Hindi Seva Mandal's,

Shri Sant Gadge Baba

College of Engineering & Technology,

Near Z.T.C., Bhusawal. Dist. - Jalgaon (Maharashtra) Pin - 425203.

An Autonomous Institute with Accreditation by

NAAC with A+ Grade

(Affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere.)

www.ssgbcoet.com

Master of Technology (M Tech)

In

Civil Engineering

(Construction Technology & Management)

Programme Curriculum

With Effect from the Academic Year 2025-2026

2-year, 4 Semester Full time Programme Choice Based Credit System (CBCS) and Grading System Outcome Based Education Pattern Aligned with National Education Policy (NEP) 2020

Shri Sant Gadge Baba College of Engineering and Technology, Bhusawal

Department of CIVIL ENGINEERING

Construction Technology & Management

PG First Year Structure 25-26 as per NEP 2020

Semester I											
Course Category	**Category under NEP**	**Course Code**	**Course Title**	**Teaching Scheme**			**Evaluation Scheme**				
				L	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**No. Of Credits**
PCC	Programme Core	MTCE25PC101	Management and Project Planning	03	--	--	20	20	60	100	03
PCC	Programme Core	MTCE25PC102	Contract Administration and Management	03	--	--	20	20	60	100	03
PEC	Programme Elective-I	MTCE25PEC103	**Programme Elective-I**	03	--	--	20	20	60	100	03
PEC	Programme Elective-II	MTCE25PEC104	**Programme Elective-II**	03	--	--	20	20	60	100	03
PCC	Programme Core	MTCE25PC105L	PG lab-I	--	--	04	50	--	--	50	02
ELC	Experiential Learning	MTCE25ELC106L	Seminar I	--	--	04	50	--	--	50	02
IKS	IKS	MTEC25IKS107	IKS Bucket	03	--	--	20	20	60	100	03
Audit	Ability Enhancement course	MTCE25AEC108	YOGA for Stress Management	--	--	02	50	--	--	50	01
			Total	15	--	10	250	100	300	650	**20**

Semester II											
Course Category	**Category under NEP**	**Course Code**	**Course Title**	**Teaching Scheme**			**Evaluation Scheme**				
				L	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**No. Of Credits**
PCC	Programme Core	MTCE25PC201	Project Economics and Finance	03	--	--	20	20	60	100	03
PCC	Programme Core	MTCE25PC202	Construction Safety	03	--	--	20	20	60	100	03
PEC	Programme Elective-III	MTCE25PEC203	**Programme Elective-III**	03	--	--	20	20	60	100	03
RM	RM	MTCE25RM204	**Research Methodology and IPR**	03	--	--	20	20	60	100	03
OEC	Open Elective-I	MTCE25OE205	**Open Elective-I**	03	--	--	20	20	60	100	03
PCC	Programme Core	MTCE25PC206L	PG lab-II	--	--	04	50	--	--	50	02
ELC	Experiential Learning	MTCE25ELC207P	Mini Project	--	--	04	50	--	--	50	02
Audit	Ability Enhancement course	MTCE25AEC208	Communication Skill	--	--	02	50	--	--	50	01
			Total	**15**	**--**	**10**	**250**	**100**	**300**	**650**	**20**

Programme Elective-I	Programme Elective-II	Programme Elective-III	Open Elective-I
Advanced Construction Materials and Techniques	**Construction Disaster Management**	**Building Environment and Services**	**Infrastructure Development**
Applications of Statistical Methods	Advanced Construction Equipment	Cost and Quality Management	Value Engineering and Valuation
Retrofitting of Structures	Advanced Sustainable Building Technology	Construction Techniques	Operation Research

PG Second Year Structure 25-26 as per NEP 2020

Semester III											
Course Category	**Category under NEP**	**Course Code**	**Course Title**	**Teaching Scheme**			**Evaluation Scheme**				
				L	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**No. Of Credits**
OE	Open Elective-II	MTCE25OE301	**Open Elective-II**	03	--	--	20	20	60	100	03
MD M	Multidisciplinary Minor	MTCE25MD302	**Multidisciplinary Minor**	03	--	--	20	20	60	100	03
ELC	Experiential Learning	MTCE25EL303S	Seminar II	--	--	04	50	--	50	100	02
ELC	Experiential Learning	MTCE25EL304P	Project-I	--	--	24	100	--	100	200	12
			Total	**06**	**--**	**28**	**190**	**40**	**270**	**500**	**20**

Open Elective-II	**Multidisciplinary Minor**
Architecture and town planning	Entrepreneurship
Risk Analysis and Decision Making	Managerial Techniques
Legal Aspect In Civil Engineering	Business Communication & Presentation Skills

Semester IV											
Course Category	**Category under NEP**	**Course Code**	**Course Title**	**Teaching Scheme**			**Evaluation Scheme**				
				L	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**No. Of Credits**
ELC	Experiential Learning	MTCE25EL401P	Project-II	--	--	40	100	--	100	200	20
			Total	--	--	40	100	--	100	200	20

Credit Distribution				
SEM I	**SEM II**	**SEM III**	**SEM IV**	**Total**
20	**22**	**18**	**20**	**80**

IKS :- https://iksindia.org/courses-offered-by-iks-centers.php

Sr.No				
1	Arogyasamskriti – Health Culture of Bharat	Amrita IKS Center for Ayurveda, Vyakrana and Darshana	Dr. Rammanohar P. (PI) Dr. Manish Rajan Walvekar (Co-PI)	rammanohar@ay.amrita.edu r_manish@blr.amrita.edu
2	**Indian Knowledge System in Science**	**IKS Centre in Jaina Mathematics** **School of Data Science and Forecasting** **Devi Ahilya University, Indore**	**Prof. Anupam Jain (PI)** **Prof. V.B. Gupta (Co-PI)**	**anupamjain3@rediffmail.com** **vbgupta.davv@gmail.com**
3	Bhagavad Gita: A Guide for Holistic Wellbeing	Institute for Science and Spirituality, Delhi	Dr Jyotiranjan Beuria (PI) Mr. Parveen Kumar (Co-PI)	jb@issdelhi.org
4	Mathematics in India	IIT Madras Centre for Indian Knowledge Systems	Prof. Aditya Kolachana (PI) Co-PIs: 1. Dr.Arun Menon, 2. Dr. Manu Santhanam, 3. Dr. Sudarsan Padmanabha 4. Dr. Santosh Kumar Sahu, 5. Dr. Jyotirmaya Tripathy, 6. Dr. Rajesh Kumar	aditya@iitm.ac.in arunmenon@iitm.ac.in manus@iitm.ac.in sudarsanp@iitm.ac.in santosh@iitm.ac.in Jyotirmaya@iitm.ac.in
5	**Indian ethics** **Indian knowledge system in architecture and town planning**	IKS Centre for the Study of Knowledge Transmission in India, Centre for Indic Studies, Indus University, Ahemdabad	Dr. Amit Kumar Dubey (PI) Dr. Ankur Kakkar (Co-PI) Mrs. Komal Thawrani (Co-PI)	indicstudies@indusuni.ac.in amit.philosophia@gmail.com komalthawrani.idea@indusuni.ac.in

Hindi Seva Mandal's (Estd. 1950)

SHRI SANT GADGE BABA
COLLEGE OF ENGINEERING AND TECHNOLOGY,
BHUSAWAL – 425203. DIST. – JALGAON (M. S.)

SEMESTER-I

Subject Name: Management and Project Planning **Subject Code: MTCE25PC101**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 To equip students with the knowledge and skills necessary to effectively manage construction projects from inception to completion. .

2 To develop the ability to accurately estimate resource needs for project success.

3 To understanding Management principles in construction, developing planning and organizational skills, fostering leadership qualities, and promoting sustainable practices.

Course Outcomes:-

CO1 Highlight the system of Management

CO2 Classify organizations into various forms, explain the concept of project Life cycle, jolt down the responsibilities of project managers & PMCs, define the scope of the Project and various documentations required on major projects

CO3 Study of cost analysis subjected to Management

CO4 Highlight the various domains of construction Management as regards to mobilization, demobilization, co-coordinating, communicating, reporting and training aspects

CO5 Study the methods of a construction system and hence measure works.

Course Contents

UNIT-1: Basics of Management **[7Hours]**

Management functions, Management styles, Objectives of Management, Management techniques & use, organizations, forms of organizations.

UNIT-2: Project Management **[7Hours]**

Project life cycle, concept of s-curve between time and cost of project, planning for achieving time, cost, quality, safety requirements of projects, project feasibility reports based on socio-techno-economic-environmental impact analysis, project clearance procedures and necessary documentation for major works like dam, highway, railway, airport, multi storied structures, ports, tunnel, Qualities, role, and responsibilities of projects Manager, Role of Project Management Consultants on major projects.

UNIT-3: Construction Scheduling & Controlling [8Hours]

Construction Scheduling, LOB technique, Mass haul diagrams. Precedence Network Analysis, Activity cost and time estimation in Bar Chart, CPM, PERT, RPM, Work break down structure, Applications for major construction projects, Monitoring and Control of construction project, Resource Leveling and Smoothening.

UNIT-4: Cost Analysis [9Hours]

Direct and Indirect cost, Cost analysis, cost curve, optimization and crashing of network for civil engineering projects, updating of network. Torsion

UNIT-5: Excitation system modeling [8Hours]

Job layout, Site mobilization – Demobilization, Mass housing, small scale industries, Co-ordinating, communicating & reporting techniques, Organizing and monitoring of the construction work with respect to cost-time schedules, Staffing its Nature and purpose, selection, appraisal, organizational development.

Reference books:

1. P.S. Gahlot & B. M. Dhir, Construction Planning & Management, New Age int. (p) Ltd.
2. K Nagrajan, Project Management, New Age International Ltd.
3. Barrie – Paulson, Professional Construction Management, McGraw Hill Institute Edition.
4. Ahuja H. N, John Wiely, Project Management, New York.
   Sengupta and Guha, Construction Management and Planning, Tata McGraw Hill publication
5. T. R. Banga and S. C. Sharma, Industrial Engineering and Management including Production Management, Khanna Publishers.
6. Khanna O P, Industrial Engineering and Management, Dhanpat Rai Publication.

Subject Name: Contract Administration and Management Subject Code: MTCE25PC102

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 To understand how to choose the right construction equipment for different projects and locations

2 To study the characteristics and benefits of using sustainable materials in construction

3 To learn techniques for ensuring high-quality standards in construction work.

4 To explore how site conditions affect the choice of construction methods and materials.

Course Outcomes:- Students will be able to

CO1 Study the methods of a construction system and hence measure works.

