PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
MTCM13101	Industrial Safety	3	1	-	(70)	(30)	Min: 40 (D Grade)	(Nil)	(Nil)	(Nil)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 15	Assignment/Quiz/Attendance - Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	Functioning of Engineering equipments and industry work culture.
Course Outcome	1. Student should be able to apply standard safety procedures in an industrial environment.
	2. An ability to identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the safety.

Unit	Contents (Theory)	Marks Weightage
I	**Industrial Safety:** Accident, Causes, Types, Results and control, Mechanical and electrical hazards, Types, Causes and preventive steps/procedure, Describe salient points of factories act 1948 for health and safety, Wash rooms, Drinking water layouts, Light, Cleanliness, Fire, Guarding, Pressure vessels, etc, Safety color codes, Fire prevention and firefighting, Equipment and methods.	**14**
II	**Fundamentals Of Maintenance Engineering:** Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.	**14**
III	**Wear And Corrosion And Their Prevention:** Wear- Types, Causes, Effects, Wear reduction methods, Lubricants-types and applications, Lubrication methods, General sketch, Working and applications of screw down grease cup, Pressure grease gun, Splash lubrication, Gravity lubrication, Wick feed lubrication, Side feed lubrication, Ring lubrication, Definition, Principle and factors affecting the corrosion, Types of corrosion, Corrosion prevention methods.	**14**
IV	**Fault Tracing:** Fault tracing-concept and importance, Decision tree concept, Need and applications, Sequence of fault finding activities, Show as decision tree, Draw decision tree for problems in machine tools, Hydraulic, Pneumatic, Automotive, Thermal and electrical equipment's like, Any one machine tool, Pump ,Air compressor, Internal combustion engine, Boiler, Electrical motors, Types of faults in machine tools and their general causes.	**14**
V	**Periodic and Preventive Maintenance**: Periodic inspection-concept and need, Degreasing, Cleaning and repairing schemes, Overhauling of mechanical components, Overhauling of electrical motor, Common troubles and remedies of electric motor, Repair complexities and its use, Definition, need, Steps and advantages of preventive maintenance, Steps/procedure for periodic and preventive maintenance of, Machine tools, Pumps, Air compressors, schedule of preventive maintenance of mechanical and electrical equipment, Advantages of preventive maintenance, Repair cycle, concept and importance.	**14**

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Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Text Book/References Books/ Websites:

1. Maintenance Engineering Handbook; Higgins & Morrow; Da Information Services.
2. Maintenance Engineering; H. P. Garg; S. Chand and Company.
3. Pump-hydraulic Compressors; Audels; Mcgrew Hill Publication.
4. Foundation Engineering Handbook; Winterkorn; Hans; Chapman & Hall London

Suggested List of Laboratory Experiments :- (Expandable): Nil

PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTCM13102	Waste to Energy	3	1	-			Min: 40 (D Grade)			(Nil)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 15	Assignment/Quiz/Attendance - Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	1. Student should be able to apply the knowledge about the operations of waste to energy plants.
	2. Apply the knowledge in planning and operations of waste to energy plants.
	3. Able to analyze the various aspects of waste to energy management systems.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction to Energy from Waste:** Classification of waste – agro based, Forest residues, Domestic waste, Industrial waste (hazardous and non-hazardous), Characterization of waste for energy utilization, Conversion devices – Incinerators, Gasifiers, digestors ,Waste production in different sectors i.e. domestic, Industrial, Agriculture, Postconsumer waste etc. Waste Selection criteria.	**14**
II	**Technologies for Waste to Energy Biochemical Conversion** – Energy production from organic waste through anaerobic digestion and fermentation, Thermo-chemical conversion – combustion, Incineration and heat recovery, Pyrolysis, Gasification, Plasma Arc Technology.	**14**
III	**Waste to Energy Options**: Landfill gas, Collection and recovery, Refuse Derived Fuel (RDF) – fluff, Briquettes, Pellets, Alternate Fuel Resource (AFR) – production and use in cement plants, Thermal power plants and industrial boilers, Conversion of wastes to fuel resources for other useful energy applications, Energy from plastic wastes – non-recyclable plastic wastes for energy recovery, Energy recovery from wastes and optimization of its use, Benchmarking and standardization.	**14**
IV	**Centralized and Decentralized Waste to Energy Plants**: Collection, Segregation, transportation and storage requirements, Location and Siting of waste to energy, Plant,. Industry specific applications – In-house use – sugar, Distillery, Pharmaceuticals, Pulp and paper, Refinery and petrochemical industry and any other industry, Centralized and decentralized energy production, Distribution and use, Comparison of centralized and decentralized systems and its operations.	**14**
V	**Waste To Energy & Environmental Implications**: Environmental standards for waste to energy plant operations and gas clean-up, Savings on non-renewable fuel resources, Carbon Credits, Carbon foot calculations and carbon credits transfer mechanisms, Energy analysis, Global best practices in waste to energy production and use, Indian scenario on waste to energy production distribution and use in India, Role of the Government in promoting 'Waste to Energy'.	**14**

