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Proposed Course Structure for M.Tech (Construction Engineering & Management)

SEMESTER I								
Sl. No.	**Course Type**	**Course Code**	**Title of the Course**	**L**	**T**	**P**	**Contact Hours/Week**	**Credits**
1	Theory	SMA61105	Probability Theory and Statistical Techniques	3	0	0	3	3
2	Theory	ECE61123	Management Principles and Risk Analysis	3	0	0	3	3
3	Theory	ECE61125	Construction Planning, Scheduling and Control	3	0	0	3	3
4	Theory	ECE61127 ECE61129 ECE61131	**Elective I** Modern Construction Materials, Construction Equipment and Management Project Formulation and Appraisal	3	0	0	3	3
5	Theory	ECE61133	Construction Project Management	3	0	0	3	3
6	Practical	ECE61209	Construction Materials Laboratory	0	0	3	3	2
7	Sessional	ECE61305	Seminar I	0		2	2	1
8	Sessional	ECE61307	Assignment I	0	0	0	0	2
			Total	**15**	**0**	**5**	**20**	**20**
SEMESTER II								
Sl. No.	**Course Type**	**Course Code**	**Title of the Course**	**L**	**T**	**P**	**Contact Hours/Week**	**Credits**
1	Theory	ECE61134	Construction Personnel Management	3	0	0	3	3
2	Theory	ECE61136	Quality Control and Assurance in Construction	3	0	0	3	3
	Theory	ECE61138	Project Safety Management	3	0	0	3	3
3	Theory	ECE61140 ECE61142 ECE61144	**Elective II** Contract Laws and Regulations Advanced Construction Techniques Functional Planning and Building Management	3	0	0	3	3
4	Theory	ECE61146 ECE61148 ECE61150	**Elective III** Resource Management and Control in Construction Maintenance and Rehabilitation of Structures Building Information Management	3	0	0	3	3
5	Practical	ECE61206	Computational Laboratory for Construction Management	0	0	3	3	2
6	Sessional	ECE61308	Assignment II	0	0	0	0	2
			Total	**15**	**0**	**3**	**18**	**19**

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SEMESTER III								
Sl. No.	**Course Type**	**Course Code**	**Title of the Course**	**L**	**T**	**P**	**Contact Hours/ Week**	**Credits**
1	Sessional	ECE62301	Industrial Training & Technical Presentation*	0	0	0	4	4
2	Thesis	ECE62405	Pre-Dissertation	0	0	0	24	18
3	Viva	ECE62505	Pre-submission Defense of Dissertation	0	0	0	0	4
			Total	**0**	**0**	**0**	**28**	**26**

***Industrial Training will be for 30 days, taken at the end of 2nd semester and will be evaluated in the 3rd semester.**

SEMESTER IV								
Sl. No.	**Course Type**	**Course Code**	**Title of the Course**	**L**	**T**	**P**	**Contact Hours/ Week**	**Credits**
1	Thesis	ECE62406	Dissertation	0	0	0	24	18
2	Viva	ECE62508	Defense of Dissertation	0	0	0	0	6
3	Viva	ECE62510	Comprehensive Viva	0	0	0	0	4
			Total	**0**	**0**	**0**	**24**	**28**

TOTAL CREDITS = 93

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SEMESTER-I

SMA61105 PROBABILITY THEORY AND STATISTICAL TECHNIQUES 3 – 1 - 0

UNIT – I **9**

Random Variables: Discrete and Continuous random variables – Moments – Moment generating functions – Discrete distributions – Binomial distribution – Poisson distribution – Geometric distribution.

UNIT – II **9**

Continuous Distributions: Uniform distribution – Exponential distribution – Normal distribution. Correlation and Regression: Simple and linear correlation – Multiple and partial correlation - Rank correlation – Simple and Multiple regression.

UNIT- III **9**

Parameter Estimation: Point Estimation, Characteristics of estimators, Unbiasedness, Consistency, Efficiency, Sufficiency, Methods of point estimation, Method of moments, Method of Maximum likelihood, Curve fitting, Straight line fit, Parabolic fit, Exponential curve.

