PEOPLE'S UNIVERSITY, BHOPAL

Scheme of Examination

(With Effective from Academic Session 2022-23 onwards)

SEMESTER: I

PROGRAMME : Master of Technology
BRANCH : Civil Engineering
SPECIALIZATION: Transportation Engineering

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Teaching Hours Per Week			Total Credits	Remark
			Theory Slot				Practical Slot				L	T	P		
			End Sem	MST	Quiz, Assignment	Attendance	Term Work		End Sem						
							Lab Performance, Lab Record & Viva	Assignment /Quiz/Attendance							
1	MTTR101	Research Methodology & IPR	70	15	10	05	-	-	-	100	3	1	-	04	One hour Lecture (L) refer 1 credit, one hour Tutorial (T) refer 1 credit, and one hour Practical (P) refer 0.5 credit.
2	MTTR102	Transportation Systems	70	15	10	05	-	-	-	100	3	1	-	04	
3	MTTR103	Alignment & Geometric Design of Highways	70	15	10	05	-	-	-	100	3	1	-	04	
4	MTTR104	Soil Mechanics in Highway Engineering	70	15	10	05	-	-	-	100	3	1	-	04	
5	MTTR105	Material Science & Concrete Technology	70	15	10	05	-	-	-	100	3	1	-	04	
6	MTTR106	Soil Mechanics Lab	-	-	-	-	15	15	70	100	-	-	4	02	
7	MTTR107	Computer Aided Design Lab	-	-	-	-	15	15	70	100	-	-	4	02	
8	MTTR108	#Audit Course I (Value Education)	35	-	10	05	-	-	-	50	2	-	-	00	
		Total	350	75	50	25	30	30	140	700	15	5	8	24	**Grand Total** 700

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.

MST: Mid Semester Test (at least twice per Semester)

L: Lecture   T: Tutorial   P: Practical

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PEOPLE'S UNIVERSITY, BHOPAL

Scheme of Examination
(With Effective from Academic Session 2022-23 onwards)

PROGRAMME : Master of Technology
BRANCH : Civil Engineering
Specialization: Transportation Engineering
SEMESTER: II

S.No	Subject Code	Subject Name	End Sem	MST	Quiz, Assignment	Attendance	End Sem	Lab Performance, Lab Record & Viva	Assignment/Quiz/Attendance	Total Marks	L	T	P	Total Credits	Remark
			Theory Slot				**Practical Slot**	**Term Work**			**Teaching Hours Per Week**				
1	Refer Table-1	Professional Elective - I	70	15	10	05	-	-	-	100	3	1	-	04	
2	MTTR202	Pavement Analysis & Design	70	15	10	05	-	-	-	100	3	1	-	04	
3	MTTR203	Design & Construction of Rigid Pavements	70	15	10	05	-	-	-	100	3	1	-	04	
4	MTTR204	System Analysis & Urban Transportation	70	15	10	05	-	-	-	100	3	1	-	04	
5	MTTR205	Transportation Planning	70	15	10	05	-	-	-	100	3	1	-	04	
6	MTTR206	Advanced Pavement Laboratory	-	-	-	-	70	15	15	100	-	-	4	02	
7	MTTR207	CAD in Transportation Engineering	-	-	-	-	70	15	15	100	-	-	4	02	
8	MTTR208	# Audit Course II (English for Research Paper Writing)	35	-	10	05	-	-	-	50	2	-	-	00	
		Total	350	75	50	25	140	30	30	700	15	05	08	24	

Remark: One hour Lecture (L) refer 1 credit, one hour Tutorial (T) refer 1 credit, and one hour Practical (P) refer 0.5 credit.

Grand Total 700

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.

Table 1: Professional Elective-I

Subject Code	MTTR1201	MTTR1202	MTTR1203
Name of Professional Elective Subject	Highway Traffic Analysis & Design	Geographical Information Systems & Remote Sensing	Ground Improvement Techniques

MST: Mid Semester Test (at least twice per Semester)   L: Lecture   T: Tutorial   P: Practical

PEOPLE'S UNIVERSITY, BHOPAL

Scheme of Examination

(With Effective from Academic Session 2022-23 onwards)

SEMESTER: III

PROGRAMME : Master of Technology
BRANCH : Civil Engineering

Specialization: Transportation Engineering

S.No.	Subject Code	Subject Name	Theory Slot — End Sem	Theory Slot — MST	Theory Slot — Quiz, Assignment	Theory Slot — Attendance	Practical Slot — End Sem	Term Work — Lab Performance, Lab Record & Viva	Term Work — Assignment/Quiz/Attendance	Total Marks	L	T	P	Total Credits	Remark
1	Refer Table-II	Open Elective	70	15	10	05	-	-	-	100	3	1	-	04	One hour Lecture (L) refer 1 credit, one hour Tutorial (T) refer 1 credit, and one hour Practical (P) refer 0.5 credit.
2	Refer Table-III	Professional Elective II	70	15	10	05	-	-	-	100	3	1	-	04	
3	MTTR303	Pre-Dissertation	-	-	-	-	200	50	50	300	-	-	12	06	
	Total		140	30	20	10	200	50	50	500	6	2	12	14	**Grand Total 500**