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Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Text Book/References Books/ Websites:

1. Industrial and Urban Waste Management in India; TERI Press.
2. Banwari Lal and Patwardhan; Wealth from Waste: Trends and Technologies; TERI Press.
3. S.N Mukhopadhyay; Fundamentals of waste and Environmental Engineering; TERI Press.
4. www.envfor.nic.in www.cpcb.nic.in
5. www.eai.in/ref/ae/wte/typ/clas/india_industrial_wastes.html
6. www.teriin.org/projects/green/pdf/National-Waste.pdf

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
MTCM13103	Cost Management of Engineering Projects	3	1	-	(70)	(30)	Min: 40 (D Grade)	(Nil)	(Nil)	(Nil)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 15	Assignment/Quiz/Attendance - Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	1. Students should be able to perform and evaluate present worth, future worth and annual worth and more economic alternatives.
	2. Able to carry out and evaluate benefit/cost, life cycle and break-even analyses on one or more economic alternatives.

Unit	Contents (Theory)	Marks Weightage
I	Introduction and overview of the strategic cost management process cost concepts in decision-making, Relevant cost, Differential cost, Incremental cost and opportunity cost, Objectives of a costing system, Inventory valuation, Creation of a database for operational control, Provision of data for decision-making.	**14**
II	Project: meaning, Different types, Why to manage, Cost overruns centers, Various stages of project execution, Conception to commissioning, Project execution as conglomeration of technical and nontechnical activities, Detailed engineering activities, Pre project execution main clearances and documents project team, Role of each member, Importance project site, Data required with significance, Project contracts, Types and contents, Project execution project cost control, Bar charts and network diagram.	**14**
III	Project commissioning, Mechanical and process cost behavior and profit planning marginal Costing, Distinction between marginal costing and absorption costing, Break-even analysis, Cost-volume-Profit Analysis, Various decision-making problems, Standard costing and variance analysis.	**14**
IV	Pricing strategies. Pareto analysis. Target costing, life cycle costing, Costing of service sector Just-in-time approach, Material requirement planning, Enterprise resource planning, Total quality management and theory of constraints Activity-based cost management, Bench marking, Balanced score card and value-chain analysis, Budgetary control, Flexible budgets, Performance budgets, Zero-based budgets, Measurement of divisional profitability pricing decisions including transfer pricing.	**14**
V	Quantitative techniques for cost management, linear programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, learning curve theory.	**14**

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Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Text Book/References Books/ Websites:

1. Cost Accounting A Managerial Emphasis; Prentice Hall of India; New Delhi.
2. Charles T. Horngren and George Foster; Advanced Management Accounting .
3. Robert S Kaplan Anthony A. Alkinson; Management & Cost Accounting.
4. Ashish K. Bhattacharya; Principles & Practices of Cost Accounting A. H. Wheeler publisher.
5. N.D. Vohra; Quantitative Techniques in Management; Tata McGraw Hill Book Co. Ltd.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTCM13201	Management of Quality and Safety in Construction	3	1	-			Min: 40 (D Grade)			(Nil)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 15	Assignment/Quiz/Attendance - Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	Student should be able to know control of quality during design of structures.
	Student should be able to understand quality standards/codes in design and construction.
	Student should be able to understand training in quality and quality management systems.

Unit	Contents (Theory)	Marks Weightage
I	Introduction to quality, Planning and control of quality during design of structures, Quantitative techniques in quality control, Quality assurance during construction, Inspection of materials and machinery, In process inspection and test.	**14**
II	Preparation of quality manuals, Check-list and inspection report, Establishing quality assurance system, Quality standards/codes in design and construction, Concept and philosophy of total quality management (TQM).	**14**
III	Training in quality and quality management systems (ISO-9000), Concept of safety, Factors affecting safety, Physiological, Psychological and technological, Planning for safety provisions, Structural safety, Safety consideration during construction.	**14**
IV	Demolition and during use of equipment, Management of accidents/injuries and provision of first aid, Provisional aspect of safety, Site management with regard to safety recommendations.	**14**
V	Training for safety awareness and implementation, Formulation of safety manuals, Safety legislation, Standards/codes with regard to construction, Quality vs. Safety, Case Studies.	**14**

Text Book/References Books/ Websites:

1. Richard J. Coble, Theo C. Haupt, Jimmie Hinze;The Management of Construction Safety and Health; CRC Press.
2. Abdul Razzak Rumane; Quality Management in Construction Projects; CRC Press.
3. Tim Howarth, Paul Watson; Construction Safety Management; Wiley Black Well.
4. Phil Hughes, Ed Ferrett,; Introduction to Health and Safety in Construction: The Handbook for Construction Professionals and Students on Nebosh and Other Construction Courses; Routledge Publisher 2008.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTCM13202	Advanced Highway Construction	3	1	-			Min: 40 (D Grade)			(Nil)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 15	Assignment/Quiz/Attendance - Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	1. Student should able to know earthwork and soling.
	2. Student should able to understand bituminous properties, requirements& specification .
	3. Student should able to understand cement concrete road construction.

