PEOPLE'S UNIVERSITY, BHOPAL

Programme: **M. Tech. (Construction Technology & Management)** **Semester -II**

Subject Title	Subject Code	Credit			Theory		
		L	T	P	External (70)	Internal (30)	Total (100)
Construction Management	MTCM-201	3	1	-			Min: 40 (D Grade)

Duration of theory (External): 3 hours
Theory internal - max marks: 30
Best of two mid semester test – Max. Marks: 15
Assignment / Quiz/ Regularity – Max. Marks: 15

Unit	Contents (Theory)
I	**Contract Management - I :** Types of Construction contract, Lump sum, Unit rate, cost plus-fee, Cost Plus percentage-fee, Incentive Contracts, Nature of Contract, Contract Documents and Contracting procedures, contract revisions, Negotiated contracts, contract claims.
II	**Contract Management – II:** Technical Specifications, Drawings, Tender Bond, Labour and Material Payment Bonds, Scrutiny of Tenders, acceptance, letter of Indent. Important Contract clauses, Terms of Payment, retention acceptance and final payment, maintenance period, Time for Completion, Extension of time, Variation in work and conditions, claims and disputes, liquidated damages, Termination rights and responsibility of client, Architect, Engineer, Contractor, Professional liability. Disputes in contracts, Sub-contracts Purchase orders as contracts. Insurance Contract and Claims. Arbitration, Accounts.
II	**Tender Management:** Advance Techniques of Estimating. Principles of Analysis of rates and Specification, writing for different types of construction industries, capital structure, Theories.
IV	**Legal Frame Work of Construction:** Constitutional provisions relating to Business and industry, Master Plans, Indian Contract Act, Arbitration act.
V	**Labour Laws and Legislation:** Contract labour (RRA) ACT 1970, laws relating to wages, bonus & industrial disputes.

References:

1 Estimating & Costing by B. N. Dutta.
2 Quantity Surveying & Costing by Sanjay Mahajan.
3 Laws relating to building & Engg. contracts in India M.P.P.W.D. Code.
4 Construction Project Management by Neeraj Kumar Jha.

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Subject Title	Subject Code	Credit			Theory		
		L	T	P	External (70)	Internal (30)	Total (100)
Prefabrication Design & its Construction Tech.	MTCM-202	3	1	-			Min: 40 (D Grade)

Duration of Theory (External): 3 hours
Theory Internal - Max Marks: 30
Best of two mid semester test –Max. Marks: 15
Assignment / Quiz/ Attendance –Max. Marks: 15

Unit	Contents (Theory)
I	**Prefabricated Construction:** Prefabricated construction, necessity, Advantages, disadvantages, Mass produced steel, reinforced concrete and masonry systems, Industrialised buildings.
II	**Modular Construction :** Modular coordination, basic module, planning and design modules, Modular grid systems, National Building Code Specification, Standardizations, Dimensioning of products, Preferred dimensions and sizes, tolerances and deviations layout and processes.
III	**Prefabricates:** Classification, foundation, columns, beams, roof and floor panels, wall panels, clay units, box prefabricates, erection and assembly.
IV	**Design of prefabricated Elements:** Lift points, beams, slabs, columns, wall panels, footings, design of joints to transfer axial forces, moments and shear forces.
V	**Construction Techniques:** Large panel construction, Lift slab system, Glover system, constrains' jack-block system, Constain V-Plate system, Bis on system, Silber-Kuhi System, control of construction processes.