UNIT- IV **9**

Testing of Hypothesis: Definition, Population and Samples, Large Sample tests, Tests for Mean and Proportions, Test of significance for small samples – t- test – F- test– Chi-square test of goodness of fit, Independent of attributes

UNIT - V **9**

Design of Experiments: Basic Definitions, Analysis of variance, One-way classification, Completely Randomized Design, Two-way classification, Randomized Block Design, Latin Square Design.

Lecture: 45, Tutorial: 15, TOTAL: 60

REFERENCE BOOKS

1. Jay.L. Devore, “Probability and Statistics for Engineering and the Sciences”, Thomson and Duxbury, Singapore, 8th Edition, 2012.
2. Richard Johnson, Miller & Freund’s “Probability and Statistics for Engineers”, Prentice Hall of India, Seventh Edition, 2007.
3. Gupta S.C. and Kapoor V.K. “Fundamentals of Mathematical Statistics” Sultan Chand and Sons, 11th Edition 2002.
4. Dallas E.Johnsons, “Applied Multivariate Methods for Data Analysis”, Thomson and Duxbury press, 1998.

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ECE61123 MANAGEMENT PRINCIPLES AND RISK ANALYSIS 3 – 0 - 0

UNIT – I **9**

Introduction: Operations Research - Introduction to Operations Research - Linear Programming - Graphical and Simplex Methods.

UNIT – II **9**

Optimality Analysis: Duality and Post - Optimality Analysis - Transportation and Assignment Problems.

UNIT – III **9**

Production and Financial Management: Inventory Control - EOQ - Quantity Discounts - Safety Stock - Replacement Theory -PERT and CPM - Simulation Models - Quality Control.

UNIT – IV **9**

Working Capital Management: Compound Interest and Present Value methods -Discounted Cash Flow Techniques - Capital Budgeting.

UNIT – V **9**

Decision Theory and Managerial Economics: Decision Theory - Decision Rules - Decision making under conditions of certainty, risk and uncertainty - Decision trees - Utility Theory. Cost Concepts - Break-even analysis - Pricing Techniques - Game Theory Applications.

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Vohra, N.D. "Quantitative Techniques in Management", Tata McGraw-Hill Company Ltd, New Delhi, 1990
2. Sehroeder, R.G. "Operations Management", McGraw-Hill, New York, 1982.
3. Levin, R.I, Rubin, D.S. and Stinson, J. "Quantitative Approaches to Management", McGraw-Hill Book Co., New York, 1988.

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ECE61125 CONSTRUCTION PLANNING, SCHEDULING AND CONTROL 3 – 0 – 0

UNIT – I **9**

Construction Planning and Scheduling: 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.

UNIT – II **9**

Scheduling with Constraints: The Critical Path Method - Scheduling with Resource Constraints and Precedence - Use of Advanced Scheduling Techniques - Calculations for Monte Carlo Schedule Simulation - Crashing and Time/Cost Tradeoffs

UNIT – III **9**

Cost Control, Monitoring and Accounting: The Cost Control Problem - The Project Budget - Forecasting for Activity Cost Control - Financial Accounting Systems and Cost Accounts - Control of Project Cash Flows - Schedule Control - Schedule and Budget Updates - Relating Cost and Schedule Information.

UNIT – IV **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.

UNIT –V **9**

Database Model: Relational Model of Databases - Other Conceptual Models of Databases - Centralized Database Management Systems - Databases and Applications Programs - Information Transfer and Flow.

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Chitkara, K.K. “Construction Project Management: Planning, Scheduling and Control”, Tata McGraw-Hill Publishing Company, New Delhi, 1998.

2. Calin M. Popescu, Chotchai Charoenngam, “Project Planning, Scheduling and Control in Construction: An Encyclopedia of terms and Applications”, Wiley, New York, 1995.

3. Chris Hendrickson and Tung Au, “Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders”, Prentice Hall, Pittsburgh, 2000. (Cost Control, Monitoring & Accounting)

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ECE61127 MODERN CONSTRUCTION MATERIALS 3 – 0 – 0

UNIT – I **9**

Concrete and Metals: High Strength Concrete and High Performance Concrete – Applications- Properties of steel - New alloy steels - Aluminum and its products – applications.