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

Table II: Open Elective

Subject Code	MTTR3101	MTTR3102	MTTR3103
Name of Open Elective Subject	Industrial Safety	Waste to Energy	Cost Management of Engineering Projects

Table III: Professional Elective-II

Subject Code	MTTR3201	MTTR3202	MTTR3203
Name of Professional Elective Subject	Highway Construction Practice	Intelligent Transportation Systems	Transportation Network Analysis & Optimization

L: Lecture   T: Tutorial   P: Practical

MST: Mid Semester Test (at least twice per Semester)

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Scheme of Examination

(With Effective from Academic Session 2022-23 onwards)

PROGRAMME : Master of Technology
BRANCH   : Civil Engineering

Specialization: Transportation Engineering

SEMESTER: IV

S.No.	Subject Code	Subject Name	End Sem	MST	Quiz, Assignment	Attendance	End Sem	Lab Performance, Lab Record & Viva	Assignment /Quiz/Attendance	Total Marks	L	T	P	Total Credits	Remark
					Theory Slot			Practical Slot / Term Work				Teaching Hours Per Week			One hour Lecture (L) refer 1 credit, one hour Tutorial (T) refer 1 credit, and one hour Practical (P) refer 0.5 credit.
1	MTTR401	Dissertation	-	-	-	-	500	-	-	500	-	-	32	16	
		Total	-	-	-	-	500	-	-	500	-	-	32	16	500

MST: Mid Semester Test (at least twice per Semester)   L: Lecture   T: Tutorial   P: Practical

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PEOPLE'S UNIVERSITY, BHOPAL
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Programme: **Master of Technology**   Specialization: Transportation Engineering   Semester –I

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR101	Research Methodology & IPR	3	1	-	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (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. They will have knowledge to analyze research related information and follow research ethics.
	3. Students will apply their knowledge in the importance of IPR.

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.	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.	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.	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; 2nd 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.

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

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Department: Civil Engineering   Branch: Transportation Engineering

PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: **Master of Technology**   **Specialization:** Transportation Engineering   **Semester –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR102	Transportation Systems	3	1	-						

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 - Max. Marks: Nil

Pre-Requisite	Transportation Engineering.
Course Outcome	1. Students will have knowledge of road plans and transport policy.
	2. Student will apply their knowledge in design of runway and taxiway.
	3. Student will able to understand about urban transportation systems.

Unit	Contents (Theory)	Marks Weightage
I	**Historical Development of Transport In India:** 20 year Road Plans, National Transport Policy Recommendations, IRC, CRRI, Vision 2021, NHDP, PMGSY. Characteristics of different modes of transport and their integration and interactions impact on environment.	14
II	**Planning of Railway:** Passenger and goods terminals, layout, Passenger facilities traffic control.	14
III	**Airport Planning:** Requirements and components, Design of runway and taxiway Apron parking configuration, terminal requirements, Airport marking and lighting Air traffic control.	14
IV	**Planning of Harbours and Ports:** Cargo handling, Containerization, Navigation aids Inland waterways, Pipeline transportation.	14
V	**Urban Transportation Systems:** Mass rapid transit system, Light rail transit, Personal rapid transit, Guided way systems, Cabin taxi, Dual mode bus, Para transit systems, Demand responsive system, Intermediate public transport.	14

Text Book/References Books/ Websites:

1. R.J. Paquette; et al, Transportation Engineering Planning and Design; John Wiley & Sons; New York, 1982.
2. Alan Black; Urban Mass Transportation Planning; McGraw-Hill, 1995.

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

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PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: Master of Technology   **Specialization:** Transportation Engineering   **Semester –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR103	Alignment & Geometric Design of Highways	3	1	-	External (70)	Internal (30)	Min: 40 (D Grade)	External (Nil)	Internal (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	Highway Engineering.
Course Outcome	1. The student will have an idea of types of highway.
	2. Students will apply their knowledge in horizontal and vertical alignment.
	3. Student will able to understand highway financing and administration.