References:

1 Prefab Architecture by Ryan E Smith.
2 Modern Modilar by Jill Herbers.
3 Sustainable Design by David Bergman.

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Subject Title	Subject Code	Credit			Theory		
		L	T	P	External (70)	Internal (30)	Total (100)
Construction Equipment and Material Management	MTCM-203	3	1	-			Min: 40 (D Grade)

Duration of theory (External): 3 hours
Theory internal - max marks: 30
Best of two mid semester test –Max. Marks: 15
Assignment / Quiz/ Attendance – Max. Marks: 15

Unit	Contents (Theory)
I	**Planning and Selection of Construction Equipment :** Advantage of mechanization of Construction industry. Merits of Labour intensive construction. Planning for construction equipments. Analytical studies, equipment operation. Selection of construction machinery & equipments.
II	**Production Estimates, Sizing and Matching :** Cycle time capacity ratings and output of Excavators, Power shovels, drag lines, scrapper, bulldozers, tractor shovels rippers, motor graders etc. Sizing and matching. Capacity ratings and output of compactors, aggregate processing plant concrete production plants
III	**Economics of Construction Equipment :** Equipment working rates, Investment cost, Depreciation cost, major repair cost. Cost of fuel and lubricants. Cost of labour, servicing and field repairs, overheads. Recommendations of statutory bodies.
IV	**System Approach :** Problems of equipment management. Application of CPM in equipment management. Application of the assignment model, transportation model and waiting line models in equipment management.
V	**Material Management :** Materials planning and budgeting. Role and functions at different levels of management and budgeting variations. Stages of materials management. A.B.C. analysis. Advantages, mechanics purpose cautions, limitations and tabular analysis. Purchasing parameters and inter relationships. Time source quantity, price, quality, grading systems. Special purchasing systems. Obsolescence. Scrap disposal.

References:

1 Construction Planning & Management by Sitaraman.
2 Construction Equipment & Management by S C Sharma.
3 Construction Equipment & its planning & application by Dr. Mahesh Verma.
4 Construction Equipment & job planning by S V Deodhar.

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Subject Title	Subject Code	Credit			Theory		
		L	T	P	External	Internal	Total (100)
Financial Management in Construction Industries	MTCM-204	3	1	-	(70)	(30)	Min: 40 (D Grade)

Duration of theory (External): 3 hours
Theory internal - max marks: 30
Best of two mid semester test –Max. Marks: 15
Assignment / Quiz/ Attendance – Max. Marks: 15

Unit	Contents (Theory)
I	**Personnel Management:** Principle of personnel management. Qualities of a personnel manager. Objective of personnel management. Personnel policed procedures and programmes. Organizational structure of personnel department. Man power resources. Human resource planning. Job analysis. Performance standards, work rules. Recruitment and selection process. Tests and interview Induction orientation and in doctrination. Policies, promotion, demotion, transfer etc. Training of personnel's. Need for training. Principles of training programmes. Types of training programmes on the job training policy and implementation. Task analysis identification and methodologies. Evaluation of training and post training follow up. Performance appraisal-rating scales, rankings etc. Management development programmes. Wage and salary management. Principles of wages and salary administration. Factors influencing wages. Types of wages and salary structure. Theory of wages. Minimum fair and living wages. Types of wages. Wage incentives. Types of incentive schemes. Profit sharing features-Fringe benefits general scope. Different types of fringe benefits and awards.
II	**Labour Management:** Industrial relations in construction industry. Principles of industrial relationships. Functional requirements and programme, Industrial disputes, causes of disputes. Types of disputes. Procedures of the settlement of industrial disputes. Implementation mechanism. Trade Unions - Principles of industrial trade unionism. Objectives and functions. Essentials of trade union. Objectives, forms levels and growth of worker's participation in management. Collective bargaining. Principles and main features of collective bargaining. Different industrial Regulations and labour laws and acts – Industrial Health and Safety. Occupational hazards. Provisions under factory act. Accident and safety at construction sites. nature and causes of accident. Safety Programmes and their principles. Factors effecting accidents etc.
II	**Waste Management:** Introduction to waste and waste management, the concept of productivity and its inter relationship with productivity. Systems concept of waste. Complementarity of waste and resource management. Identification of construction waste material waste, man power waste, energy waste, space waste time waste, equipment waste, capital waste, utilities and services waste. Data and information waste. Design of waste reduction in construction. Reduction, Collection, recycling treatment and disposal of waste in construction systems. Modelling of resources and waste flow in construction systems waste management and cost reduction. Roles of legislation and government.
IV	**Financial Management:** Managerial Economics & Financial Statement Nature and scope of managerial economics. Economic theories. Demand analysis and fore casting. Elasticities of demand. Cost and production analysis. Pricing decisions, Policies and practices. Break even analysis. Time value of money, Economics. Comparisons using time value of money basic of comparisons. Decision making amongst alternatives. Cash flow, discounted cash flow. Cash flow forecasting, Project appraisal through financial statements. Statement analysis. Financial ratio analysis, Trend analysis yield. Taxation and inflation, Sinking fund provisions. Risks and uncertainties. Project risk and firm risk. Replacement analysis. Finances & working capital. Capital budgeting & Performance budgeting. Benefit-cost ratio. Project selection, Control and evaluation, Pre-project and post project evaluation.
V	**Capital Generation & Financial Accounting Banking:** Financial Institutes like IFCI, IBI, International financing etc. Book keeping process in construction. Journals, ledgers etc. for labour cost, materials and purchases miscellaneous ledgers and accounting procedures, types of financial statements in Govt.