UNIT – II **9**

Alloys: Other Alloys - Market forms - Uses - Lightweight metals - Copper and Zinc alloys

UNIT – III **9**

Composites: Plastics -Reinforced Polymers - Fiber Reinforced Plastics - Cellular cores - Types of Polymer concrete composites - Properties of composites - Ferro-cement

UNIT – IV **9**

Other Materials: Applications. Water proofing compounds - Non-weathering materials - Flooring and facade Materials - Accelerating mixtures - Air entraining admixtures - Mineral admixtures –Super - plasticizers - Applications. Bitumen: Bitumen chemistry – Traditional properties – Susceptibility parameters – ageing of bitumen.

UNIT – V **9**

Smart and Intelligent Materials: Brief outline and uses - Smart materials - Types of smart and intelligent materials - Usage in advanced construction - Smart structures - energy efficient building constructions.

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Somayaji, Shan. "Civil Engineering Materials". - 2nd edition, Prentice Hall Inc, 2001
2. Siddique, Rafat. "Special Concretes". Ist edition, Galgotia Publications, New Delhi 2000
3. Mamlouk, M.S. and Zaniewski, J.P. "Materials for Civil and Construction Engineers". Prentice Hall Inc., 1999. 4. Aitain."High Performance Concrete", ESPON Publications, Canada, 2003

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ECE61129 CONSTRUCTION EQUIPMENTS AND MANAGEMENT 3 – 0 – 0

UNIT – I **9**

Construction Equipment Management, Identification, Planning, Equipment Management in Projects, Maintenance Management, Replacement, Unit Operating Cost, Cost Control of Equipment, Depreciation Analysis, Safety Management

UNIT – II **9**

Construction Equipment, Fundamentals of Earth Work Operations, Earth Moving Operations Types of Earth Work Equipment, Tractors, Motor Graders, Scrapers, Front end Loaders, Earth Movers.

UNIT – III **9**

Equipment for Dredging, Trenching, Tunneling, Drilling, Blasting - Equipment for Compaction - Erection Equipment - Types of pumps used in Construction - Equipment for Dewatering and Grouting - Foundation and Pile Driving Equipment

UNIT – IV **9**

Equipment for Materials Handling - Forklifts and related equipment - Portable Material Bins - Conveyors - Hauling Equipment- Crushers - Feeders - Screening Equipment.

UNIT – V **9**

Concreting equipment - Batching and Mixing Plant layout - Equipment - Hauling, Pouring and Pumping Equipment – Transporters – RMC plant –equipment

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Sharma, S.C. "Construction Equipment and Management", Khanna Publishers, New Delhi, 2006.
2. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C. "Construction Planning, Equipment and Methods", 5th edition, McGraw-Hill, Singapore, 2006.
3. Deodhar, S.V. "Construction Equipment and Job Planning", Khanna Publishers, New Delhi, 1988.

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ECE61131 PROJECT FORMULATION AND APPRAISAL 3 – 0 – 0

UNIT – I **9**

Project Formulation and Costing: Generation and Screening of Project ideas - Project identification -Preliminary Analysis, Market, Technical, Financial, Economic and Ecological report.

UNIT – II **9**

Project Costing and report: Pre-Feasibility Report and its Clearance, Project Estimates and Techno Economic Feasibility Report, Detailed Project Report - Time Value of Money - Cost of Capital.

UNIT – III **9**

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 – IV **9**

Project Financing: Project Financing - Means of Finance - Financial Institutions - Special Schemes - Key Financial Indicators.

UNIT – V **9**

Private Sector Participation: Private sector participation in Infrastructure Development Projects – PPP Models- BOT, BOLT, BOOT - Technology Transfer and Foreign Collaboration - Case studies- Scope of Technology Transfer.

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Prasanna Chandra, “Projects: Planning Analysis Selection Implementation and Review", 4th edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 1995.
2. Joy, P.K. "Total Project Management - The Indian Context". New Delhi: Macmillan India Ltd, 1992.
3. United Nations Industrial Development Organization (UNIDO) "Manual for the preparation of Industrial Feasibility Studies". Bombay: IDBI Reproduction, 1987.