CO2 Apply control concepts for improving the quality of construction.

CO3 Maintain the records of quality assurance processes and audits.

CO4 Know various quality improvements techniques.

CO5 Implement safety policies, methods, training provided on any ISO approved construction policies.

Course Contents

UNIT-1: Contracts Administration [8Hours]

Professional ethics, standard forms of building contracts, conditions of contracts, Contract formation, contracts with various stakeholders on a major Construction projects, rights of owners, adjoining owners and third parties, project Management consultants, contractor, contract performance, contract correspondence and contract closure, Global tenders and B.O.T. System.

UNIT-2: Contract System and Acts [7Hours]

Various types, Importance & clauses of contract, The Indian Contract Act (1872): Objectives of the act, Definition of the contract, Valid, Voidable, and Void contracts, Sale of Goods Act.

UNIT-3: Construction Claims, Injunctions and Bailment [8Hours]

Extra items and causes of claims, Types of construction claims, documentation, settlement of claims, and extension of time, Injunctions, Types:- temporary, perpetual, mandatory, Indemnity & Guarantee- difference between the two, Contracts of Guarantee & Indemnity, Consideration for Guarantee, Surety's liability, discharge of surety, Bailment- Nature of transaction, delivery of bailee.

UNIT-4: Arbitration Awards & Dispute Resolving boards [8Hours]

Indian Arbitration Act, arbitration agreement, conduct of arbitration, power and duties of arbitrator, rules of evidence/ preparation and publication of awards, methods of enforcement, impeding and award, Limitations of arbitration in the Indian context (DRB_s) Dispute resolving boards-necessity, formation, functioning advantages, Causes of disputes and importance of role of various stakeholders in prevention of disputes, Alternate Dispute Resolution methods-mediation, conciliation

UNIT-5: Industrial Act and Labour Laws [7Hours]

Industrial Dispute Acts, payment of wages act, Minimum Wages Act, Indian Trade Union Act, and Workmen's Compensation Act. Labour welfare fund act 1953.

Reference books:

1. B. N Dutta, Estimating and Costing in Civil Engineering: Theory and Practice Published S. Dutta & Company, Lucknow._
2. B. S. Patil, Civil Engineering Contracts and Estimates -Universities Press (India) Private Limited, 2006.
3. Joseph T. Bockrath, Contracts and the Legal Environment for Engineers and Architects, McGraw Hill, 2000.
4. Kwaku, A., Tenah, P.E. Jose M. Guevara, P.E., Fundamentals of Construction Management and Organisation, Printice
5. Hall, 1985.M.M.Tripathi Private Ltd., Bombay, 1982.
6. Gajaria G.T., Laws Relating to Building and Engineering Contracts in India,
7. Jimmie Hinze, Construction Contracts, McGraw Hill, 2001.
8. Jack Meredith & Samuel Mantel, Project Management: A managerial approach, Wiley India.
9. Dennis Lock, Project Management, Gower Publishing England.
10. Gopalan, Project Management, Wiley India.
11. The Indian Contract Act (9 of 1872), 1872- Bare Act- 2006 edition, Professional Book Publishers.
12. The Arbitration and Conciliation Act, (1996), 1996 (26 of 1996)- 2006 Edition, Professional Book Publisher.

Programme Elective -I

Subject Name: Advanced Construction Materials and Techniques

Subject Code: MTCE25PE103-A

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To understand how to choose the right construction equipment for different projects and locations

2 To study the characteristics and benefits of using sustainable materials in construction.

3 To learn techniques for ensuring high-quality standards in construction work.

4 To explore how site conditions affect the choice of construction methods and materials.

Course Outcomes:- Students will be able to

CO1 Understand the construction metals and alloys

CO2 Learn to use waste material in construction process

CO3 Know about special concrete and their applications

CO4 Understand construction systems for High Rise structures

CO5 Learn design and requirement of different types of formwork

Course Contents

UNIT-1: Metals & Alloy **[7Hours]**

Types of structural steels, special steel, alloy steel, stainless steel, light gauge steel, Corrosion of concrete in various environments, Corrosion of reinforcing steel, methods/treatments to overcome the corrosion, Electro-chemical process, Ferro- cement, material and properties, fibers and composites, Architectural use and Aesthetics of composites, Adhesives and sealants, Structural elastomeric bearings and resilient seating. Moisture barriers, Glass facade, materials and techniques, Use of titanium dioxide, transparent Aluminum.

UNIT-2: Use of Waste Materials **[7Hours]**

Material composition and properties, production, storage, distribution, testing, acceptance criteria, applications, limitations of use, economic consideration, and recent development related to the following materials to be studied: Fly Ash, coal ash, Blast furnace slag, Red mud, Waste glass, Rice husk.

UNIT-3: Special Concrete [8Hours]

Light weight concrete, high strength concrete, Fly ash concrete, Fibre reinforced concrete, Sulphur impregnated concrete, Polymer Concrete, High performance fiber reinforced concrete, Self-Compacting Concrete, Geo Polymer Concrete, Ready mixed concrete, Silica fume concrete.

Special concrete operations

Shortcrete, grouting, grunting, under water concreting, hot and cold weather concrete, pumpabale concrete, special concreting methods

UNIT-4: High Rise Structure & Prefabricated structure [7Hours]

Construction systems for High Rise structures, Special techniques required for construction and maintenance, Prefabricated Construction techniques & System planning for pre-casting, selection of equipment for fabrication, transport and erection, quality measures, safety measure during erection.

UNIT-5: Formwork Design [8Hours]

Design and requirement of different types of formwork, Types of formwork: Timber, steel, aluminum, scaffoldings, jump form, modular shuttering, Doka shuttering. Mivan technology and its applications and safety measures for tall structures, slip form, vertical slip forming, lifting techniques, horizontal slip forming, and safety measures for tall structures.

Text books:

1. Rangawala S.C, Engineering Materials, Charotar Publications
2. S. K. Duggal, Building Materials, , New Age International Publications
3. Bruntley L. R, Building Materials Technology Structural Performance & Environmental Impact, ,McGraw Hill Inc Construction Technology, Vol I - IV, R Chudley, Longman Group Construction Ltd
4. Verghese, Building Material, PHI EEE New Delhi -2012
5. Ashby, M. F. and Jones, Engineering Materials: An introduction to Properties, applications and designs

Programme Elective -I

Subject Name: Application of Statistical Methods **Subject Code: MTCE25PE103-B**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 Learn probability concepts, rules, and various theoretical distributions for realworld applications.

2 To Apply statistical tests like t-test, chi-square, and ANOVA to evaluate hypotheses and assess data distribution

3 Understand relationships between variables using correlation, regression, and multivariate techniques for resource Management

4 Utilization of Utilize simulation techniques and mathematical models to identify, analyze, and mitigate risks in construction and project Management.

Course Outcomes:-

CO1 Understand fundamental probability concepts, rules, and various theoretical distributions for realworld applications.

CO2 Learn sampling methods, quality control techniques, and statistical measures for effective analysis in construction projects.

CO3 Apply statistical tests like t-test, chi-square, and ANOVA to evaluate hypotheses and assess data distribution

CO4 Analyze relationships between variables using correlation, regression, and multivariate techniques for resource Management

CO5 Utilize simulation techniques and mathematical models to identify, analyze, and mitigate risks in construction and project Management.

Course Contents

UNIT I: Probability and Distributions **[7Hours]**

Probability theory and its importance, Definition of probability, Rules of Probability, The Baye's theorem, Random variable, Probability distribution, Mean or Expectation of Random variable,

Properties of Mean of Expectation. Distributions: Theoretical probability Distributions: Binomial Distribution, Poisson distribution. Normal Distribution, Exponential Distribution, Beta, Gamma.

UNIT II: Sampling [7Hours]

Sampling and sampling distribution: Probability samples, Non-probability samples, sample Random sampling, Other sampling schemes, sampling distribution and standard error, some Sampling and Quality control, Use of concepts of standard deviation, coefficient of variance, range in quality control of concreting and similar such activities.

UNIT III: Testing Hypothesis [7Hours]

Sampling of distribution, Test based on Normal Distribution, students- t test, chi square, K-S test for goodness of fit and distribution, Analysis of variance- one way & two way classification

UNIT IV: Correlation and Regression Analysis [7Hours]

Correlation types, co-efficients, Bi-variate Frequency Distribution, Scatter Diagram, Correlation Analysis, Regression and Multivariate Analysis, Multiple Regression Analysis, Non linear Regression, Use of regression analysis in resources Management.

UNIT V: Simulation [8Hours]

Simulation, Types, case studies in construction using simulation techniques, simulation software's used, Griffi's waiting line Method. Use of mathematical models based on probabilistic and statistical methods, simulation in risk identification, analysis and mitigation of project risk, EOQ in civil engineering, Sensitivity analysis, ABC analysis

Text Books

1. Montgomery and Runger, Applied Statistics and Probability for Engineers, Wiley, India.
2. Miller, Freund-Hall, Probability and Statistics for Engineers, Prentice India Ltd. 2009
3. Sampling techniques-Cochran, Wiley Series, 2008.
4. David S. Moore, Statistics-Concepts and Controversies, Freeman Company, New York.

Reference Books:

1. Applied Statistics for Civil and Environmental Engineers by Kottegoda.- Stratford Books

Programme Elective -I

Subject Name: Retrofitting of Structures **Subject Code: MTCE25PE103-C**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 Understand factors of Serviceability and Durability of Structures.

2 Determine crack width, effect of crack on materials, effect of moisture on structures.

3 Understand methods for protection of steel structures and masonry structures.

4 Understand various materials and methodologies used for repairing of structures.

5 CO5 Understand and implement techniques used for repairing and maintenance of structure.

Course Outcomes:- Students will be able to

CO1 Highlight the system of Management

CO2 Classify organizations into various forms, explain the concept of project Life cycle, jolt down the responsibilities of project managers & PMCs, define the scope of the Project and various documentations required on major projects

CO3 Study of cost analysis subjected to Management

CO4 Highlight the various domains of construction Management as regards to mobilization, demobilization, co-coordinating, communicating, reporting and training aspects

CO5 Study the methods of a construction system and hence measure works.