References:

1 Financial Management by I.M. Pandey.
2 Construction Management System by S. B. Jha & Subhash Chander.
3 Construction Planning & Management by V. K. Shrivastava.

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Programme: **M. Tech. (Construction Technology & Management)** **Semester -II**

Subject Title	Subject Code	Credit			Theory		
		L	T	P	External (70)	Internal (30)	Total (100)
Appropriate Technology and Energy Conservation	MTCM-205	3	1	-			Min: 40 (D Grade)

Duration of theory (External): 3 hours
Theory internal - max marks: 30
Best of two mid semester test –Max. Marks.: 15
Assignment / Quiz/ Attendance – Max. Marks.: 15

Unit	Contents (Theory)
I	**Appropriate Technology:** concept and its role in the present circumstances.
II	**Rural Housing & Rural Environmental Technologies:** Planning, use of locally available materials, construction techniques. Concept and scope in rural areas planning of water supply schemes in rural areas, development of preferred sources of water, springs, wells, infiltration wells infiltration gallaries, collection of rain water, specific problems and method's in rural water supply and treatment. Treatment and disposal of waste water, community and sanitary latrines. Compact and simple waste water disposal systems, biogas plants.
III	**Rural roads:** Planning of rural roads, Socio-economic aspects, materials for rural roads, design aspects, drainage problems, and maintenance of rural roads.
IV	**Energy Conservation:** Energy production, distribution and utilization, a review of global situation. Energy Trends, renewable and non renewable sources, research reviews. Building designs and energy factors affecting energy budget in buildings and settlements, Design of buildings for minimising energy. Solar, Wind and Tidal energies, a review and their adoptability.
V	Low energy materials, construction techniques and environmental control.

References:

1 www.icevirtuallibrary.com

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Subject Title	Subject Code	Credit			Practical		
		L	T	P	External (105)	Internal (45)	Total (150)
Lab-III (Material Testing-II)	MTCM-206	-	-	2			Min: 60 (D Grade)

Practical internal - max marks: 45

Lab work & sessional – Max. Marks: 40

Assignment / Quiz/ Regularity – Max. Marks: 05

List of Experiments:

1. Determination of penetration value of Bitumen.
2. Determination of Viscosity of Bituminous Material.
3. Determination of softening point of bituminous material.
4. Determination of ductility of the bitumen.
5. Determination of flash point and fire point of bituminous material.
6. Determination of Bitumen content by centrifuge extractor.
7. Determination of stripping value of road aggregate.
8. Determination of Marshall Stability value for bituminous mix.

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Subject Title	Subject Code	Credit			Practical		
		L	T	P	External (105)	Internal (45)	Total (150)
Lab-IV (Software Lab-II)	MTCM-207	-	-	2			Min: 60 (D Grade)

Practical Internal - Max Marks: 45

Lab work & Sessional – Max. Marks: 40

Assignment / Quiz/ Regularity – Max. Marks: 05

List of Experiments/ Programs:

1. Primavera
2. MX Roads
3. Auto Plotter
4. 3DS Max
5. IREVIT

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