Unit	Contents (Theory)	Marks Weightage
I	**Principle of Route Selection and Highways Location:** Reconnaissance, Preliminary and final location surveys. Different Studies for Route Locations, Traffic, Soil and Materials, Drainage etc. Use of aerial photographs and remote sensing in route location, Preparation and presentation of project documents.	14
II	**Highway Financing, Economics and Administration:** Financing of Highways, revenues and expenditures, Highway financing in India. Economics of highway improvements, Highway administration and planning in India, Saturation system.	14
III	**Classification of Highway:** Terrain classification, Design speed and other factor for Geometric design, Uniform and non-uniform acceleration theory. **Cross Sectional Elements:** Road lines, Building and control lines, Roadways, Width, shoulders. Median, Camber. **Sight Distances:** Analysis of stopping sight distance, Intermediate and passing sight distance.	14
IV	**Horizontal Alignment:** Design Radius, Dynamics and motion of vehicle on a curve, Friction between tyre and road surface, Different curves, Super-elevation, Widening and transition curves, Setting of transition spiral, Use of tables.	14
V	**Vertical Alignment:** Gradients, Grade compensation, Relation between gradient and camber, Design of summit and valley curves, Design criteria for hair pin bend, Design of curves in tight location, Lateral and vertical clearances, Under passes, Coordination of horizontal and vertical, Set back distance.	14

Text Book/References Books/ Websites:

1. IRC-73-1980; Geometric Design Standards for Rural Highways.
2. IRC-52-1970; Design Tables for Horizontal Curves for Highways.
3. IRC-52-1973; Recommendation about the Alignment Survey Geometric Design of Hill Roads.

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

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Programme: Master of Technology **Specialization:** Transportation Engineering **Semester –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTTR104	Soil Mechanics in Highway 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	Geotechnical Engineering.
Course Outcome	1. The student will have an idea of bearing capacity of soil.
	2. Student will be conversant with CBR value.
	3. The student will be able to know about soil stabilization.

Unit	Contents (Theory)	Marks Weightage
I	**Classification of Soils:** IS Classification, AASHTO classifications, CAA classifications, Introduction to geotechnical investigations, Different methods of investigation, Trial pits, Rotary drilling, Percussion drilling, Geophysical methods. Introduction to rock engineering, core recovery, Rock quality designation, Joint condition, Joint orientation rock mass rating, Crushing strength, Point load index, Rock durability test, Pressure meter test, Percolation tests.	14
II	**Compaction:** Theory of compaction, Factors affecting compaction, Effect of compaction on soil, Properties, Measurement of field compaction and field methods of compaction and control. **CBR and Group Index:** Laboratory and field determination of CBR value, Effect of soaking, Modules of sub-grade reaction.	14
III	**Bearing Capacity:** Skempton's analysis, Plate Load Test, Penetration tests, General bearing capacity equation, Effect of water table on bearing capacity. **Stability of Slopes:** Types of slope failure, Bishop's slope stability analysis, Stability number.	14
IV	**Earth Pressures:** Classical theories, Effect of submergence and seepage.	14
V	**Soil Stabilization:** Mechanics of stabilization, Mechanical, Electrical, Cement, Lime, Bitumen and chemical stabilization. **Drainage:** Vertical and sand drains, Surface and sub-surface drainage for highways, Drainage for hill roads.	14

Text Book/References Books/ Websites:

1. Alam Singh; Soil Engineering in Theory and Practice; Asia Publication House.
2. HMSO; Soil Mechanics for Road Engineers.
3. S. K. Khanna and Justo C.G; Highway Engineering; Nem Chand, 1973
4. B.C. Punmia; Soil Mechanics and Foundation Engineering; Laxmi Publications.

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

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PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: **Master of Technology**   Specialization: Transportation Engineering   **Semester –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR105	Material Science & Concrete Technology	3	1	-			Min: 40 (D Grade)			

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	Material Technology.
Course Outcome	1. They will possess the skills to solve problems in creep & fatigue.
	2. They will have knowledge about testing of concrete.
	3. Student will able to understand mix design.
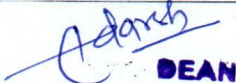
Unit	Contents (Theory)	Marks Weightage
I	**Structure of Solid Materials:** Atoms and bonds, Inter-atomic and intermolecular bond, Crystals, Classification of solids. Mechanism of elastic and plastic action in tension, Compression, Pure bending and torsion, Elastic and inelastic properties of solids, Dislocations, Strain hardening, Triaxial stress	14
II	**Creep:** Components of creep fracture, Analysis of creep curves, Method of predicting creep strength, Designing of creep. **Fatigue:** Fatigue loading, Mechanism, Factor affecting creep fatigue properties, S.N. diagrams. **Hardness:** Relation between hardness of different atomic structure measurement of hardness with other mechanical properties.	14
III	**Concrete Materials:** Cement manufacture, Composition, Structure, Hydrated cement paste, Heat of hydration, Test for physical properties, Different types of cements, Properties of aggregates. **Fresh Concrete:** Workability, Factor affecting, Testing, Vibration analysis of fresh concrete. **Strength of Concrete:** Nature of strength, Factor affecting, Autogenous heating, Maturity of concrete, Fatigue strength, Impact strength. Admixtures & plasticizers.	14
IV	**Elasticity Shrinkage And Creep:** Modulus of elasticity, Dynamic Modulus, Poisons ratio, Early volume changes, Swelling, Shrinkage, Creep factors influencing creep nature. Rheological models, Effects and design of creep. **Durability of Concrete:** Permeability of concrete, Thermal properties of concrete, Resistance of concrete to fire, Resistance to abrasion, Electrical properties, Acoustic properties, Chemical attack	14
V	**Testing of Hardended Concrete:** Destructive and non destructive testing of concrete, Tests of composition of hardened concrete, Variation of test results, Accelerated testing of concrete. **Mix Design:** Basic consideration, Factor in choice of mix. Proportion, Method of mix design, I.S. Code method, I.B.C. Murdock, A.C.I. method based on road note No.4,	14

