PEOPLE'S UNIVERSITY, BHOPAL

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

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

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MT1101	Research Methodology & IPR	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. Students will be able to understand research problem formulation.
	2. Able to analyze research related information and follow research ethics.
	3. Understand the importance of IPR and its protection for further research work.

Unit	Contents (Theory)	Marks Weightage
I	**Research Methodology:** Meaning, Objective & its types, Research approaches , Significance of research, Research methods vs. methodology, Research process, Criteria of good research, Meaning of research problem, Sources of research problem, Errors in selecting a research problem, Scope and objectives of research problem, Effective literature studies approaches, Plagiarism, Research ethics, Problems encountered by researchers in India.	**14**
II	**Concept and Importance in Research:** Features of a good research design, Exploratory research design, Concept types and uses, Descriptive research designs, Concept, Types and uses, Experimental design, Concept of independent & dependent variables, Interpretation , Meaning & technique, Precaution in interpretation , Significance of report writing; layout of the research report, Types of reports, Precautions for writing research reports, Effective technical writing, Role of computer software in report writing.	**14**
III	**Data Collection:** Collection of primary data, Observation method, Interview method, Collection of data through questionnaires, Collection of data through schedules, Difference between questionnaires and schedules, Collection of secondary data.	**14**
IV	**Hypothesis**: Null hypothesis & alternative hypothesis, Basic concepts concerning testing of hypotheses, Procedure for hypothesis testing, Flow diagram for hypothesis testing, Qualities of a good hypothesis.	**14**
V	**Nature of Intellectual Property:** Patents, Designs, Trade and copyright, Process of patenting and development, Technological research, Innovation, Patenting; Development, International scenario, International cooperation on intellectual property, Procedure for grants of patents, Patenting under pct, **patent rights,** scope, licensing and transfer of technology, Patent information and databases, Geographical indications, New developments in IPR, Administration of patent system, IPR of biological systems.	**14**

Text Book/References Books/ Websites:-

1. C . R. Kothari; Research Methodology; New Age Publication.
2. Wayne Goddard and Stuart Melville; Research Methodology: An Introduction.
3. Ranjit Kumar; 2 nd Edition ; Research Methodology: A Step by Step Guide for beginners.
4. Robert P. Merges; Peter S. Menell; Mark A. Lemley; Intellectual Property in New Technological Age.
5. T. Ramappa; Intellectual Property Rights Under WTO ; S. Chand; 2008.

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 –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTCM1102	Composite Materials	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 understand fibre reinforced concrete.
	2. Student should able to understand fly ash concrete & polymer concrete.
	3. Student should able to understand Ferrocement & high performance concrete.

Unit	Contents (Theory)	Marks Weightage
I	**Fibre Reinforced Concrete:** Properties of constituent materials, Mix proportions, Mixing and casting procedures, Properties of freshly mixed FRC, Mechanics and properties of fibre reinforced concrete, Composite material approach, Application of fibre reinforced concrete.	**14**
II	**Fly Ash Concrete & Polymer Concrete:** Classification of Indian fly ashes, Properties of fly ash, Proportioning of fly ash concretes, Properties of fly ash concrete in fresh and hardened state, Durability of fly ash concrete, Terminology used in polymer concrete, Properties of constituent materials, Polymer impregnated concrete, Polymer modified concrete, Properties and applications of polymer concrete and polymer impregnated concrete.	**14**
III	**Ferro Cement & High Performance Concrete:** Constituent materials and their properties, Mechanical properties of ferro-cement, Construction techniques and application of ferro-cement, Materials for high performance concrete, Supplementary cementing materials, Properties and durability of high performance concrete, Introduction to silica fume concrete, Properties and applications of silica fume concrete.	**14**
IV	**Sulphur Concrete & Sulphur Infiltrate Concrete:** Process technology, Mechanical properties, Durability and applications of sulphur concrete, Sulphur infiltrated concrete, Infiltration techniques, Mechanical properties, Durability and applications of sulphur infiltrated concrete.	**14**
V	**Light Weight Concrete:** Properties of light weight concretes pumice concrete, Aerated cement mortars, No fines concrete, Design and applications of light weight concrete.	**14**

Text Book/References Books/ Websites:

1. P.K. Mehta, and P.J.M. Monterio;Concrete, its Properties and Microstructure; McGraw-Hill Education.
2. Malhotra and Ramezanianpour; Flyash in Concrete; CANMET Natural Resources Canada (1994).
3. Bentur and Mindess ;Fibre Reinforced Concrete; Modern Concrete Technology Series.
4. B.K. Paul, and R.P. Pama ;Ferrocement; International Ferrocement Information Center (1978).