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ECE61133 CONSTRUCTION PROJECT MANAGEMENT 3 – 0 – 0

UNIT -I **9**

Organizing for Project Management, Project Management, Trends in Modern Management Strategic Planning and Project Programming, Organization of Project Participants, Traditional Designer, Contractor Sequence

UNIT-1I **9**

Professional Construction Operation, Leadership and Motivation, Interpersonal Behavior in Project Organizations - Perceptions of Owners and Contractors

UNIT–III **9**

Design and Construction Process, Design and Construction as an Integrated System, Innovation and Technological Feasibility, Innovation and Economic Feasibility, Design Methodology Functional Design

UNIT–IV **9**

Value Engineering, Construction Planning, Industrialized Construction and Pre-fabrication, Computer-Aided Engineering, Labour Productivity, Factors Affecting Job-Site Productivity

UNIT – V **9**

Cost Estimation, Costs associated with Constructed Facilities, Approaches to Cost Estimation Type of Construction Cost Estimates, Cost Indices, and Applications of Cost Indices to Estimating Estimate Based on Engineer's List of Quantities

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Chris Hendrickson and Tung Au, "Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders", Prentice Hall, Pittsburgh, 2000.

2. Chitkara, K.K. "Construction Project Management: Planning, Scheduling and Control",Tata McGraw-Hill Publishing Company, New Delhi, 1998.

3. Choudhury, S. "Project Management", Tata McGraw-Hill Publishing Company, New Delhi,1988.

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ECE61209 **CONSTRUCTION ENGINEERING LABORATORY** **0 – 0 – 3**

LIST OF EXPERIMENTS:

1. Determination of Specific Gravity of Cement and Mineral Admixtures using Le- Chatlier Flask.
2. Draw Stress Strain curve for Ductile and Brittle material in tension.
3. Draw Stress Strain curve for Ductile and Brittle material in compression.
4. Determination of Water Quality (Chloride, Sulphate, pH and Hardness Tests).
5. Determination of CBR Value.
6. Determination of Setting Time of Concrete using Penetration Test.
7. Determination of Workability of Concrete by Flow Table Test and Vee-Bee Consistometer Tests.
8. Determination of Flow Ability Tests of Self Compacting Concrete.
9. Determination of Modulus of Elasticity of Concrete using Deflectometer.
10. Mortar bar expansion test
11. Determination Flexural Strength of Concrete Beam using Two Point Loading Method.
12. Determination of Concrete Quality using Non-Destructive Tests using USPV and Rebound Hammer

TOTAL: 45 Periods

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SEMESTER-II

ECE61134 CONSTRUCTION PERSONNEL MANAGEMENT 3 – 0 – 0

UNIT -I **9**

Manpower Planning: Manpower Planning and Organisation - Manpower Planning, Organising, Staffing, directing, and controlling - Personnel Principles - Organisation - Span of Control - Organisation Charts

UNIT - II **9**

Organization: Staffing Plan - Development and Operation of human resources - Managerial Staffing -Recruitment - Selection -Placement, Training and Development

UNIT – III **9**

Human Relations and Organizational Behaviour: Introduction to the field of people management - basic individual psychology; motivation - Job design and performance management - Managing groups at work - self-managing work teams - intergroup behaviour and conflict in organisations – Leadership

UNIT – IV **9**

Welfare Measures: Compensation - Safety and health - GPF - EPF - Group Insurance - Housing - Pension -Laws related to welfare measures. Wages and Salary, Employee Benefits, employee appraisal and assessment - Employee services

UNIT – V **9**

Management and Development Methods: Safety and Health - Discipline and discharge - Special Human resource problems, Performance appraisal. - Employee hand book and personnel manual - Job descriptions and organization structure and human relations - Productivity of Human resources

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Carleton Counter and Jill Justice Coutler, "The Complete Standard Handbook of Construction Personnel Management": Prentice-Hall Inc, New Jersey, 1989