Course Contents

UNIT-1: Serviceability and Durability **[7Hours]**

Quality Assurance for Concrete Construction, Permeability, Thermal Properties and Cracking, Distress Monitoring, Causes for Distress, Effects of Climate, Temperature, Chemicals, Wear and Erosion, Design and Construction Errors, Corrosion Mechanism, Effects of Cover Thickness and Cracking. Non Destructive Testing: Ultrasonic and Sonic Test, Rebound Hammer Test, Strength Evaluation of Existing

UNIT-2: Cracks in Structures **[7Hours]**

Causes, Thermal and Shrinkage cracks, Cracks due to Vegetation and Trees, Foundation Movements, Types and their Fatality, Diagnosis Techniques for Repair.

Moisture Penetration Sources of Dampness, Moisture Movement from Ground, Reasons for Ineffective Damping, Leakage in Concrete Slabs, Pitched Roofs, Dampness in Solid Walls, Condensation, Remedial treatments, Chemical Coatings

UNIT-3: Construction Scheduling & Controlling [7Hours]

Types and Causes of Deterioration, Preventive Measures, Repair Procedure, Brittle Failure, Defects in Connections, Welded Joints: Test for Defects; Mechanism of Corrosion , Methods of Corrosion Protection, Corrosion Inhibitors, Corrosion Resistant Steels, Coatings, Cathodic Protection. Design and Fabrication Errors, Distress during Erection.

Masonry Structures

Discoloration and Weakening of Stones, Preservation, Chemical Preservatives, Brick Masonry Structures, Distress and Remedial Measures

UNIT-4: Materials for Repairs [9Hours]

Essential Parameters for Repair Material, Premixed Cement Concrete and Mortar, Sulphur Infiltrated Concrete, Fiber Reinforced Concrete, Special Elements for Accelerated Strength Gain, Expansive Cement, Polyester Resin.

Polymer Concrete: Physical and Mechanical Properties, General Guidelines and Precautions for Use, Field Application

Polymer Modified Concrete: Physical and Mechanical Properties, General Guidelines and Precautions for Use, Field Application, Epoxy Concrete and Mortar: Epoxies, Physical and Mechanical Properties, General Guidelines and Precautions for Use, Field Application.

Surface Coatings: Essential Parameters, Types, Characteristics

UNIT-5: Excitation system modeling [7Hours]

Definitions: Maintenance, Repair and Rehabilitation, Facets of Maintenance, Importance of Maintenance, Preventive Measures on Various Aspects Inspection, Assessment Procedure for Evaluating a Damaged Structure, Causes of Deterioration, Testing Techniques.

Techniques for Repairs

Repairs using Mortars and Dry Packs, Concrete Replacement, Surface Impregnation, Rust Eliminators and Polymers Coating for Rebar during Repair Foamed Concrete, Vacuum Concrete, Gunite and Shotcrete, Injection: Epoxy, Resin, Polymer Modified Cement Slurry; Shoring and Underpinning. Propping and Supporting: False Work, Requirement of Good False Work, Design Brief for False Work, Execution Procedure.

Strengthening of Existing

General Principle, Relieving Loads, Stress Reduction, Strengthening of Super Structures (Beam, Column, Slab including Joints) for Tension, Compression, Flexural, and Shear respectively, Jacketing (RCC, Plate, Fiber ,Wrap), Bonded Overlays, Reinforcement Addition, Strengthening the Substructures, Increasing the Load Capacity of Footing, Strengthening of Masonry Structure.

Text books:

1. M. S. Shetty, "Concrete Technology- Theory and Practice", S. Chand and Company, New Delhi, 1992 Peter.
2. "Concrete Technology" by M.L. Gambhir
3. Raikar, R.N., "Learning from failures – Deficiencies in Design ", Construction and Service – R & D Centre (SDCPL), Raikar Bhavan, Bombay, 1987
4. SP25-84, "Hand book on causes and prevention of cracks on buildings", Indian standards.
5. Santhakumar, A.R., " Training Course notes on Damage Assessment and repair in Low Cost Housing "," RHDC–NBO " Anna University, July, 1992.

Reference books:

1. Denison Campbell, Allen and Harold Roper, "Concrete structures", Materials, Maintenance and Repair, Longman Scientific and technical UK, 1991.
2. Johnson. S.M., "Deterioration, maintenance and repair of structures", McGraw-Hill book company, New York, 1965.
3. R. T. Allen and S. C. Edwards, "Repair of concrete structures", Blakie and Sons, UK, 1987.

Programme Elective -II

Subject Name: Construction Disaster Management Subject Code: MTCE25PE104-A

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.

2 Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.

3 Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

4 Critically understand the strengths and weaknesses of disaster Management approaches.

5 Planning and programming in different countries, particularly their home country or the countries they work in.

Course Outcomes:-

CO1 Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.

CO2 Capacity to describe, analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.

CO3 Capacity to work theoretically and practically in the processes of disaster Management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.

CO4 Capacity to manage the Public Health aspects of the disasters.

CO5 Capacity to obtain, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them

Course Contents

UNIT I: **[7Hours]**

Introduction: Disaster: Definition, Factors and Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.

UNIT II: **[8Hours]**

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

UNIT III: **[7Hours]**

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

UNIT IV: **[7Hours]**

Disaster Preparedness and Management: Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

UNIT V: **[8Hours]**

Risk Assessment: Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co- Operation in Risk Assessment & Warning, People's Participation in Risk Assessment. Strategies for Survival. Concept & Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.

Reference Books:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal bookCompany

2. Sahni, Pardeep Et.Al. (Eds.),” Disaster Mitigation Experiences And Reflections”, Prentice Hall Of India, NewDelhi.
1. Goel S. L. , Disaster Administration And Management Text And Case Studies” , Deep & Deep Publication Pvt. Ltd., NewDelhi.

Programme Elective -II

Subject Name: Advanced Construction Equipment Subject Code: MTCE25PE104-B

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 To understand how to choose the right construction equipment for different projects and locations

2 To study the characteristics and benefits of using sustainable materials in construction.

3 To learn techniques for ensuring high-quality standards in construction work

4 To explore how site conditions affect the choice of construction methods and materials.

Course Outcomes:- Students will be able to

CO1 Learn about different construction equipment.

CO2 Learn about different pumps used in construction process

CO3 Understand about excavating equipment.

CO4 Understand about compacting equipment.

CO5 Learn about cranes and crushers used in construction process.

Course Contents

UNIT-1: Introduction [7Hours]

Identification, Planning, Equipment Management in projects, various costs associated with equipments, Maintenance Management, Replacement, Cost control of equipment, Depreciation Analysis, Fundamentals of earthwork operations-Earth moving operations, Types of Earthwork Equipment, Tractors, Motor Graders, Scrapers, Front end waders, Earth Movers Equipment for Dredging, Trenching, Tunneling, Drilling, Blasting, Equipment for compaction Erection.

UNIT-2: Pumps [8Hours]

Types of pumps used in construction, Equipment for Dewatering and Grouting, Foundation and Pile Driving Equipment, Forklifts and Related Equipment, Portable Material Bins, Conveyors.

UNIT-3: Excavating Equipment [7Hours]

Power shovels; size, basic parts, selection, factors affecting output, Draglines: - types, size, basic parts, and effect of job and Management conditions on the output of dragline.Shortcrete,

grouting, grunting, under water concreting, hot and cold weather concrete, pumpabale concrete, special concreting methods

UNIT-4: Hauling & Compacting Equipment [7Hours]

Clamshells – clamshell buckets, Hoes- basic parts working ranges, Bulldozers-types, moving earth with bull dozers.

Types of compacting equipments, Such as tamping rollers, smooth wheel rollers, pneumatic tyred rollers, and Hoisting equipments: Chain, hoist, fork trucks

UNIT-5: Cranes and Crushers [8Hours]

Classification, derrick crane, mobile crane, Tower crane, Hydraulic crane, overhead or gantry crane, Safety in crane operation, Use of cranes in steel construction, Use of cranes in concrete construction. Crushers - Types, primary, secondary, tertiary crushers, jaw, gyratory, stone crushers, hammer mills, roll crushers, rod and ball mills screening aggregate, revolving, vibrating screens.

Text books:

1. Patrick Powers. J., Construction Dewatering: New Methods and Applications, John Wiley & Sons, 1992.
2. Peter. H. Emmons, “Concrete repair and maintenance illustrated”, Golgotha Publications Pvt. Ltd., 2001.Press, 2008.
3. Robertwade Brown, Practical foundation engineering hand book, McGraw Hill Publications, 1995.

Programme Elective -II

Subject Name: Advanced Sustainable Building Technology Subject Code: MTCE25PE104-C

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 Understand the sustainable materials used in construction.

2 Understand the amount of energy required for building

3 Understand the use of Non-renewable sources

4 Understand the Cost Effective Techniques for Sustainable Building

Course Outcomes:- Students will be able to

CO1 Critically review the quantitative data and draw results from it using probability and statistics

CO2 Model a construction system, so the maximum output from a particular input may be obtained

CO3 Correlate and hence develop linear regression equation between various civil engineering parameters

CO4 Apply Griffi's waiting line models and other such models to decide the optimum number of servicing units required for a prime mover (sizing-matching operation)

CO5 Predict the performance of a particular system, based on past performance using simulation and other tool

Course Contents

UNIT 1 Concept of Green Building [7 HOURS]

Sustainable Development concept, Buildings and climate, important considerations for the design of sustainable buildings, Green Building Assessment, Current version of the LEED rating system.

UNIT 2 Energy and Buildings [8 HOURS]

The design of a sustainable building, Lighting - day lighting; Ventilation - natural ventilation; Indoor air quality; Passive and Active systems for energy production and conservation, Elements of successful design of a building envelope.

UNIT 3 Sustainable Building Materials [7 HOURS]

Environmental issues related to building materials, Local, Building materials from agricultural waste and Industrial waste.

UNIT 4 Cost Effective Techniques for Sustainable Building [8 HOURS]

Stabilized Mud blocks, Stone masonry blocks, solid and hollow concrete blocks, Selection of building blocks, Ferro- Concrete, Properties and Uses, Practical aspects. Concepts in Roofing alternatives, Filler slab roofs, Composite Slab panel roofs, hollow block roofs, Masonry Domes.

UNIT 5 Alternative sustainable Roofing Systems & Environmental Techniques [7 HOURS]

Waste water Management, Rain water harvesting and conservation, recycling, waste water treatment processes, external drainage system in building

Text Books

1. K. S. Jagadish, B. V. V. Reddy, "Alternative Building Materials and Technologies", New Age International Publishers
2. Gevorkian ,"Green Buildings" Mac Graw hill.
3. P. N. Balaguru and S.P. Shah, "Fibre reinforced Cement Composites"
4. The engineering guide to LEED- new construction-sustainable construction for engineer's haselbach.
5. D. J. Hannant, John Wiley and Sons, Fibre cements and Fibre Concretes.