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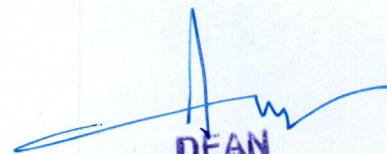
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PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: **Master of Technology**   Specialization: Transportation Engineering   **Semester –I**

	Design of different types of concrete: Light weight and high density.	

Text Book/References Books/ Websites:

1. A. M. Neville, J.J. Brooks ; Concrete Technology; By Pearson.
2. M. S. Shetty; Concrete Technology ; Paperback,

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

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Programme: **Master of Technology**   Specialization: Transportation Engineering   **Semester –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (Nil)	Internal (Nil)	Total (Nil)	External (70)	Internal (30)	Total (100) Min:40 (D Grade)
MTTR106	Soil Mechanics Lab	-	-	2						

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	Concrete technology
Course Outcome	1. Students will understand the basic knowledge of Indian standard light compaction test.
	2. Students will be able to understand the use of Indian standard heavy compaction test.
	3. Students will have knowledge about the use of determination of field density.

Unit	Contents (Theory)	Marks Weightage
I	**Testing of cement:** Consistency, Fineness, Setting time, Specific Gravity, Soundness and strength.	100
II	**Testing of aggregate:** Testing of fine aggregate- Specific Gravity, Sieve analysis and zoning, Bulking of fine aggregate, Bulk density, Silt content. **Testing of coarse aggregate:** Specific Gravity, Sieve analysis, Bulk density, Flakiness index, Elongation index, Water absorption & moisture content, Soundness of aggregate, Concrete mix design by ACI 211.1-91 method, IS code method as per 10262- 2007 & 456-2000, DOE method tests on concrete.	
III	**Workability tests:** Slump cone test, Compaction factor test, Vee-bee consistometer test, Flow table test.	
IV	**Strength tests:** Compressive strength, Flexural strength, Split tensile strength. Effects of admixture: Accelerator, Retarder, Super plasticizer	
V	**Non-destructive Testing:** Rebound hammer test, Ultrasonic pulse velocity test.	

Text Book/References Books/ Websites:
1. Building and construction materials; M.L. Gambhir; McGraw Hill Education
2. H.E. Davis;.Testing of engineering materials; Mc Graw hill india.
3. Lab manual prepared by department of civil engineering.

Suggested List of Laboratory Experiments:-
1. To determine the consistency of cement.
2. To determine the fineness of cement.
3. To determine the specific gravity of aggregate.
4. To determine the bulk density of aggregate.
5. Determination of workability.
6. Determination of Soundness.
7. To study Sieve analysis and zoning.

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Programme: Master of Technology   **Specialization:** Transportation Engineering   **Semester –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (100)
MTTR107	Computer Aided Design Lab	-	-	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	Basic applications of computer.	
Course Outcome	1. Students will be able to understand the concept of auto CAD.	
	2. Students will be conversant with modifying Tools.	
	3. They possess the skill to solve problem in plan a commercial.	
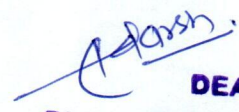
Unit	Contents (Theory)	Marks Weightage
I	**Basic AutoCAD Drawing Tools:** Lines, Circle, Arc, Polyline, Multiline, Polygon, Rectangle, Spline, Ellipse. **Modifying Tools:** Erase, Copy, Mirror, Offset, Array, Move, Rotate, Scale, Stretch, Lengthen, Trim, Extend, Break. **Chamfer and Fillet Text:** Single line, Multi line, Spelling, Edit text. **Special Features:** View tools, Layers concept, Dimension tools, Hatching, Customizing tool bars, Working with multiple drawings. Plan a commercial/Residential/Industrial/Institutional building using Auto CAD. Draw cross section of foundation, Masonry wall, RCC columns isolated & combined footing using AutoCAD.	100

Text Book/References Books/ Websites:

1. AutoCAD 2013 and AutoCAD LT 2013; Ellen Finkelstein; John Wiley & Sons.
2. Mastering AutoCAD 2012 and AutoCAD LT 2012; George Omura; Sybex
3. AutoCAD, SolidEdge, Cadlab software and Manuals.