2. Memoria, C.B. "Personnel Management", Himalaya Publishing Co., Bombay, 1992

3. Pringle Charles. "Management". Longenecker Emerricle Publishing Company, 1981.

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ECE61136 QUALITY CONTROL AND ASSURANCE IN CONSTRUCTION 3 – 0 – 0

UNIT – I **9**

Construction Organization: Types of organization - Inspection - Quality Management Systems and method - Responsibilities and authorities in quality assurance and quality control - Quality circle

UNIT – II **9**

Quality Planning: Quality policy - Objectives and methods in Construction Industry - Consumers satisfaction, Ergonomics - Time of Completion - Statistical tolerance - Taguchi's concept of quality - Document - Contract and construction programming - Inspection procedures - Processes and products - Total QA / QC programme and cost implication

UNIT – III **9**

Quality Assurance: Objectives - Regularity agent, owner, design, contract and construction oriented objectives, methods - Techniques and needs of QA/QC - Different aspects of quality

UNIT – IV **9**

Factors of construction quality: Appraisals - Critical, major failure aspects and failure mode analysis, -Stability methods and tools, optimum design - Reliability testing, reliability coefficient and reliability prediction

UNIT – V **9**

Quality Control: Total Quality Control- Quality Control by statistical methods – Sampling by attributes and by variables - Selection of new materials - Influence of drawings, detailing, specification, standardization - Bid preparation - Construction activity, environmental safety, social and environmental factors - Natural causes and speed of construction - Life cycle costing -Value engineering and value analysis

TOTAL: 45 Periods

REFERENCE BOOKS:

1. O'Brian, James J. "Construction Inspection Handbook - Quality Assurance and Quality Control", Van Nostrand, New York, 1989

2. Tenah, Kwaku A. and Guevara, Jose M., "Fundamentals of Construction Management and Organization", Reston Publishing Co., Inc., Virginia, 1985

3. Oglesby, Clarkson H. "Productivity Improvement in Construction", McGraw-Hill, New Delhi, 1989

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ECE61138 CONTRACT LAWS AND REGULATIONS 3 – 0 – 0

UNIT – I **9**

Construction Contracts: Indian Contracts Act – Elements of Contracts – Types of Contracts – Features – Suitability – Design of Contract Documents – International Contract Document – Standard Contract Document – Law of Torts.

UNIT-II **9**

Tenders: Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Commercial Points of View – Contract Formation and Interpretation – Potential Contractual Problems – World Bank Procedures and Guidelines – Tamilnadu Transparency in Tenders Act.

UNIT – III **9**

Arbitration: Comparison of Actions and Laws – Agreements – Subject Matter – Violations – Arbitration Act - Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Costs -Legal Requirements for Planning – Property Law – Agency Law – Local Government Laws for Approval – Statutory Regulations.

UNIT –IV **9**

Legal Requirements: Insurance and Bonding – Laws Governing Sale, Purchase and Use of Urban and Rural Land – Land Revenue Codes – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties and their Influence on Construction Costs

UNIT-V

9

Labour Regulations: Social Security – Welfare Legislation – Laws relating to Wages, Bonus and Industrial Disputes, Labour Administration – Insurance and Safety Regulations – Workmen's Compensation Act – Indian Factory Act – Tamilnadu Factory Act – Child Labor Act - Other Labor Laws.

TOTAL: 45 Periods

REFERENCE BOOKS

1. Gajaria G.T., "Laws Relating to Building and Engineering Contracts in India", M.M.Tripathi Private Ltd., Bombay, 1982.

2. Tamilnadu PWD Code, 1986.

3. Jimmie Hinze, "Construction Contracts", Second Edition, McGraw-Hill, New York, 2001. Mamlouk, M.S. and Zaniewski, J.P.

4. Joseph T. Bockrath, "Contracts and the Legal Environment for Engineers and Architects", Sixth Edition, McGraw-Hill, New York, 2000.

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ECE61140 ADVANCED CONSTRUCTION TECHNIQUES 3 – 0 – 0

UNIT – I **9**

Sub Structure Construction: Trenchless techniques, box jacking, pipe jacking, Pipe line Laying, under water construction of diaphragm walls, tunneling techniques, piling techniques, driving well and caisson foundations, cable anchoring and grouting, sinking cofferdam, shoring for deep cutting, well points.