Reference Books

1. M. Neville, Properties of Concrete, ELBS, Longman.
2. Miller G. T Jr Living in the environment, Cengage Publisher.

Subject Name: PG lab-I **Subject Code: MTCE25PC105L**

TEACHING SCHEME	EXAMINATION SCHEME		CREDITS
PR(Hrs/Week)	CA	ESE	
04	50	-	02

Laboratory Work:

The students are expected to perform **any three** experiments out of list given below and submit report of same;

1. Minimum Two site visits to study construction techniques and use of major construction equipment associated with ongoing major construction works, Visit Report to be submitted.
2. Minimum one site visit to Ready Mix Concrete Plant use for major construction, Visit report to be submitted.
3. To prepare study report on Earthquake Resistant Building Construction.
4. Collection of techno-commercial information as regards new construction materials, new construction methods.

Subject Name: Seminar I **Subject Code: MTCE25EL106**

TEACHING SCHEME	EXAMINATION SCHEME		CREDITS
PR(Hrs/Week)	CA	ESE	
04	50	-	02

Laboratory Scheme:

Seminar I shall be delivered on one of the advanced topics chosen in consultation with the supervisor after compiling the information from the latest literature. The concepts must be clearly understood and presented by the student. All modern methods of presentation should be used by the student. Minimum 03 presentations are expected within period of semester by the stude t. A hard copy of the report (20 to 25 pages, A4 size, 12 fonts, Times New Roman, 1.5 line spacing with normal margin on all sides, both side printed, as per format) should be submitted to the Department Post Graduate Committee (DPGC) before delivering the seminar. A copy of the report in soft form must be submitted to the Supervisor along with other details, if any.

Subject Name: YOGA for Stress Management **Subject Code: MTCE25AEC108**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	PR (Hrs/Week)	MSE	CA	ESE	
--	02	_	50	_	01

Course Objectives:

1. Understand the physiological and psychological aspects of stress and its impact on overall wellbeing.
2. Learn and practice specific yoga postures, breathing exercises, and relaxation techniques to alleviate stress.
3. Explore the connection between mindfulness, meditation, and stress reduction, fostering mental clarity.
4. Discover holistic practices that promote betters leep, nutrition, and overall lifestyle habits for stress Management.
5. Develop practical skills to manage stress in daily life, enhancing resilience and promoting emotional balance.

Course Outcomes:

1. Recognize the signs and sources of stress, understanding its effect some mental and physical well-being.
2. Master a variety of yoga techniques, including postures, breathing, and meditation, to effectively manage stress.
3. Acquirerelaxationstrategiesthatpromotecalmness,reduceanxiety,andenhance overall mental clarity.
4. Incorporate healthy habits inspired by yoga principles to foster better sleep, nutrition, and self-care routines.
5. Developpracticalskillstonavigateandcopewithstress,enhancingemotionalbalance and promoting a more harmonious life.

Course Contents

Unit 1 Introduction to Yoga for Stress Management

Stress according to Western perspective Stress Eastern Perspective Developmental process: Western and Eastern Perspective Stress Hazards and Yoga

Unit 2 Meeting the challenges of Stress

Introduction to Stress Physiology Stress, Appetite and Dietary Management- Modern and Yogic perspective Sleep and Stress: understanding the relationship for effective Management of stress

Unit 3 Stress Assessment methods

A valuable tool toward stress Management Role of Yoga in prevention and Management of stress related disorders – a summary of research evidence Concept of stress and its Management – perspectives from Patanjali Yoga Sutra – Part 1/Part 2/ Part 3

Unit 4 Stress Management

Unit 5

Bio-Psycho-Socio-Spiritual model of stress Management Yoga practices for Stress Management Breathing practices , Asana practices- Tadasana, Ardhakati Chakrasana, Ardha Chakrasana, Trikonasana, Vrikshasana, Vakarasana, Janu Sirshasana, Ushtrasana, Sashankasana, Ardhamatseyndrasana, Paschimottanasana, Poorvottanasana, Gomukhasana, Makarasana, Bhujangasana, Salambha Shalabahasana, Dhanurasana, Setubandhasana, Sarvangasana, Mastyasana, Deep Relaxation Technique (DRT),etc

Text Books:

1. H R Nagendra and R Nagarathna. Yoga for Promotion of Positive Health. Swami Vivekananda Yoga
2. Prakashana. 2011.
3. Contrada, R., & Baum, A. (Eds.). The handbook of stress science: Biology, psychology, and health.
4. Springer Publishing Company. 2010
5. Al'Absi, M. (Ed.). Stress and addiction: Biological and psychological mechanisms. Elsevier. 2011.
6. Van den Bergh, O. Principles, and practice of stress Management. Guilford Publications. 2021.
7. Swami Muktibodhananda, Hatha Yoga Pradipika, Bihar Scool of Yoga, 1998

Reference Books:

1. Swami Satyananda Saraswati, Four Chapters on Freedom, Bihar Scool of Yoga, 1975
2. Swami Tapasyananda, Srimad Bhagavat Gita, Sri Ramakrishna Math, 2012

NPTELplatform:

NPTELCourse	Name of Instructor	Host Institute	Link
Yoga for Stress Management	Dr.H R Nagendra, Dr. MithilaMV, Dr. Rajesh Nair	Swami Vivekananda Yoga Anusandhana Samsthana	https://onlinecourses.swayam2.ac.in/aic23_ge10/preview#:~:text=In%20this%20course%20we%20intend,meeting%20the%20challenges%20of%20stress

Semester-II

Subject Name: Project Economics and Finance **Subject Code: MTCE25PC201**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 To analyze project requirements and formulate effective project proposals.

2 To develop monitoring and control strategies to ensure project objectives are met.

3 To apply financial Management principles to assess project viability and performance.

Course Outcomes:- Students will be able to

CO1 Highlight the basic principles of economics

CO2 Estimate the working capital required on a construction project

CO3 Manage cash and credit of suppliers

CO4 Demonstrate the impact of exchange rate fluctuations on international projects

CO5 Perform capital budgeting and project portfolio analysis

Course Contents

UNIT-1: Principles of Economics **[7Hours]**

Importance of the economic background to measurement, objectives of business firm, Factors bearing on size of firms, Motives to growth, Obstacles to growth of firms, Study of present economy.

UNIT-2: Capital **[7Hours]**

Analysis of need working capital, Estimation of requirements of working capital, Credit Management, Cash Management, Managing payments to suppliers and out standings.

UNIT-3: Economic Analysis **[7Hours]**

Cost implication to different forms of construction and maintenance and maintenance and replacement lives of material, Installation and running cost of services, Capital investment in project, Cost analysis by traders and by functional element, Cost planning techniques, Cost control during design and Construction, Depreciation, Various Appraisal Criteria Methods. Break-even analysis, Cash flow analysis, Risk Analysis and Management Practice, Role of Lender's Engineer.

UNIT-4: Financial Planning and Budgeting [8Hours]

Long term finance planning, Stock, Borrowings, Debentures, Loan Capital, Public Deposit, Dividend Policies, Bonus Shares, Market value of shares, Reserves, Over and under capitalization.

Budget: Budgetary control system. Types of budgets, Procedure for master budgets, Budget manual, Cash now forecast.

UNIT-5: Corporate Finance [7Hours]

Corporate tax planning, Public policies on ICRA grading of exchange, World financial market, Role of financing institutes in Construction, CIDC- grading of construction entities, Venture Capital Financing- Indian Venture Capital scenario, SEBI regulation, Problems of expansion and merger of companies. Accounting process, preparation of profit and loss account and balance sheet as per the companies Act, 1956, preparation of contract accounts for each project.

Reference books:

1. Prasanna Chandra, Projects planning, Analysis Selection, Implementation and Review , Tata McGraw Hill, New Delhi
2. Oliver, Lianabel, The cost Management toolbox, A Managers guide to controlling costs and boosting profits, Tata McGraw Hill
3. Singh H., Construction Management and Accounts, Tata McGraw Hill, New Delhi.
4. Cormican D., Construction Management, Planning and finance, Constru. Press, London.
5. Brealey R. A., "Principles of Corporate Finance, Tata McGraw Hill, New Delhi.
6. Leland T. Blank., Anthony Tarquin, Engineering Economy, McGraw Hill.
7. David Bedworth, Sabah Randhawa, Engineering Economics ,McGraw Hill
8. Bruggeman., Fishr, Real Estate, Finance and investment, McGraw Hill.
9. Block Hirt, Foundations of Financial Management, McGraw Hill.
10. Burner, Case studies in finance, McGraw Hill
11. DeMello, Cases in Finance, McGraw Hill.

Subject Name: Construction Safety **Subject Code: MTCE25PC202**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 To Understand Safety risk and safety practices followed on basic level on job site

2 To get knowledge of effective implementation safety program in a construction company

3 To be acquainted with knowledge of Laws related to construction Safety

Course Outcomes:- Students will be able to

CO1 Learn about the causes construction accidents.

CO2 Understand the different construction safety Management.

CO3 Learn about the safety measures in civil structures.

CO4 Study and understand the various safety concepts, requirements applied to construction Project

CO5 Learn about the safety training program and safety polices

Course Contents

UNIT-1: Construction Accidents [7Hours]

Accidents and their Causes, Human Factors in Construction Safety, Costs of Construction Injuries, Occupational and Safety Hazard Assessment, Legal Implications Accident Prevention: Principles of accident prevention; job safety analysis; fault tree analysis; accident Management

UNIT-2: Construction Safety Management [8Hours]

Introduction to Construction Safety and Safety Technology Government's policy in industrial safety, safety & health legislation in India, Construction Sites (Safety) Regulations, Codes of practice, Role of various parties, duties and responsibilities of top Management, site managers, supervisors etc. role of safety officers, responsibilities of general employees, safety committee, safety training, incentives and monitoring, Writing safety manuals, preparing safety checklists and inspection reports.

UNIT-3: Safety in Typical Civil Structures [7Hours]

Safety of accidents on various construction sites such as buildings, dams, tunnels, bridges, roads, water Tanks, Retaining walls, etc. safety at various stages of construction, Critical factors for failure, Prevention of accidents, Regular Inspection and monitoring, Safety measures.