Suggested List of Laboratory Experiments:-

- Practicing plan, section and elevation of residential buildings.
- Practicing plan, section and elevation of commercial buildings.
- Practicing plan, elevation and side view of institutional buildings.

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School of Research and Technology   Department: Civil Engineering   Branch: Transportation Engineering

PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: **Master of Technology** Specialization: Transportation Engineering **Semester –I**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (35)	Internal (15)	Total (50) Min: 20 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR108	Audit Course - I (Value Education)	-	-	-						

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. Students will have knowledge of self-development.
	2. Students will learn the importance of human values.
	3. Students will be 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 behaviour 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	**Brotherhood and Religious Tolerance:** 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.
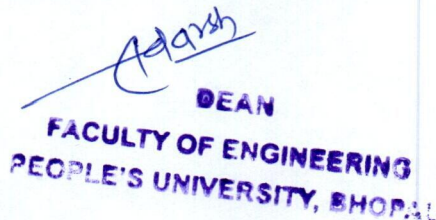
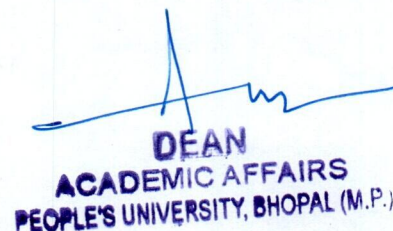**Text Book/References Books/ Websites**

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

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

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PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: **Master of Technology**   Specialization: Transportation Engineering.   Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR1201	Highway Traffic Analysis & Design	3	1	-			Min: 40 (D Grade)			

Duration of Theory (Externals): 3 Hours

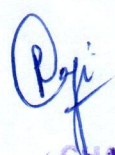| Theory Internal- Max Marks: 30	Best of Two Mid Semester Test - Max Marks: 15	Assignment/Quiz/Attendance - Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil

Pre, Requisite	Highway engineering.
Course Outcome	1. The student will have an idea of highway capacity and levels of service.
	2. Student will be conversant with elements of design.
	3. The student will be able to plan grade separated intersections

Unit	Contents (Theory)	Marks Weightage
I	**Elements of Traffic Engineering:** Road user, Vehicle and road way. Vehicle characteristics. **IRC standards:** Design speed, Volume. Highway capacity and levels of service, Capacity of urban and rural roads, PCU concept and its limitations. Road user facilities, Parking facilities, Cycle tracks and cycleways, Pedestrian facilities.	14
II	**Traffic Volume Studies:** Origin destination studies, Speed studies, Travel time and delay studies, Parking studies, Accident studies.	14
III	**Elements of Design:** Alignment, Cross sectional elements, Stopping and passing sight distance, Horizontal curves, Vertical curves, Design problems, Hill roads.	14
IV	**Traffic Regulation and Control:** Signs and markings, Traffic system management, Design of grade intersections. Principles of design - Channelisation, Design of rotaries, Traffic signals, Pre-timed and traffic actuated. Design of signal setting, Phase diagrams, timing diagram, Signal co-ordination	14
V	**Grade Separated Intersections:** Geometric elements for divided and access controlled highways and expressways, Road furniture, Street lighting. Traffic Safety, Principles and practices, Road safety audit.	14

Text Book/References Books/ Websites:

1. ITE Hand Book; Highway Engineering Hand Book; Mc Graw Hill.
2. AASHTO A Policy on Geometric Design of Highway and Streets.
3. R. J. Salter and N. B. Hounsel; Highway Traffic Analysis and Design; Macmillan Press Ltd 1996.