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 –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTCM1103	Geotechnical 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 understand stress distribution in soils.
	2. Student should able to understand well foundations & coffer dams.
	3. Student should able to understand & design machine foundations.

Unit	Contents (Theory)	Marks Weightage
I	**Site Investigations & Stress Distribution in soils:** Brief review of various methods of subsurface explorations, Soil sampling, Subsurface soundings, Geophysical explorations, Stress distribution beneath loaded areas by Boussinesq, Westergaard's and Steinbrenner methods, Newmark's influence chart, Contact pressure distribution, Settlement analysis.	**14**
II	**Well Foundations & Coffer Dams:** Types of caissons, Wells, and their design criteria, IS and IRC codes and their provisions, Tilt and shift in wells and their rectifications, Types, Design data for cellular dams, Stability analysis, Interlock stresses, Methods of design of cellular coffer dams.	**14**
III	**Machine Foundations:** Theory of vibrations, Single and double degree of freedom system, Damped and undamped vibrations, Types of machine foundations, Mass spring model of analysis, Apparent mass of soil, Design of block foundations for impact type of machinery, Indian standard on design and construction of foundations for reciprocating machines.	**14**
IV	**Foundations on Expansive Soils:** Characteristics and treatment of expansive soils, Construction techniques in expansive soils, Use of under-reamed piles and their design criteria, CNS Layer techniques, Construction on collapsible soil.	**14**
V	**Rock Mechanics:** Problems in rock mechanics, Classification of rocks, physical, geological and mechanical properties of rocks, Mechanics of rock, Deformation and fracture under load, The range and scope of rock mechanics in relation to civil engineering projects.	**14**

Text Book/References Books/ Websites:

1. Dr. K.R. Arora ;Soil Mechanics & Foundation Engg.; Std. Publishers Delhi.
2. B.C. Punmia ;Soil Mechanics & Foundation Engg.; Laxmi Publiscations Delhi.
3. Dr. Alam Singh ;Modern Geotech. Engg.;IBT Publishers Delhi.
4. C.Venkatramaiah ;Geotech. Engg;New AGe International Publishers, Delhi.
5. G A Leonards; Found. Engg ;McGraw Hill Book Co. Inc.
6. Relevant IS Code.

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 –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTCM1104	Concrete Construction Technology	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 strength, permeability & durability.
	2. Student should able to know concreting operations-practices and equipment.
	3. Student should able to understand special concrete operations, shotcrete, grouting, guniting.

Unit	Contents (Theory)	Marks Weightage
I	Introduction of concrete materials, Admixtures, Fly ash, Polymers, Early age properties, Strength, Permeability & durability, Principles of concrete mix design, Concrete mix design procedure by IS/ACI/British standards.	**14**
II	Concreting operations-practices and equipment, Batching; Mixing; Transporting; Placing and compacting, Curing, Properties and technique of construction for concrete, Fiber reinforced concrete, light weight concrete, Heavy weight concrete, Foam concrete, High performance concrete.	**14**
III	Special concrete operations, Shotcrete, Grouting, Guniting, under water concreting, Hot and cold weather concrete, Pumpable concrete, Construction techniques for reinforced concrete elements-materials, Principles and procedures for beams, Slabs, Columns, Foundations, Walls and tanks, Design and fabrication of form work for R.C.C elements.	**14**
IV	Prestressed concrete construction-principle, Methods, Materials, System, Tools and equipment for the construction of a prestressed bridge, Pre tensioning and post tensioning, Losses of prestressed.	**14**
V	Inspection and quality control of concrete construction-stages, Principles, Checklist, Statistical controls, Procedures, Role of quality control in construction.	**14**

Text Book/References Books/ Websites:

1. M.L. Gambhir; Concrete Technology; Tata Mc Grew Hill Publishing Company Ltd.
2. Neville and Brooks ;Concrete Technology; Person Publication.
3. P.K. Mehta and PJM Monteiro; Concrete Microstructure, Properties and Materials; McGraw Hill Education.
4. M.S. Shetty;Concrete Technology; S. Chand Publishing.

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

PEOPLE'S UNIVERSITY, BHOPAL

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

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTCM1105	Low Cost Housing Materials and Construction Technology	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 able to know soil, fly ash, ferrocement, lime, fibers, stone dust.
	Student should able to know low cost building material products.
	Student should able to understand low cost construction techniques and equipment.