UNIT-4: Safety in Use of Construction Equipment [7Hours]

Vehicles, cranes, hoist and lifts etc., Safety of scaffolding and working platforms, Safety in Erection and closing operation, Safety while using electrical appliances, Explosives.

UNIT-5: Safety Training Programmes and Safety Policies [8Hours]

Construction Safety Management and Accident Prevention Safety training, safety policy, Safety Meetings, safety committees, safety inspection, safety audit, reporting accidents and dangerous occurrences, Safety Incentives. Problem areas in Construction Safety, Elements of an Effective Safety Programme , Job-Site Safety Assessment, , Methods, equipment, and training provided on any ISO approved Construction Company, safety in office.

Reference books:

1. Safety Management in Construction Industry – A manual for project managers. NICMAR Mumbai.
2. Davies V. S. Thomasin ,K, Thomas, Construction Safety Handbook – (Telford, London.)
3. ISI for safety in Construction – Bureau of Indian Standards.
4. Giri maldi and Simonds, Safety Management – (AITBS, New Delhi)
5. Construction Safety Manual - Published by National Safety Commission of India.

6. Outcomes:

7. Upon completion of the course the students will be able to:
8. Summarize safety policies, methods, equipments, training provided on any ISO approved construction company.
9. Study and understand the various safety concepts, requirements applied to construction Project

Programme Elective -III

Subject Name: Building Environment and Services Subject Code: MTCE25PE203-A

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 To develop concepts of Management of building services provisions

2 To learn the synchronization of construction activities with installation of building services

3 To study the suitable electrical and mechanical services, fire protection, acoustic and sound Insulations

Course Outcomes:- Students will be able to

CO1 Understand the important of Energy and Conservation of energy in facility design.

CO2 Describe the technologies, codes and policies for energy conservation in buildings

CO3 Explain the Energy Saving Opportunities in Various Building facilities and Services

CO4 Design of energy efficient buildings and environment friendly building.

Course Contents

UNIT-1: Acoustics and Lighting [7Hours]

Acoustical Designs, Noise and its control, Natural and artificial Light in Building, Lighting, Measurement, Design of Lighting system.

UNIT-2: Energy Conservation in Buildings [8Hours]

Thermal properties of buildings, Thermal insulation and insulating material, Thermal design of enclosures, Thermal environment inside building, cooling & heating loads, Centralized Systems of air-conditioning.

UNIT-3: Electrical Services [7Hours]

Planning electrical wiring for building – Main and distribution boards ,Layout of substations – Solar power system. Conductor, cable & conduits, Elevators, Escalators and conveyer, Design, Type, Location, byelaws etc.

UNIT-4: Water Supply Systems [7Hours]

Domestic and commercial Hot water and water supply system for multi-storeyed buildings, Swimming pools-Design criteria, Drainage system: Nature of Drainage phenomenon, Anti siphon

& vent piping - Installation, External drainage System in building, Design aspects of Sewage Treatment Plants.

UNIT-5: Fire Safety installation in Buildings [7Hours]

Causes of fire in buildings, Safety regulations, NBC Planning considerations in buildings. Heat and smoke detectors, Fire alarm system, Snorkel ladder, Fire lighting pump and water storage, Dry and wet risers , Automatic sprinklers, Norms for fire prevention and mitigation measures, Fire rating of materials.

References

1. National Building code, Bureau of Indian standard
2. V .O.Kusen &C.M.Harris, Acoustical designing in Architecture, John.Wiley & Son.
3. R. L. Suri, Acoustic designing & practice, Asia Publishing House.
4. B. Govoni, Main climate & Architecture, Elsvire Publishing co
5. J. P Van Stratten, Thermal Performance of Building, Elsvier Publishing Co.
6. Functional requirement of building (other than Industrial Building), BIS Handbook

Programme Elective -III

Subject Name: Cost and Quality Management **Subject Code: MTCE25PE203-B**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 To explore the principles and applications of various formwork systems in construction projects.

2 To gain comprehensive knowledge of steel construction methods and the intricacies of pre-stressed concrete design.

3 To evaluate the criteria for selecting construction equipment based on project requirements and site conditions

Course Outcomes:- Students will be able to

CO1 Study the methods of a construction system and hence measure works.

CO2 Apply control concepts for improving the quality of construction.

CO3 Maintain the records of quality assurance processes and audits.

CO4 Know various quality improvements techniques.

CO5 Implement safety policies, methods, training provided on any ISO approved construction policies.

Course Contents

UNIT-1: Construction Costing **[8Hours]**

Costing of construction Works, different methods of costing, types of costs, demand and supply, cost elements in a project, Analysis of rates, Non-scheduled items of work, Cost estimation for a small construction job, Purpose, methods and stages of cost control, cost monitoring, cost forecasting methods.

UNIT-2: Cash Flow **[7Hours]**

Determining the funds required for a construction job, preparing cash flow statements, Cash inflow and outflow during contract period, Project expectations and performance models.

UNIT-3: Cash and Payment of Works **[7Hours]**

Precautions in custody of cash, Maintenance of temporary advance and advance account, different types of payment, first running advance and final payments.

UNIT-4: Preparation of Bill and Report **[7Hours]**

Preparation of bills for payment, measurement book, mode of payment, running account bill, Ledger and Cash book details, Arbitration, Completion report of the project; Checking of Plan, Details of various works and issue of completion report of the project.

UNIT-5: Quality and Quality Assurance **[8Hours]**

Factors influencing construction quality, Concept of Quality Control, Quality Management and Total Quality Management (TQM), Designing of quality manuals, checklists and inspection reports, installing the quality assurance system, monitoring and control. Quality system standard, ISO 9000, ISO 14000 and QS 9000 family of standards & requirements

References

1. Chitkara, K.K. Construction Project Management, Tata-McGraw Hil
2. P. S. Gahlot & B. M. Dhir, Construction Planning & Management, New Age int.
3. Mueller, F.W. Integrated cost and schedule control for construction projects.
4. Gopalakrishanan, P, Sundaresan, Material Management- an Integrated Approach, Prentice Hall.
5. Datta, material Management procedures, Text and Cases, 2e. Prentice Hall
6. Dobbler and Bart, Purchasing and supplies Management, Text and Cases, 6e.
7. ISO 9000, ISO 14000 and QS 9000 standards and certifications.
8. Schedule of rates, specification manuals etc from PWD.

Programme Elective -III

Subject Name: Construction Techniques **Subject Code: MTCE25PE203-C**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To know the various methods and techniques involved in construction of deep foundations.

2 To get familiar with different construction processes with recommended specifications

3 To provide a coherent development to the students in area of construction technology

.

Course Outcomes:- Students will be able to

CO1 Understand the planning of new project with site accessibility and services required.

CO2 Comprehend the various civil construction equipment's

CO3 Familiar with layout of RMC plant, production, capacity and operation process

CO4 Recognize various aspect of road construction, construction of diaphragm walls, railway track construction etc.

UNIT-1: **[7Hours]**

Introduction, planning of a new project, site access and services, mechanical and manual construction, excavation in earth: Understanding basics and functions of equipment, earthmoving equipment - Tractors, Bulldozers, Scrappers, Power shovel, Hoes, simple numerical problems based on cycle time and production rates, drag line, Clamshell, Trenchers, Compactors- types and performance, operating efficiencies, lifting capacities

UNIT-2: **[7Hours]**

Excavation in hard rock, Rippers, jack hammers, drills, compressors and pneumatic equipment, blasting explosives, detonators, fuses, drainage in excavation – necessity and methods of dewatering

UNIT-3: **[8Hours]**

RMC Plant, layout and production capacity, type of concrete mixers, machinery for vertical and horizontal transportation of concrete, grouting, Shotcreting, under water concreting, Type of formwork, Slip formwork, equipment for placing of concrete in normal and difficult situations

UNIT-4: **[7Hours]**

Prefabricated construction: Relative economy, steel construction: planning and field operations, erection equipment, cranes of various types such as tower, crawler, tower crane, floating and dredging equipment

UNIT-5: **[7Hours]**

Road construction aspects, asphalt mixing and batching plant (Hot Mix Plant), sensor paver for rigid roads, crushing plants belt conveyers, cableway, and construction of a new railway track.

Text books:

1. . Peurifoy R.L. (2010). Construction, Planning, Equipment & Methods, McGraw hill Book Co. N. Delhi
2. Verma Mahesh, (1975). Construction Equipment, Metropolitan book Co., New York
3. Singh J., (2006). Heavy Construction - Planning, Equipment & Methods, Oxford & IBH Pub., N. Delhi
4. Huckin T. N. and Olsen L. A."Technical Writing and Professional Communication for Nonnative Speakers of English"Tata McGraw Hills, UK

Subject Name: Research Methodology and IPR **Subject Code: MTCE25RM204**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To select and define appropriate research problem and parameters with appropriate methodology.

2 To understand statistical techniques for the specific perspective data in an appropriate manner.

3 To make predictions and decisions for the data set using open-source software.

4 To understand the mathematical modeling and its predicting capabi

5 To learn the various steps in research writing and publication process

Course Outcomes:- Students will be able to

CO1 Understand various mathematical techniques useful in research work.

CO2 Understand various sampling techniques useful in research work

CO3 Understand various techniques for correlating and predicting different parameters with each other based on data collected.

CO4 Understand concept of research, its types, methods, detailed procedure to identify and solve a research problem.

CO5 Design the experiments for research work Analyze and interpret the data, results and to conclude the final results

UNIT-1: **[8Hours]**

Introduction, meaning of research, objectives, types and role of scientific and engineering related research in advancing the knowledge, defining a research problem, formulation of a hypothesis, research design and features of good design, methods of data collection, approaches and techniques for data acquisition, processing, analyses and synthesis, Designing a questionnaire, Interpretation of results, Report Writing, Aspects of literature review, Different ways of communication and dissemination of research results

UNIT-2: **[7Hours]**

Descriptive Statistics, Probability and Distribution: Basic statistical concepts, Measures of central tendency and dispersion, Elements of Probability, Addition and multiplication theorems of probability, Examples, probability distributions, Binomial, Poisson and normal distributions.

UNIT-3: **[7Hours]**

Sampling Techniques: Random sampling, simple random sampling and stratified random sampling, Non-sampling errors.