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

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PEOPLE'S UNIVERSITY, BHOPAL
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Programme: **Master of Technology**   Specialization: Transportation Engineering.   Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR1202	Geographical Information Systems & Remote Sensing	3	1	-			Min: 40 (D Grade)			

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. The student will have an idea of concepts and foundations of remote sensing.
	2. Student will be able to analysis raster data analysis.
	3. The student will be able to know about mapping and monitoring.
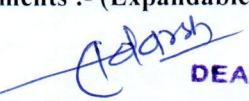
Unit	Contents (Theory)	Marks Weightage
I	**GIS Definition:** Map and map analysis, Automated cartography, History and development of GIS, Hardware requirement, Type of data, Spatial and non-spatial data, Data structure, Vector and raster, Files and data formats, Data compression.	14
II	**Spatial Analysis:** Data retrieval, Query, Overlay, Vector data analysis, Raster data analysis, Modelling in GIS, Digital elevation model, DTM, Types of output data, Output devices, Sources of errors, Types of errors, Elimination, Accuracies, The global positioning system and its applications.	14
III	**Concepts and Foundations of Remote Sensing:** Electromagnetic spectrum, EMR interaction with atmosphere, Water vapour, Ozone, Basic principles of photogrammetry, Spectral signature and spectral signature curves, Remote sensing platforms and sensors.	14
IV	**Satellite System Parameters:** Sensor parameters, Earth resources and meteorological satellites, Microwave sensors, Data acquisition and interpretation, Visual image interpretation, Visual image interpretation equipment, Digital image processing, Classification.	14
V	**Applications in Survey:** Mapping and monitoring of land use/land cover, Transportation planning, Infrastructure development, Natural resources management, Urban planning, environment, Coastal zone management, Air quality, Development of resources information systems.	14

Text Book/References Books/ Websites: -

1. P.A. Burrough and A. Rachel McDonell; Principles of Geographical Information Systems; Oxford Publication; 2004.

2. C.P. Lo and Albert K. W. Yeung; Concepts and Techniques of Geographical Information Systems; Prentice Hall India; 2006.

3. Thomas. M. Lillesand and Ralph. W. Kiefer; Remote Sensing and Image Interpretation; John Wiley and Sons; 2003.

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

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Programme: **Master of Technology**   Specialization: Transportation Engineering.   Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR1203	Ground Improvement Techniques	3	1	-						

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. The student knows about the knowledge of engineering properties of soil.
	2. Student wills analysis the soil stabilization.
	3. The student will be able to design the soil reinforcement.
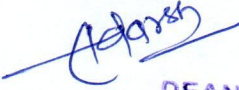
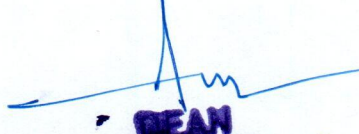| Unit	Contents (Theory)	Marks Weightage
I	**Introduction:** Engineering properties of soft, Weak and compressible deposits, Problems associated with weak deposit, Requirements of ground improvements, Introduction to engineering ground modification, Need and objectives.	14
II	**Soil Stabilization:** Science of soil stabilization, Mechanical modification, Hydraulic modification, Dewatering systems, Chemical modification, Modification by admixtures like lime, Cement, Bitumen etc. Grouting, Deep jet mixing methods.	14
III	**Recent Ground Improvement Techniques:** Stabilization using industrial waste, Modification by inclusion and confinement, Soil nailing, Stone column, Compaction piles, Dynamic compaction, Prefabricated vertical drains, Preloading, Electro, Osmosis, Soil freezing vacuum consolidation, Deep explosion, Dry powdered polymers, Enzymes.	14
IV	**Soil reinforcement:** Historical background, RCC, Vidalean concept of reinforced earth, mechanisms, Types of reinforcements, Soil-reinforcement, Interaction studies, Internal & External stability criteria, Design principles of steep reinforced soil slops, Pavements, Embankments on soft soils.	14
V	**Geo-synthetics:** Geo-synthetic clay liner, Construction details, Geo-synthetic materials Functions, Property characterization, Testing methods for geo-synthetics, Recent research and developments. Control of improvement, Field instrumentation, Design and analysis for bearing capacity and settlement of improved deposits.	14

Text Book/References Books/ Websites:

1. M. R. Hausmann; Engineering Principles of Ground Modification; McGraw-Hill International Editions.
2. Raj Purushotham; Ground Improvement Techniques; Laxmi Publications, New Delhi
3. S.K. Sharma; Priniciples practice and Design of Highway Engineering, S.Chand & Co. New Delhi,1985.
4. Jones C. J. F. P, Earth Reinforcement and Soil Structures, Butterworths, London.

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

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Branch: Transportation Engineering

PEOPLE'S UNIVERSITY, BHOPAL
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Programme: **Master of Technology**   Specialization: Transportation Engineering.   Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR202	Pavement Analysis & Design	3	1	-						