Unit	Contents (Theory)	Marks Weightage
I	**Concepts of Low Cost Materials:** Soil, Fly ash, Ferrocement, Lime, Fibers, Stone dust, Boulders and oversize metal, Bitumen etc.	**14**
II	**Low Cost Building Material Products:** Walls - Stabilized and sun dried, Soil blocks & bricks, Hollow concrete blocks, Stone masonry blocks, Ferro-cement partitions, Roofs - Precast R.C. plank & joists roof, Precast channel roof, Precast L-panel roof, Precast Funicular shells, Ferrocement shells, Filler slab, Seasal fibre roof, Improved country tiles, Thatch roof.	**14**
III	**Low Cost Construction Techniques And Equipment:** Techniques- Rat trap bond construction, Precast R.C. and ferrocement technique, Mud technology, Equipments- Brick moulding machine, Stablilised soil block making machine and plants for the manufacturing of concrete blocks, Low cost roads- Murrum road, WBM road, Earthen road, GSB road.	**14**
IV	**Low cost sanitation:** Waste water disposal system**,** Low cost sanitation for rural and urban areas**,** Ferrocement drains.	**14**
V	**Cost analysis and comparison:** Low cost materials **,** Low cost techniques.	**14**

Text Book/References Books/ Websites:

1. A.K. Lal; Hand book of Low cost Housing;

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

PEOPLE'S UNIVERSITY, BHOPAL

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

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (100)
MTCM1106	Material Testing-I	-	-	2	External (Nil)	Internal (Nil)	(Nil)	External (70)	Internal (30)	Min:40 (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: 30	Lab work & Sessional - Max Marks: 15	Assignment/Quiz/Attendance- Max. Marks: 15

Pre-Requisite	**Nil**
Course Outcome	1. To understand the basic knowledge of Indian standard light compaction test.
	2. To be able to understand the use of Indian standard heavy compaction test.
	3. To get to know about the use of determination of field density.

Unit	Contents (Theory)	Marks Weightage
I	Indian standard light compaction test/std. proctor test, Indian standard heavy compaction test/modified proctor test, Determination of field density by core cutter method, Determination of field density by sand replacement method, Determination of field density by water displacement method, To find the coefficient of permeability of soil by constant head and variable head method, CBR test, To find the Hardness of Aggregate by Crushing test, Aggregate Impact Value test, Elongation and Flakiness index test, Abrasion Test of aggregate.	**100**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments:-

Student should perform any Seven test as per assigned by subject faculty.

PEOPLE'S UNIVERSITY, BHOPAL

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

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

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (100)
MTCM1107	Software Lab –I	-	-	2	External (Nil)	Internal (Nil)	(Nil)	External (70)	Internal (30)	Min:40 (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: 30	Lab work & Sessional - Max Marks: 15	Assignment/Quiz/Attendance- Max. Marks: 15

Pre-Requisite	**Nil**
Course Outcome	1. To be able to understand the concept of Auto CAD.
	2. To understand the STAAD Pro.
	3. To get to know about the Auto Plotter

Unit	Contents (Theory)	Marks Weightage
I	Plan a Commercial/Residential/Industrial/Institutional building using Auto CAD, Analysis a different types of building frames/Structures using STAAD Pro, Prepare a Commercial /Residential/Industrial/Institutional building drawing using 3 D max, Prepare a Commercial/ Residential/Industrial/Institutional building drawing using 3 D Studio.	**100**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments:-

Student should prepare a report using any of the software as per assigned by subject faculty.

PEOPLE'S UNIVERSITY, BHOPAL

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

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (50)	External	Internal	Total
MT1108	Audit Course - I (Value Education)	-	-	-	(35)	(15)	Min: 20 (D Grade)	(Nil)	(Nil)	(Nil)

Duration of Theory (Externals): 2 Hours

Theory Internal- Max Marks: 15	Best of Two Mid Semester Test – Max Marks: Nil	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.Knowledge of self-development.
	2.Learn the importance of Human values.
	3.Developing the overall personality.

Unit	Contents (Theory)	Marks Weightage
I	Values and self-development –Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation, Standards and principles, Value judgments.	**07**
II	Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National Unity, Patriotism, Love for nature, Discipline.	**07**
III	Personality and Behavior Development - Soul and Scientific, attitude, Positive Thinking. Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labour.	**07**
IV	Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature.	**07**
V	Character and Competence –Holy books vs Blind faith, Self-management and Good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of Women, All religions and same message, Mind your Mind, Self-control, Honesty, Studying effectively.	**07**

 # Mandatory (Non Credit) subject according to AICTE. Non University Examination, End Sem marks not to be included in total marks and credit. Students must pass in this subject.

Text Book/References Books/ Websites

1. S.K. Chakroborty ; Values and Ethics organizations theory and practice; Oxford University Press, New Delhi.

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