UNIT – II **9**

Super Structure Construction: Vacuum dewatering of concrete flooring, concrete paving technology, techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections, suspended form work, launching techniques for large span heavy decks, Prestressing in high rise structures – erection techniques for tall structures.

UNIT – III **9**

Repair Construction: Micro piling for strengthening floor and shallow profile, aerial transporting, handling, erecting lightweight components on tall structures, mud jacking grout through slab foundation , sub grade, water proofing.

UNIT – IV **9**

Construction of Special Structures: Erection of lattice towers and rigging of transmission line structures, construction sequence in cooling towers, silos, chimney, sky scrapers, bow string bridges, cable stayed bridges - construction sequence and methods in domes and prestress domes – erection of articulated structures.

UNIT – V **9**

Latest Techniques: Advanced construction techniques in offshore construction practice – construction sequence and methods in RCC domes and prestressed domes – sequence in demolition and dismantling.

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Robertwade Brown, “Practical Foundation Engineering Handbook”, McGraw-Hill, New York, 1995.
2. Jerry Irvine, “Advanced Construction Techniques”, CA Rocketr, 1984.
3. Patrick Powers. J., “Construction Dewatering: New Methods and Applications”, John Wiley & Sons, New York, 1992.

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ECE61142 FUNCTIONAL PLANNING AND BUILDING MANAGEMENT 3 – 0 – 0

UNIT – I **9**

Planning: Components of urban forms, planning of urban forms, Concepts- Neighborhood Module Street system, Layout in a Neighborhood-Functional planning of buildings Optimization of space, Spatial Synthesis graphical techniques, heuristic procedures - Formulation of linear and non-linear optimization problem

UNIT – II **9**

Fire Resistance: Standard fire, fire resistance - Classification of buildings - Means of escape, alarms, etc. Space requirements and relationships for typical buildings like residential, offices, hospitals, etc.,

UNIT – III **9**

Engineering Services: Engineering services in a building system- Lifts, escalators, cold and hot water systems - waste water systems - electrical systems.

UNIT – IV **9**

Lighting: Design of modern lighting, lighting for stores and house lighting, Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in buildings.

UNIT – V **9**

Maintenance Management: Building Maintenance, Scheduled and contingency maintenance planning. M.I.S for building maintenance, Maintenance standards, Economic maintenance decisions

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Moore F, "Environmental Control System", McGraw-Hill, New York, 1994.
2. Brown G Z, "Sun, Wind and Light: Architectural Design Strategies", John Wiley and Sons, New York, 1985
3. Cook J Award, "Winning Passive Solar Design", McGraw-Hill, New York, 1984

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ECE61144 RESOURCE MANAGEMENT AND CONTROL IN CONSTRUCTION 3 – 0 – 0

UNIT – I **9**

Resource Planning: Resource Planning, Procurement, Identification, Personnel, Planning for material, Labour, time schedule and cost control.

UNIT – II **9**

Resource Allocation: Types of resources- Manpower- Equipment, Material, Money - Time-cost trade off - Resource loading, Cumulative cost ETC - Value Management.

UNIT – III **9**

Labor and Materials: Systems approach in resource management, Characteristics of resources, Resources, Utilization, Tools for measurement of resources, Classes and cost of Labor - Labour schedule - Time of purchase - Quantity of material – Sources.

UNIT – IV **9**

Equipment: Transportation, Delivery and Distribution. Equipment, Planning and selecting by optimistic choice with respect to cost, Time, Source and handling

UNIT – V **9**

Time and Cost Management: Personnel time - Time and quality - Management and planning - Managing time on project, forecasting the future, Critical path measuring the changes and their effects. Cost control: Cash flow and cost control, objectives of cost.

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Szilagg, Andrew D. "Hand Book of Engineering Management", 1982
2. Sears, Glenn A. and Clough, Reichard H. "Construction Project Management", John Wiley & Sons, Inc. New York, 1979
3. Oxley Rand Poslcit, "Management Techniques applied to the Construction Industry", Granda Publishing Ltd., 1980.