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 - Max. Marks: Nil

Pre, Requisite	Pavement design, Pavement management.	
Course Outcome	1.	They possess the skill to solve problem in functions of pavement components.
	2.	Student will be able to know about by IRC, AASHTO Methods.
	3.	Student will apply their knowledge to understand pavement management system.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction:** Types and component parts of pavements, Factors affecting design and performance of pavements. Highway and airport pavements, Functions of pavement components.	14
II	**Pavement Design Factors:** Design wheel load, Strength characteristics of pavement materials, Climatic variations, Traffic, Load equivalence factors and equivalent wheel loads, Aircraft loading, Gear configuration and tyre pressure. Drainage, Estimation of flow, Surface drainage, Sub-surface drainage systems, Design of sub-surface drainage structures.	14
III	**Flexible Pavement Design:** Empirical, Semi-empirical and theoretical approaches, Design of highway and airport pavements by IRC, AASHTO Methods, Applications of pavement design software.	14
IV	**Rigid Pavement Design:** Types of joints and their functions, Joint spacing design of CC pavement for roads, Highways and airports as per IRC, AASHTO, Design of joints, Design of continuously reinforced concrete pavements, Use of software for rigid pavement design.	14
V	**Pavement Management:** Pavement failures, Maintenance of highways, Structural and functional condition evaluation of pavements, Pavement management system.	14

Text Book/References Books/ Websites:-

1. Yoder and Witczak; Priniciples of Pavement Design; John Wiley and Sons.
2. Yang. H. Huang; Pavement Analysis and Design; Second Edition; Prentice Hall Inc.
3. Rajib B. Mallick and Tahar El. Korchi; Pavement Engineering; Principles and Practice; CRC Press.
4. W. Ronald Hudson and Ralph Haas and Zeniswki; Modern Pavement Management; Mc Graw Hill and Co.
5. Relevant IRC Codes.

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

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Programme: **Master of Technology**   Specialization: Transportation Engineering.   Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR203	Design & Construction of Rigid Pavements	3	1	-						

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 - Max. Marks: Nil

Pre, Requisite	IRC, 18, 1981, Standards, Specifications, IRC, 58, 1988, Guidelines for the design of rigid pavements.
Course Outcome	1. The student will have an idea of design of airfield pavements.
	2. Student will apply their knowledge to understand pavement joints.
	3. They will have knowledge in cement concrete mixes.

Unit	Contents (Theory)	Marks Weightage
I	**Theories and Design of Rigid Pavements:** Wastergaurds analysis, Pickets solution, Westergaurd formula for loads on applied area. Finite difference method, Linear elastic layer method. Finite element method, Deflection in rigid pavements. **Design of Concrete Pavements:** ESWL, Stress calculations, Curling stresses, Frictional stresses, Infiltration stresses and load stresses, Slab thickness design, Use of charts and formula for different load positions, Design of airfield pavements.	14
II	**Pavement Joints:** Types of joints, Contraction and warping joints, Dowel bars and tie bars, Temperature reinforcements filling and sealing of joints.	14
III	**Continuously Reinforced Concrete Pavements:** Width and thickness of slab, Reinforcing steel design, Design and construction criteria, Factors affecting, Crack width and spacing of CRC pavements, Design of CRC pavement for highway and airfield.	14
IV	**Design of Prestressed Concrete Pavements:** Stresses in pavements, Thickness design and pre - stressing techniques. **Evaluation and Strengthening:** Performance evaluation safety, Serviceability and durability concepts, Design of overlays on rigid pavements, Fibrous concrete overlays, Economics of rigid pavements, Construction and maintenance.	14
V	**Construction of Rigid Pavements:** Formwork, Mixing, Spreading, Compaction and finishing, Slip form pavers. **Cement Concrete Mixes:** Methods with special reference considering the requirements of pavements, Comparison of different methods.	14

Text Book/References Books/ Websites:-

1. H.M.S.O; Concrete Road; Design and Construction.
2. E. J. Yodar; Principle of Pavement Design.
3. IRC, 18, 1981; Specifications and Code of Practice for Construction of Concrete Roads.
4. IRC, 58, 1988; Guidelines for the design of Rigid Pavements for Highways.
5. IRC SP, 49, 1988; Guidelines for the use of Dry Lean Concrete as Sub Base for Rigid Pavements.

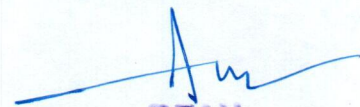**Suggested List of Laboratory Experiments:- (Expandable): Nil**

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School of Research and Technology   Department: Civil Engineering   Branch: Transportation Engineering

PEOPLE'S UNIVERSITY, BHOPAL
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Programme: **Master of Technology** Specialization: Transportation Engineering. Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR204	System Analysis & Urban Transportation	3	1	-						

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 - Max. Marks: Nil

Pre, Requisite	Traffic engineering and Transport planning.
Course Outcome	1. Student will able to know about sampling theory and regression analysis.
	2. They will have knowledge in trip generation models.
	3. Student will able to know about effects of traffic on the environment.