UNIT-4: Introduction to Intellectual Property Rights **[8Hours]**

Nature of Intellectual Property: Patents, Designs, Trademarks 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-5: Beginning a Project **[7Hours]**

Project Selection, Defining criteria, Project selection methods, Sacred Cow, Comparative Benefit Model (CBM), Quality functional deployment (QFD), Scope Definition, Project Charter development..

Reference books:

1. Gupta S. C. and Kapoor V. K, "Fundamentals of Applied Statistics", Sultan Chand & Com. N.Delhi.
2. Montogomery D. C., "Probability and Applied Statistics for Engineers", Wiley Int.Student Edition
3. Walpole Ronald E, Myers Raymond H and Myers Sharon L, "Probability & Statistics for Engineers and Scientists", 6thEdition,Prentice Hall.
4. Ross S. M., "Introduction to Probability and Statistics for Engineers and Scientists", 3rd Edi, Elsevier
5. Miller and Freund: Probability and Statistics for Engineers", EEE
6. Johnson R. and Wichern, "Applied Multivariate Statistical Analysis", 3rd Edi, Prentice Hall India
7. Douben K. J., "Research Methodologies – Principles and Guidelines of Applied Scientific Research", UNESCO-IHE Lecture Notes LN0317/06/01, Delft, the Netherlands.
8. Holtom D. and E. Fisher, "Enjoy Writing Your Science Thesis - a Step by Step Guide to Planning and Writing Dissertations
9. Prabuddha Ganguly, "Intellectual Property Rights",Tata Mc-Graw Hill.
10. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd, 2007.
11. Robert P. Merges, Peter S. Menell, Mark A. Lemley "Intellectual Property in New Technological Age".

Open Elective -I

Subject Name: Infrastructure Development **Subject Code: MTCE25OE205-A**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To know role of Infrastructure in Nations Economy.

2 Co-relating Budget provisions and construction sector for infrastructure development

3 Role of Public Private Partnership in Economic Development

Course Outcomes:- Students will be able to

CO1 Justify role of Infrastructure in National Economy.

CO2 Co-relate Indian budget and its relation w,r,to any of the Construction sector.

CO3 Explain role of Public Private Partnership in Construction project.

CO4 Identify and apply various provisions made for Infrastructure Development

UNIT-1: Construction Industry **[7Hours]**

Nature, characteristics, size and structure, Role of infrastructure development in employment generation andimproving of the National economy.

UNIT-2: Infrastructure Policies and Agencies **[7Hours]**

Indian government policy, Five year plan of government, Various Agencies associated with infrastructure development in India as regards various sectors.

UNIT-3: Status of Infrastructure Development in India **[7Hours]**

Roads and buildings, communication, water supply, irrigation, power energy sectors, ports aviation, healthand educational services, rural development.Issues related with infrastructure development, Government sector Management, public sector Management, private sector Management.

UNIT-4: Funding and Consultant **[7Hours]**

Funding and managing infrastructure projects, role, and responsibility of project Management consultants.

UNIT-5: Infrastructure Development and Project Development **[7Hours]**

Issues related with infrastructure development, Government sector Management, publish sector Management, private sector Management. BOT projects, PPP projects, related to role of government, concern Construction Company, benefits.

Reference books:

1. Rakesh Mohan, India Infrastructure Report
2. Infrastructure Today - Magazine
3. Document of five year plans, published by Govt. of India
4. CE & CR Magazine.
5. Construction World Magazine.

Open Elective -I

Subject Name: Value Engineering and Valuation **Subject Code: MTCE25PE205-B**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	--	20	20	60	03

Course Objectives:-

1 To produce civil engineers with knowledge of value Engineering and analysis used in construction industry.

2 To produce civil engineer with knowledge of analysis carried out for life cycle costing and applications of value engineering

3 To produce civil engineer with detailed knowledge of valuation for various types of assests.

Course Outcomes:- Students will be able to

CO1 Illustrate the concept and importance of Value Engineering

CO2 Demonstrate their capability for Value analysis and Management.

CO3 Use of Life cycle costing for the construction project.

UNIT-1: Value **[7Hours]**

Meaning of value, basic and secondary functions, factor contributing to value such as aesthetic, ergonomic, technical, economic etc., Difference between value engineering, value analysis & value Management, Habits, roadblocks, attitudes & their relevance in value engineering.

UNIT-2: Job Plan **[7Hours]**

Definition & Terms related to Value Engineering Job Plan, Various versions of job plan, Phases involved in job plan.

UNIT-3: Function Analysis **[7Hours]**

Function- Definition, Role of function in achieving value, Types of function, Function Analysis System Techniques (FAST), Graphical function Analysis.

UNIT-4: Value Analysis **[7Hours]**

Principles of value analysis, Benefits & applications of value analysis, Methods for improving the effectiveness of value analysis

UNIT-5: Valuation **[7Hours]**

Types of value, purposes of valuation factors affecting value, Different methods of valuation for different types of assets such as land and building, horticulture, historical places, Valuation Report: Valuation Report, contents, standard formats, Case study of any one Report.

References

1. O. P. Khanna Industrial Engg. & Mgt., Dhanpat Rai Publ.
2. T. R. Banga, S. C. Sharma Industrial Organization & Engg. Economics, Khanna Publ.
3. B.N. Dutta, Estimating and Costing in Civil Engineering: Theory and Practice Published S. Dutta & Company, Lucknow.
4. M. Chakraborty, Estimating, Costing Specifications & valuation in Civil Engineering Published By: Author.
5. G. S .Birdie Estimating and Costing
6. Rangwala, Estimating and Costing , Charotar Publishing House
7. P. T. Joglekar, Practical Information for Quantity Surveyors, Property valuers, Architects Engineers and Builders, Pune
8. Vidyarthi Griha Prakashan, 2008 reprint.

Open Elective -I

Subject Name: Operation Research **Subject Code: MTCE25OE205-C**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To familiarize with concepts and techniques of Linear and Nonlinear Programming Problems.
2 To derive feasible and optimal solution for Transportation and Assignment Problem
3 To apply various methods to select and execute various optimal strategies using decision theory
4 To construct network diagrams with single and three time estimates of activities involved in the project

Course Outcomes

CO1 Understand the theoretical workings of the simplex method, the relationship between a linear program and its dual, including strong duality and complementary slackness.

CO2 Perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change.

CO3 Solve specialized linear programming problems like the transportation and assignment problems, solve network models likethe shortest path, minimum spanning tree, and maximum flow problems

CO4 Understand the applications of integer programming and a queuing model and compute important performance measures.

Unit 1: Introduction to Operations Research [8Hours]

Introduction, Use of Operations Research in Civil Engineering and Managerial Decision making process, Structure of the Mathematical Model, Limitations of Operations Research, Identification of civil engineering systems and their methods of analysis, Introduction to Optimization Techniques and their application in Engineering Planning, Design and Construction, Multivariable optimization with and without constraints, Gradient vector and Hessian Matrix, Gradient techniques, steepest ascent/decent technique, Newton's Method, Lagrange Multiplier Technique, Objective function and constraints, convex and concave functions, regions and sets.

Unit 2: Linear Programming **[7Hours]**

Introduction, Linear Programming Problem, Requirements of LPP, Mathematical Formulation of LPP, Graphical method, Simplex Method Penalty Cost Method or Big M-method, Two Phase Method, duality, Sensitivity Analysis, Civil engineering applications.

Unit 3: Transportation Problem **[7Hours]**

Formulation, solution, unbalanced Transportation problem, finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method.

Unit 4: Integer, Dynamic and Non-Linear programming **[8Hours]**

Integer programming Introduction, Types of Integer Programming Problems, Gomory's cutting plane Algorithm, Branch and Bound Technique, Introduction to Decomposition algorithms. Dynamic programming Multi stage decision processes, Principle of optimality, Recursive equation, Application of D.P., Decision theory. Non-Linear programming: Single variable unconstrained optimization –Local & Global optima, Uni-modal Function- Sequential

Search Techniques: Dichotomous, Fibonacci, Golden Section methods.

Unit 5: Simulation AND Queuing Theory and Game Theory **[7Hours]**

Introduction, Methodology of Simulation, Basic Concepts, Simulation Procedure, Application of Simulation Monte-Carlo Method: Introduction, Monte- Carlo Simulation, Applications of Simulation, Advantages of Simulation, Limitations of Simulation. Queuing Theory, Simulation, Sequencing model, n jobs through 2, 3 and M machines, Competitive games, rectangular game, saddle point, minimax, maximin method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle, Rectangular games without saddle point – mixed strategy for 2 X 2 games.

References:

1. Taha, H.A. "Operations Research - An Introduction", Prentice Hall, (7th Edition), 2002.
2. Ravindran, A, Phillips, D. T and Solberg, J. J. "Operations Research: Principles and Practice", John Willey and Sons, 2nd Edition, 2009.
3. Hiller, F. S. and Liebermann, G. J. "Introduction to Operations Research", Tata McGraw Hill, 2002.
4. S. D. Sharma, Operations Research, KedarNath Ram Nath-Meerut.
5. KantiSwarup, P. K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons

Subject Name: PG Lab II **Subject Code: MTCE25PC206L**

TEACHING SCHEME	EXAMINATION SCHEME		CREDITS
PR(Hrs/Week)	CA	ESE	
04	50	-	02

Term work should consist of any (Three) exercises from the following.

1. One site visit to study the feasibility aspects, Tendering procedures, accounting systems, funds raising and other financial Management aspects, billing procedures etc. associated with on-going major construction work-visit report to be submitted.
2. Collection and study of Tender notices, tender documents of contract document associated with Civil Engineering works.
3. Study and use of various computer software_s, use in the field associated with Project Management (MSP or Primavera).
4. Web based project Management.

Subject Name: Mini Project **Subject Code: MTCE25EL207P**

TEACHING SCHEME	EXAMINATION SCHEME		CREDITS
PR(Hrs/Week)	CA	ESE	
04	50	-	02

Mini project shall be based on one of the topic chosen in consultation with the supervisor. Mini project may be interdisciplinary nature. Areas of recent techno-Management development shall be explored. Research innovations may be considered as prospective areas. Mini project may be related with main project to explore possibilities of continuation further and to study the pre-requisites.