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ECE61146 MAINTENANCE AND REHABILITATION OF STRUCTURES 3 – 0 – 0

UNIT – I **9**

Introduction: Quality assurance for concrete construction as built concrete properties strength, permeability, thermal properties and cracking. Effects due to climate, temperature, chemicals, wear and erosion.

UNIT – II **9**

Corrosion: Design and construction errors, corrosion mechanism, Effects of cover thickness and cracking, methods of corrosion protection.

UNIT – III **9**

Maintenance and Repair strategies: Facets of maintenance, importance of Maintenance, Preventive measures on various aspects of Inspection, Assessment procedure for evaluating damaged structure causes of deterioration - testing techniques.

UNIT – IV **9**

Materials and Techniques for repair: Special concretes and mortar, concrete chemicals, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fiber reinforced concrete. Rust eliminators and polymers coating for rebar during repair foamed concrete, mortar and dry pack, vacuum concrete, Gunite and Shotcrete, Epoxy injection, Mortar repair for cracks, shoring and underpinning.

UNIT – V **9**

Demolition Techniques: Engineered demolition and other case studies.

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Campbell-Allen, Denison and Roper, Harold."Concrete Structures: Materials, Maintenance and Repair", Longman Scientific and Technical UK, 1991
2. Allen, R.T and Edwards, S.C, "Repair of Concrete Structures", Blakie and Sons, UK, 1987
3. Shetty, M.S, "Concrete Technology - Theory and Practice", S.Chand and Company, New Delhi, 2008

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ECE61148 **PROJECT SAFETY MANAGEMENT** **3 – 0 – 0**

UNIT – I **9**

Construction Accidents: Introduction to Safety Management - Accidents and their Causes - Human Factors in Construction- Safety - Costs of Construction Injuries - Occupational and Safety Hazard Assessment - Legal Implications.

UNIT – II **9**

Safety Programs: Problem areas in Construction Safety - Elements of an Effective Safety Programme -Job-Site Safety Assessment - Safety Meetings - Safety Incentives - Safety in Construction Contracts - Substance Abuse - Safety Record Keeping.

UNIT – III **9**

Designing for Safety: Safety Culture, Safe Workers, Safety and First Line Supervisors, Safety and Middle Managers - Top Management Practices, Company Activities and Safety

UNIT – IV **9**

Contractual Obligation Safety Personnel - Sub Contractual Obligation, Project Coordination and Safety Procedures, Workers Compensation, Safety concerns in construction, organizing for safety

UNIT – V **9**

Safety During Construction: Safety concern construction Role of owners in safety and health management - Proactive position as an owner -Allocation of responsibility for safety - Fostering total safety culture -Promote job site safety - Additional concerns of owners

TOTAL: 45 Periods

REFERENCE BOOKS:

1. Hinze, Jimmy W. "Construction Safety", Prentice Hall Inc. New Jersey, 1997
2. Coble, Richard J. Hinze, Jimmie and Haupt, Theo C. "Construction Safety and Health Management", Prentice Hall Inc. New Jersey, 2001
3. Raymond E. Levitt, and Nancy Morse Samelson., "Construction Safety Management", Second Edition, 1993.

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING
M.Tech in Construction Engineering & Management

ECE61206 COMPUTATIONAL LABORATORY FOR CONSTRUCTION MANAGEMENT 0 – 0 – 3

LIST OF EXPERIMENTS:

1. Quantity takeoff, Preparation and delivery of the bid or proposal of an engineering construction project
2. PERT and CPM - Software Development - Use of MS Project & PRIMAVERA
3. Estimation of a single storey building.
4. Scheduling of a small construction project using tools like MS project scheduling systems including reports and tracking.
5. Scheduling and allocation of resources.
6. Scheduling of a small construction project using Primavera scheduling systems including reports and tracking.
7. Resource leveling, resource list, resource allocation, Resource loading, Cumulative cost
8. Deterministic and Probabilistic Inventory Models - Software applications
9. Decision Making – Baye's Theory.

TOTAL: 45 Periods

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