Unit	Contents (Theory)	Marks Weightage
I	**Earthwork and Soling:** Classification of types of highway construction, Suitability of each type under Indian conditions, Selection of base course and surface course, Selection of soils, Construction of embankments, Excavation and compaction equipments, Field and laboratory tests for quality control, Stone soling, Brick soling, Current practices, Construction of earth roads, Gravel roads, Soil stabilized roads, Water bound macadam, Paved roads Bricks, Stones.	**14**
II	**Bituminous Construction:** Properties, Requirements and specifications of materials, Equipments and plants, Detailed construction procedure of each type, Field and laboratory tests for quality control, Choice of binders under different conditions, IRC, British, and MOST Specifications, Bituminous surface treatments, Interface treatments-primecoat, and tackcoat, Surface dressing and seal coat, Grouted or penetration macadam, Bituminous bound macadam, Sheet asphalt, Bituminous concrete, Mastic asphalt, Dense tar surfacing.	**14**
III	**Cement Concrete Road Construction:** Necessity of providing a base course under cement concrete road construction, Selection of materials, Constructions methods, Detailed construction procedure, Quality control tests (Lab. And Field), Construction equipments, Classification of various types of joints, Necessity of providing each type, method of construction of joints, load transfer devices, Dowel bars, Tie bars, Joints filler and sealer materials, IRC Specifications.	**14**
IV	**Reinforced Cement Concrete Road Construction:** Necessity of providing reinforcement in cement concrete pavements, Continuously reinforced concrete pavements, Prestressed concrete pavements and fibre reinforced concrete pavements, Selection of the mix, Compaction method and construction prucedure for each type, Recommendations under Indian conditions.	**14**
V	**Construction Planning and Management :** CPM/PERT in Highway Construction, Difference between CPM and PERT, Role of CPM & PERT in construction project.	**14**

Text Book/References Books/ Websites:

1. S. K. Khanna & C.E.G. Justo ; Highway Engineering; Nemchand and Sons.
2. MORTH ;Hand book; IRC Ministry of road transport and highway.
3. Dr. S. K. Sharma; Priciples, Practice & Design of Highway Engg; S Chand and Company.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTCM13203	Advanced Foundation Engineering	3	1	-			Min: 40 (D Grade)			(Nil)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 15	Assignment/Quiz/Attendance - Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	**Nil**
Course Outcome	1. Student should able to know shallow foundations bearing capacity, Terzaghis analysis.
	2. Student should able to know use of piles, types of piles, design of piles.
	3. Student should able to know mechanism of reinforced earth strength.

Unit	Contents (Theory)	Marks Weightage
I	**Shallow Foundations:** Bearing Capacity, Terzaghis analysis, Computations of bearing capacity factors, Skempton's analysis, Meyerhof's analysis, Balla's theory, Hansen's theory, Design of shallow foundations.	**14**
II	**Pile Foundation:** Use of piles, Types of piles, Design of piles, Group action in cohesive and cohesionless soils, Negative skin friction, Laterally loaded piles, Piles under inclined loads, Pile load test, Hrennikoff method.	**14**
III	**Engineering with Geosythetics:** Introduction basic mechanism of reinforced earth strength characteristics of reinforced soil.	**14**
IV	**Bridge Substructures:** Introduction, Elements of bridge substructure, Stability analysis of well foundation, Design of pie & abutments, Sinking of wells.	**14**
V	**Marine Substructures:** Introduction, Types of marine structures elements, Design criteria, Design of gravity wall, Piled wharf structure breakwaters.	**14**

Text Book/References Books/ Websites:

1. V.N.S. Marshy ; Soil Mechanics & foundation engg.; CBS Publisher.
2. P. Purshotham Raj; Soil Mech. & foundation engg.; Dorley Kindersley Pvt. Ltd.

Suggested List of Laboratory Experiments :- (Expandable): Nil

PEOPLE'S UNIVERSITY, BHOPAL

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Programme: **Master of Technology** **Specialization:** Construction Technology & Management **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total	External	Internal	Total (300)
MTCM1303	Pre-Dissertation	-	-	6	(Nil)	(Nil)	(Nil)	(200)	(100)	Min: 120 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 100	Lab work & Sessional - Max Marks: 50	Assignment/Quiz/Attendance- Max. Marks: 50

Pre-Requisite	Knowledge of concerned discipline of Engineering.
Course Outcome	1. Identify literature and problem identification of research.
	2. Apply engineering principles through efficient handling of project.
	3. Identify appropriate techniques to analyze complex engineering problems.

Unit	Contents (Theory)	Marks Weightage
I	**Pre- Dissertation:** Students are required to select a topic of their interest in the third semester and prepare a dissertation on it. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available. End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions and must bring out individuals contribution. The student must submit a synopsis at the end of the semester for the approval from the research Approval committee in the specified format and submitted to the university for further Approval and give the power point presentation of the same for Evaluation/Approval.	**300**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :- (Expandable): Nil