Subject Name: Communication Skill Subject Code: MTCE25AEC208

TEACHING SCHEME	EXAMINATION SCHEME		CREDITS
PR(Hrs/Week)	CA	ESE	
02	50	-	01

Course Objectives:-

1 To study language for technical purpose and presentation tools

2 To understand research proposal and its writing

3 To understanding role of meeting, action plan and demo meeting

Course Outcomes:- Students will be able to

CO1 Understand technical language its presentation and graphical presentation

CO2 Determine research proposal ,project report and writing report in proper format

CO3 Developing meetimg agenda , schedule of meeting and concluding minutes

Course Contents

PR- 1: Language for Technical Purpose and Presentation Tools

PR- 2: Formal Written Communication

PR- 3: Project Research Proposals and Reports

PR- 4: Project Research Proposals and Reports

PR- 5: Business Meetings

References:

1. S. Hariharan, et.al. Soft Skills; MJP Publishers, 2010.
2. John Seely, Oxford Guide to Effective Writing and Speaking; Oxford University Press, 2009.
3. Thomas N. Huckin and Leslie A. Olsen, Technical Writing and Professional Communication
4. Nonnative Speakers of English; Tata McGraw Hills, International Edition, 1991
5. Jeff Butterfield,Soft Skills for Everyone,cengage Learning India Private Limited,2010

Semester-III

Open Elective -II

Subject Name: Architecture and Town planning **Subject Code: MTCE25OE301-A**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To understand the role of architecture and engineer in town development

2 To study byelaws as per govt. norms

3 To understand the development aspect of major cities as per master plan

Course Outcomes:- Students will be able to

CO1 Understand the principles of architecture and the role of urban planners in integrating function and aesthetics in design.

CO2 Learn objectives, stages, and regulations of town planning with a focus on urban and rural development.

CO3 Apply principles of environmental art and design in urban landscapes with emphasis on materials,styles, and ecological renewal and site planning through case studies of planned towns.

CO4 Develop master plann cinogn ssidtreartaetgioienss .i ncorporating zoning, density, safety, and urban financing while adhering to municipal acts

CO5 Design for various climatic conditions using passive and active energy controls, and analyze urban

Course Contents

Unit 1: Architecture Design [7Hours]

Introduction history & concept of Architecture, Principles of architecture, an analysis, integration for function and aesthetics, Role of “urban planner and architect” in planning and designing, Architectural composition and elements of design.

Unit 2: Town Planning [7Hours]

Objectives, scheme, planning for transportation and utility services, stages in town development, Urban renewal & planning for rural development, Surveys-site Analysis, Development control, zoning regulations, Layout regulations, Urban planning standards, green belt.

Unit 3: Landscaping [7Hours]

Objectives, scope, Environmental art and design for urban landscape, objectives, principles, elements, material, soft landscaping, hard landscaping, and garden styles: modern and historical, water body conservation and creation, Layout design concepts, Plant characteristics & planting design, Environmental considerations in landscape planning.

Unit 4: Concept of Master Plan [7Hours]

Structure plan, detailed town planning scheme and action plan, Estimating future needs, planning standards for different land use allocation for commerce, industries, public amenities, open areas etc, Planning concepts-application of anthropometry and space standards, Interrelationships of functions, planning standards for density distributions, density zones, Safety standards, planning standards for traffic network, standard of roads, Building Rules & Regulations, Integration of building services, Plan implementation.

Unit 5: Town planning legislations and municipal acts [7Hours]

Planning of control development schemes, urban financing, land acquisition, slum clearance schemes, and pollution control aspects and planning agencies for various levels of planning, their organization and purpose, CIDCO-MHADA-MIDC.

References:

1. G. K .Hiraskar, “Town planning”, Dhanpatrai Publication 2002
2. S. Rangwala, “Town planning”, Charotar Publishing House Pvt. Ltd., 2009
3. G Muthu, Shobha, Mohan, “Principles of Architecture” 2006 MRTP act 1966
4. UDPFI guidelines, ministry of urban affairs and employment, Govt. & India.
5. koenigsbeger, “Manual of tropical housing and building”, Universities Press (India)
6. Sustainable Building - Design Manual: Sustainable Building Design Practices, 2009 TERI
7. Shah, Kale, Patki, “Building Drawing”, Tata McGraw-Hill Education, 5th edition
8. Gevorkian, “Green Buildings”, Mc Graw hill.
9. Haselbach, “The engineering guide to LEED”, new construction-sustainable construction for engineers, The McGraw-Hill,2008.

Open Elective -II

Subject Name: Risk Analysis and Decision Making Subject Code: MTCE25OE301-B

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To understand the risk and its decision making in details

2 The analysis of risk in field by various techniques

3 To study the risk Management and policies.

Outcomes: Upon completion of the course the students will be able to:

CO1 Classify and compute risks and risk containment and risk reduction policies.

CO2 Manage risk effectively and thus have better decision making.

CO3 Understand financial savings and better productivity due to effective use of resources and thus have enhanced success rates of ongoing as well new projects.

Unit 1: Introduction to Risk Management [7 hours]

Importance of risk, development of risk Management system, Identifying risk events, cost of risk, types of risk and classification, Benefits of risk Management, responsibilities of those involved in risk Management, Risk Management standards, decision making strategies effects of tax laws, government rulings, conflict resolution, money, time and technical risks, Risks in the context of global project teams.

Unit 2: Risk Analysis and Management for Projects (RAMP) [7 hours]

Probability distribution, Stages in Investment life-cycle, Determination of NPV and its standard deviation for perfectly co-related, moderately co-related and uncorrelated cash.

Unit 3: Risk Analysis Techniques [7 hours]

Sensitivity analysis, Uncertainty, cost factors and benefit factors, Scenario analysis, scenario analysis simulation, Decision tree analysis, risk profile method, certainly equivalent method, risk adjusted discount rate method, certainty index method, 3 point estimated method, Use of risk prompts, use of

risk assessment tables, details of RAMP process, utility of grading of construction entities for reliable risk assessment, Entrepreneurial risks, pure risks, Contract review and legal conflicts.

Unit 4: Risk Mitigation [7 hours]

By elimination, reducing, transferring, avoiding, absorbing or pooling, Residual risk, mitigation of unqualified risk, Coverage of risk through CIDC's.

Unit 5: Risk Mitigation Policies [7 hours]

Actuarial Society of India programs: through risk premium such as (BIP), Bidding Indemnity Policy (DIMO), Delay in meeting obligation by client policy, (SOC), Settlement of claims policy (LOP), Loss of profit policy (TI), Transit Insurance policy (LOPCE) Loss of performance of construction equipment policy.

References

1. Kit Sadgrove, Complete guide to business risk Management Gower Publishing Ltd.
2. Hans Buhlmann, Mathematical Methods in Risk Theory Springer Verlang
3. Prasanna Chandra, Project planning analysis selection implementation and review Tata McGraw Hill
4. Christopher Marrison, Fundamentals of risk measurements Tata McGraw Hill
5. Ian Cameron, Raghu Raman Process Systems Risk Management Elsevier Academic Press
6. Seetharaman, Construction Engineering and Management Umesh Publications

Open Elective -II

Subject Name: Legal Aspect In Civil Engineering

Subject Code: MTCE25OE301-C

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To study the types of contract & its administration and RERA

2 To understand industrial acts and labour laws

3 To study arbitration and awards, safety engineering for major projects

Course Outcomes:- Students will be able to

CO1 Students will learn Indian contract act, Arbitration act and contract administration

CO2 Student will gain knowledge about bailment and FIDIC

CO3 : Students will be exposed to safety engineering and relevant act

Course Content

UNIT-1: **[7Hours]**

Professional Practice and Administration Contracts: The standard form of building contracts, Indian contract Act, The right of building owner, Right of Contractor, Types of Civil Engineering contracts, RERA

UNIT-2: **[7Hours]**

Bailment: Nature of Transactions, Delivery of Bailee, care to be taken, Bailee's Responsibility, Termination, Bailment of pledges. Injunction: Types Temporary, Perpetual, Mandatory when referred, Indemnity and Guarantee: Difference between the two, The Contract of Guarantee and Indemnity,

UNIT-3: **[7Hours]**

Industrial Acts and Labour Laws: Indian factories Act, Industrial Dispute Act, Payment of Wages Act, Work Compensation Act,Trade Union Act, The Building and Other Constructions Workers' (Regulation of mployment and Conditions of Service) Act, 1996

UNIT-4: **[7Hours]**

Arbitration and Award: Indian Arbitration Act, Arbitration Agreement, Conduct of Arbitration, Power and Duties of Arbitration, Rules of Evidence, E- Tendering, Preparation and publication of ward, Methods of Enforcement impending and Awards.

UNIT-5: **[7Hours]**

Safety Engineering: Sources, Classification, Cost of Accident and Injury Workmen's Compensation Act, Safety Programme, Safety Organization. Employers Liability Act, Employers Insurance Act, Safety and Health tandards Occupations Hazards, personal Protective equipments, preventive measures Factory Act, Fatal accidents.

References

1. Indian arbitration Act by B. S. Patil
2. Indian Contract Act.
3. Safety Engineering, Govt. of India Publication
4. Professional Practice, Roshan Namavati.
5. Legal Aspects of building and Engineering Contracts by B. S. Patil

Reference Books

1. Indian Contract Act Avatar singh
2. Indian contract Act Jhamb

Multidisciplinary Minor
Subject Name: Entrepreneurship **Subject Code: MTCE25MD302-A**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 To develop entrepreneurship awareness.
2 To inculcate an entrepreneurial mindset into the minds of young professionals
3 To leverage managerial and leadership skills for founding, leading & managing Startups
4 To learn & understand the processes and practices in business and their applications

Course Outcomes:- Students will be able to

CO1 Understand entrepreneurship and its role in economic development.
CO2 Compare and analyse the types of entrepreneurship and decision processes
CO3 Understand and relate to the business organisations and business laws
CO4 Examine the essentials to avoid failure in Entrepreneurship

UNIT-1: Introduction to Entrepreneurship **[7Hours]**

Meaning, Definition, Concept, Evolution of Entrepreneurship, Role of Entrepreneurship in Economic Development. Motivation theories- McClelland's Need Achievement Theory, Case Study of Indian Entrepreneurs in the PreIndependence and Post-Independence Era

UNIT-2: Entrepreneur concept **[7Hours]**

Why become an entrepreneur? Entrepreneur v/s Entrepreneur, Entrepreneur Vs. Manager, Types of Entrepreneurs, Social Entrepreneurship, Rural Entrepreneurship, Family Business Entrepreneurship, The Entrepreneurial Decision Process, Case Study of Entrepreneurship in Different Sectors

UNIT-3: Business organisation **[7Hours]**

Types of Business Organisations -Sole Proprietorship, Joint Hindu Family Business, Partnership, Limited Liability Partnership (LLP), Corporate Governance, Franchising,

UNIT-4: business laws **case study on business success** **[7Hours]**

Business Laws in India to Start Business, Legal aspects of business (IPR, GST, Labour laws) Case Study of success in Entrepreneurship

UNIT-5: Case studies on business failures **[7Hours]**

Concepts of Entrepreneurship Failure: Issues of Entrepreneurial Failure, Reasons of Entrepreneurial Failure, Essentials to Avoid Failure in Entrepreneurship. Case Study of Failure in Entrepreneurship

Text books:

1. Khanka SS - Entrepreneurial Development - S.Chand & Co. Ltd 2010.
2. Hisrich, R. D., Peters, M. P., & Shepherd, D. A. (2017). Entrepreneurship.

