i)Variousyogposesand theirbenefitsformind &body ii)Regularizationofbreathingtechniques and its effects-Types ofpranayam		

Suggested Reading

1.'Yogic Asanas forGroupTarining-Part-I": Janardan SwamiYogabhyasiMandal, Nagpur
2."Rajayogaor conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	PERSONALITY DEVELOPMENT THROUGHLIFE ENLIGHTENMENTSKILLS	L	T	P	C
21DAC201c		2	0	0	0
	Semester	**II**			

Course Objectives: This course will enable students:

- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students

Course Outcomes (CO): Student will be able to

- StudyofShrimad-Bhagwad-Geetawillhelpthestudentindevelopinghispersonalityand achieve the highest goal in life
- The person who has studied Geetawilllead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students

UNIT - I

Neetisatakam- Holistic development of personality
Verses-19,20,21,22(wisdom)
Verses-29,31,32(pride &heroism)
Verses-26,28,63,65(virtue)

UNIT - II

Neetisatakam- Holistic development of personality
Verses-52,53,59(dont's)
Verses-71,73,75,78(do's)

UNIT - III

Approach to day to day work and duties.
ShrimadBhagwadGeeta:Chapter2-Verses41,47,48,
Chapter3-Verses13,21,27,35,Chapter6-Verses5,13,17,23,35,
Chapter18-Verses45,46,48.

UNIT - IV

Statements of basic knowledge.
ShrimadBhagwadGeeta:Chapter2-Verses 56,62,68
Chapter12 -Verses13,14,15,16,17,18
Personality of Rolemodel. Shrimad Bhagwad Geeta:

UNIT - V

Chapter2-Verses 17,Chapter3-Verses36,37,42,
Chapter4-Verses18,38,39
Chapter18– Verses37,38,63

Suggested Reading

1."SrimadBhagavadGita"bySwamiSwarupanandaAdvaitaAshram(PublicationDepartment), Kolkata
2.Bhartrihari'sThree Satakam (Niti-sringar-vairagya) by P.Gopinath, RashtriyaSanskrit Sansthanam, New Delhi.

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OPEN ELECTIVE

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COURSE STRUCTURE & SYLLABI

Course Code	COST MANAGEMENT OF ENGINEERING PROJECTS	L	T	P	C
21DOE301a		3	0	0	3
	Semester	I			

Course Objectives:

- To explain cost concepts and objectives of costing system and cost management process
- To provide knowledge and explain Cost behaviour in relation to Volume and Profit and pricing decisions.
- To know the concepts of target costing, life cycle costing and activity based cost management in a project or business.
- To discuss on budget and budgetary control , type of budgets in a business to control costs
- To provide knowledge on project, types of projects, stages of project execution, types of project contracts and project cost control.

Course Outcomes (CO): Student will be able to

- Know the cost management process and types of costs
- Learn and apply different costing methods under different project contracts
- To understand relationship of Cost-Volume and Profit and pricing decisions.
- Prepare budgets and measurement of divisional performance.
- Acquires knowledge on various types of project contracts, stages to execute projects and controlling project cost..

UNIT - I		Lecture Hrs:10

Introduction and Overview of the Strategic Cost Management Process - Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

UNIT - II		Lecture Hrs:12

Cost Behavior and Profit Planning: Marginal Costing- Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems; Pareto Analysis Just-in-time approach, Theory of constraints.; Divisional performance management: - Measurement of Divisional profitability - pricing decisions - transfer pricing.

UNIT - III		Lecture Hrs:10

Target costing- Life Cycle Costing - Activity-Based Cost management:- Activity based costing- Value-Chain Analysis- Bench Marking; Balanced Score Card.

UNIT - IV		Lecture Hrs:10

Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing.

UNIT - V		Lecture Hrs:12

Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non-technical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process.

Textbooks:

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1. Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting
2. Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher

Reference Books:

1. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
2. Charles T. Horngren and George Foster, Advanced Management Accounting
3. N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd

Online Learning Resources:

https://nptel.ac.in/courses/105/104/105104161/
https://nptel.ac.in/courses/112/102/112102106/

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M.TECH. IN CONSTRUCTION PLANNING AND MANAGEMENT

COURSE STRUCTURE & SYLLABI

Course Code	**INDUSTRIAL SAFETY**	**L**	**T**	**P**	**C**
21DOE301b		**3**	**0**	**0**	**3**
	Semester	**III**			

Course Objectives:

- To know about Industrial safety programs and toxicology, Industrial laws , regulations and source models
- To understand about fire and explosion, preventive methods, relief and its sizing methods
- To analyse industrial hazards and its risk assessment.

Course Outcomes (CO): Student will be able to

- To list out important legislations related to health, Safety and Environment.
- To list out requirements mentioned in factories act for the prevention of accidents.
- To understand the health and welfare provisions given in factories act.

UNIT - I — Lecture Hrs:

Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

UNIT - II — Lecture Hrs:

Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

UNIT - III — Lecture Hrs:

Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working andapplications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

UNIT - IV — Lecture Hrs:

Fault tracing: Fault tracing-concept and importance, decision treeconcept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.

UNIT - V — Lecture Hrs:

Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance

Textbooks:

1. Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.
2. Maintenance Engineering, H. P. Garg, S. Chand and Company.

Reference Books:

1.Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication.
2. Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.

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COURSE STRUCTURE & SYLLABI

Course Code	BUSINESS ANALYTICS	L	T	P	C
21DOE301c		3	0	0	3
	Semester	III			

Course Objectives:

- The main objective of this course is to give the student a comprehensive understanding of business analytics methods.

Course Outcomes (CO): Student will be able to

- Students will demonstrate knowledge of data analytics.
- Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.
- Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.
- Students will demonstrate the ability to translate data into clear, actionable insights.

UNIT - I — Lecture Hrs:

Business Analysis: Overview of Business Analysis, Overview of Requirements, Role of the Business Analyst. Stakeholders: the project team, management, and the front line, Handling Stakeholder Conflicts.

UNIT - II — Lecture Hrs:

Life Cycles: Systems Development Life Cycles, Project Life Cycles, Product Life Cycles, Requirement Life Cycles.

UNIT - III — Lecture Hrs:

Forming Requirements: Overview of Requirements, Attributes of Good Requirements, Types of Requirements, Requirement Sources, Gathering Requirements from Stakeholders, Common Requirements Documents. Transforming Requirements: Stakeholder Needs Analysis, Decomposition Analysis, Additive/Subtractive Analysis, Gap Analysis, Notations (UML & BPMN), Flowcharts, Swim Lane Flowcharts, Entity-Relationship Diagrams, State-Transition Diagrams, Data Flow Diagrams, Use Case Modeling, Business Process Modeling

UNIT - IV — Lecture Hrs:

Finalizing Requirements: Presenting Requirements, Socializing Requirements and Gaining Acceptance, Prioritizing Requirements. Managing Requirements Assets: Change Control, Requirements Tools

UNIT - V — Lecture Hrs:

Recent Trands in: Embedded and colleborative business intelligence, Visual data recovery, Data Storytelling and Data Journalism.

Textbooks:

1. Business Analysis by James Cadle et al.
2. Project Management: The Managerial Process by Erik Larson and, Clifford Gray

Reference Books:

1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FT Press.
2. Business Analytics by James Evans, persons Education.