2. Reference books:

1. Frederick, H., O'connor, A., & Kuratko, D. F. (2016). Entrepreneurship: Theory, process, and practice, Cengage Learning.
2. Katherine Carpenter (2021). Introduction to Entrepreneurship, Kwantlen Polytechnic University.
3. Drucker, P., & Maciariello, J. (2014). Innovation and entrepreneurship. Routledge.

Multidisciplinary Minor
Subject Name: Managerial Techniques **Subject Code: MTCE25MD302-B**

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

To study the managerial techniques for major projects

2 To study the six sigma and DMAIC, DMADV for execution of project

3 To understand work method its analysis and control technique in Management

Course Outcomes:- Students will be able to

CO1 Inculcate various managerial techniques in practices

CO2 Analyze process control tools and techniques to improve the outcome

CO3 Adopt modern technological advancements to suit the project characteristics, at large.

UNIT-1: Introduction to Managerial Techniques **[7Hours]**

Introduction, Evolution of Managerial techniques, Managerial aspects, Management characteristics, Essentials of Managerial Techniques

UNIT-2: Process Control Techniques in Management **[7Hours]**

Quality- Improvement Programs, Starting a Quality Improvement Program, Experimental Designs for Quality improvement, Quality Control -Statistical process control: concepts of stable industrial processes, Systematic variation, random variation, Control Charts for Measurements, Control Charts for Attributes, Tolerance Limits, Acceptance Sampling

UNIT-3: Method Study and Work Study and Motion Study **[7Hours]**

Method Study: Analysis of Operations, job work, systems involving man and machines. Schematic methods, charts and other aids for analysis

Work Study: Method of work measurement, stopwatch study; PMTS; work sampling, setting of time standards.

Motion Study: Principles of motion economy and work center design

UNIT-4: Technology based Managerial Techniques [7Hours]

Introduction, Need of Technological advancements in Management, MIS, Resources Management using softwares, Planning softwares, BIM,MSP, Primavera, Advantages, Applications.

UNIT-5: Introduction to Six Sigma Technique [7Hours]

Introduction, Concept, Tools, DMAIC, DMADV, Justifying six sigma, Readiness of six sigma, Advantages, Applications

Text books:

1. Jain P. L. (2001) "Quality Control and Total Quality Management", Mc-Graw Hill Book Co.,New Delhi
2. Breu G.(2002) "Six Sigma for Managers", Mc-Graw Hill Book Co., New Delhi
3. Arora P. N., Arora S., Arora S. Arora A.(2007) "Comprehensive Statistical methods", S Chand Publishing, New Delhi
4. Jhamb L. C. (2000) "Work Study & Ergonomics" Everest Publishing House, Pune.

Reference books:

1. IS: 15883 (Part I): 2008 "Construction Project Management" BIS, New Delhi 2008
2. Munro R. A. and Ramu G. (2012) "The certified six sigma green belt Handbook" American Society of Quality

Multidisciplinary Minor
Subject Name: Business Communication & Presentation Skills
Subject Code: MTCE25MD302-C

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objectives:-

1 The objective of this Course is to understand the communication concepts and to develop the students' competence in communication at an advanced level.

2 Assuming that the students are fairly proficient in the basic communication skills of listening, speaking, reading and writing in English the course aims to train them in communicating efficiently in the workplace and professional contexts.

Course Outcomes:- Students will be able to

CO1 Inculcate basics of business communication skills & relevant tools

CO2 Understand business SOPs and essentials of the same

UNIT-1: Language for Technical Purpose and Presentation Tools [7Hours]

Technical vocabulary, Sentence structures, Computer Aids, Graphical presentations Drafting Letters, e-Mails, Memos, Notices, Circulars, Schedules.

UNIT-2: Project Proposals and Project Reports [7Hours]

Abstract, Aims, Background & significance, Design & methods, writing a sample proposal.

Project Report: Types of reports, planning a report, Collection & organization of information, Structure & style, Proof reading etc.

UNIT-3: Leadership Skill and Team Building, Working [7Hours]

Leadership Skills: Leadership quality and styles, Emotional intelligence, Diplomacy and Tact and effective communication, Case studies. Need of team, Effective teams, Group development

UNIT-4: Business Meetings **[7Hours]**

Understanding role of meetings, planning meetings, developing meeting agendas, scheduling meetings, Taking notes and publishing minutes

UNIT-5: Presentation Skills **[7Hours]**

Use of presentation tools, Presentation, nonverbal techniques, handling questions

Text books:

1. Hariharan S. (2010)"Soft Skills" MJP Publishers, Chennai
2. Seely S. (2009)"Oxford Guide to Effective Writing and Speaking" Oxford University Press, UK
3. Huckin T. N. and Olsen L. A."Technical Writing and Professional Communication for Nonnative Speakers of English"Tata McGraw Hills, UK
4. Masters A. & Harold R. W. (2011) Personal Development for Life & Work, Learning India Private Limited

Subject Name: Seminar II **Subject Code: MTCE25EL303S**

TEACHING SCHEME	EXAMINATION SCHEME		CREDITS
PR(Hrs/Week)	CA	ESE	
04	50	50	02

Seminar II shall be delivered on one of the advanced topics chosen in consultation with the supervisor after compiling the information from the latest literature. The concepts must be clearly understood and presented by the student. All modern methods of presentation should be used by the student. Minimum 03 presentations are expected within period of semester by the student. A hard copy of the report (20 to 25 pages, A4 size, 12 fonts, Times New Roman, 1.5 line spacing with normal margin on all sides, both side printed, as per format) should be submitted to the Department Post Graduate Committee (DPGC) before delivering the seminar. A copy of the report in soft form must be submitted to the Supervisor along with other details, if any.

Subject Name: Project-I **Subject Code: MTCE25EL304P**

TEACHING SCHEME	EXAMINATION SCHEME		CREDITS
PR(Hrs/Week)	CA	ESE	
24	100	100	12

Dissertation Stage I and Synopsis Approval Presentation:

It is a course requirement under the guidance of faculty Supervisor. PG student from second year is required to do innovative and research oriented applied work related to various theory and laboratory courses. Dissertation work may cover analytical formulation, experimentation or survey based project or combination of these. Student are encouraged to undertake an interdisciplinary type project.

Synopsis:

It is expected from the student to carry out exhaustive literature survey with consultation of his/her Supervisor for not less than 15 reputed national, international journal and conference papers. Student should present the Synopsis Submission Presentation (SSP) with literature survey report to justify about the research gap, innovativeness, applicability, relevance and significance of the work. Student shall undertake project work after approval of synopsis.

Dissertation Stage I presentation:

It is expected that student shall present preliminary results from his/her work during the semester with report as per prescribed format. If student is not showing satisfactory performance, then he/she will be given grace period of 2 weeks. After 2 weeks student will be again evaluated with grade penalty. Minimum 02 ISE presentations should be delivered by the student during semester.

Semester- IV

Subject Name: Project Stage II **Subject Code: MTCE25EL401P**

TEACHING SCHEME	EXAMINATION SCHEME		CREDITS
PR(Hrs/Week)	CA	ESE	
40	100	100	20

Based on the guidelines and progress of stage II works, all the desired work should be completed and final dissertation report will be prepared and presented during examination. It is desirable that student presents/publishes the research paper in peer reviewed conference/research journals. If student is not showing satisfactory performance, then he/she will be given grace period of 4 weeks. After 4 weeks student will be again evaluated with grade penalty.

Subject Name: Indian Knowledge System In Architecture And Town Planning

Subject Code: MTEC25IKS107

TEACHING SCHEME		EXAMINATION SCHEME			CREDITS
TH(Hrs/Week)	TU (Hrs/Week)	MSE	CA	ESE	
03	00	20	20	60	03

Course Objective:

1. Students would be introduced to the glorious past and achievements of the Indian subcontinent ranging from the "ancient period" to the "medieval period" concerning architecture and town planning.

2. To develop a sense of pride and belongingness amongst the students towards Indian Knowledge Systems and further motivate them to bridge the gap between knowledge and application.

3. To understand the nuances of site location, design, layout, architectural elements and planning of residences, temple architecture, forts, town and city planning.

Learning Outcome:

1. The course is devised to acquaint the students with the vast expanse of knowledge on Vastu Vidya and Vastu Shastra.

2. Students would be introduced to ancient Indian scriptures on Architecture and Planning; Temple architecture styles and Town Planning in ancient India.

Module 1: Introduction and Fundamental Concepts Concept of space in Indian Art and Architecture

Module 2: Temple Architecture Historical timeline for dynasty mapping and their important architectural and planning developments. Evolution of temple architecture from rock-cut to isolated to structural temples

Temple construction and style: Nagara, Vesara and Dravida Ancient Indian treatise on Temple Architecture Iconography in Temples

Module 3: Irrigation and Water Management System Irrigation and Water Management System in Ancient India

Module 4: Town Planning Ancient Indian Town Planning with reference to Indus Valley Civilization Classification of towns according to Manasara Town Planning as per cosmic orientation Planning of temple towns and sacred geometry of ancient cities

References:

1. Mayamatam : Treatise of Housing Architecture and Iconography by Bruno Dagens

2. Architecture of Manasara by Prasanna Kumar Acharya

3. Encyclopaedia of Indian Temple Architecture by Michael W. Meister (Editor), M. A. Dhaky

4. Theory and Practice of Temple Architecture in Medieval India by Adam Hardy

5. The Hindu Temple: An Introduction to Its Meaning and Forms by George Michell

6. Rediscovering the Hindu Temple: The Sacred Architecture and Urbanism of India by Vinayak Bharne and Krupali Krusche

7. Elements of Indian Art: Including Temple Architecture, Iconography and Iconometry by S.P. Gupta