Unit	Contents (Theory)	Marks Weightage
I	**Probability, Statistics For Traffic Engineering Design:** Random variable and statistical measures, Basic concept of probability, Probability-laws, Binomial, Poisson, Normal and Exponential distributions. Sampling theory and regression analysis, General consideration of the accuracy, Cost and time requirements of data collection, Sampling theory and principles for determining sample size and accuracy relationship, Principles of the population mean and standard deviation, Regression analysis examples.	14
II	**Traffic Forecasting:** Principles and techniques, Demand, Price and capacity relationships, Price elasticity, Forecasting for long term demand, Variables, determination of the design hourly volume. Planning methods of transport system planning, Stages of planning, Transportation study area, Collection of travel data, External cordon and screen, Line-survey, Zoning types of surveys.	14
III	**Trip Generation Models:** Introduction and definition, Factors governing trip generation, Multiple linear regression analysis, Aggregated and disaggregated analysis, Category analysis	14
IV	**Distribution Models:** Methods of trip distribution, Growth factor models, Gravity model, Tanner model, Intervening opportunity model, Competing opportunity model. **Assignment Models:** General principle, Assignment techniques, All or nothing Assignment, Multiple route assignment, Capacity restraint assignment, Diversion curves.	14
V	**Economic Analysis:** Need, Costs and Benefits, Time horizon in Economic assignment, Basic principles, Methods of Economic evaluation. Traffic and the Environment, Effects of traffic on the environment.	14

Text Book/References Books/ Websites:-

1. L. R. Kadiyali; Traffic Engineering and Transport Planning.
2. Martine Wool and Brain V. Martin; Traffic System Analysis.
3. B. G. Hutchinson; Principles of UTS Planning; Mc Graw, Hill Publish.
4. M. J. Bruton; Introduction to Transportation Planning.

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

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Programme: **Master of Technology** Specialization: Transportation Engineering. Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR205	Transportation Planning	3	1	-			Min: 40 (D Grade)			

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 - Max. Marks: Nil

Pre, Requisite	Transportation engineering.
Course Outcome	1. They will possess the skill to solve problems in Finite Element Method.
	2. Students will have knowledge in descretization of the domain.
	3. Student will be able to know static analysis.

Unit	Contents (Theory)	Marks Weightage
I	**Transportation In Society:** Role of transportation (Land, Air, water) in civilization, Economic, Social, Political, Environmental roles of transportation today in India. **The Fields of Transportation Engineering:** Different fields involved, System planning, Scientific approach to model development science and professional judgment, Organizations. **Component of Transportation System:** Transport technology, Professional systems, Transportation network and their analysis, Vehicle and containers.	14
II	**Vehicle Motion:** Equations of motion, Resistances, Path characteristics, Prediction of vehicle performance, Generalized vehicle performance relationships, Work, Energy and fuel consumptions. **Continuous Flow System:** General characteristics, Belt conveyors, Pipe lines, Concepts of flow and design. **Terminals:** Functions, Analysis, Process flow charts, Terminal processing time, Waiting times, Capacity and level of service concepts simulation probability density functions. Queuing theory, Passenger and fright terminals, Air, Bus, Railroad.	14
III	**Transport costs, Demand And Supply:** Concepts, Types, Future costs and present value, Treatment of inflation, Cost estimating methods, Choice of technology and cost output relationships, Demand function, Demand models, Urban travel for casting model, Demand for freight transportation, Projection techniques, Theory of transport supply, Supply characteristics of transport facilities, Pricing, Supply characteristics of carriers, Supply relationships for an urban transit time. **Transportation Networks Flows:** Merging of demand and supply relationships, Economic market equilibrium and extension to include level of service, Network equilibrium traffic assignment.	14
IV	**Environment Impacts:** Noise impact, Air pollution, Impact on land and value, Vibration, evaluation procedures, Situation in India. **Decision Making:** Characteristics of Transportation problems, Problem solving process, multiple objective evaluation and selection methods, Selection procedures. Economic evaluation methods, Long range transportation planning, Types of Planning process data base alternative and their generation.	14
V	**Operation Plans, System Operation and Management:** Operation plans, Components, Single line analysis, Network relationship, TSM Management scheme for reducing	14

School of Research and Technology Department: Civil Engineering Branch: Transportation Engineering

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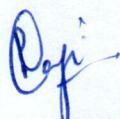PEOPLE'S UNIVERSITY, BHOPAL

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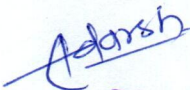| Programme: **Master of Technology** | Specialization: Transportation Engineering. | Semester –II |

| | congestion in CED and on streets, Reducing travel peaks, Traffic engineering measures, Road traffic models for CBD, Corridor operation planning, Maintenance, Integrated operation planning and design and design of a system, Implementation, Urban transportation legislation, Legal powers, Financing. | |

Text Book/References Books/ Websites:-
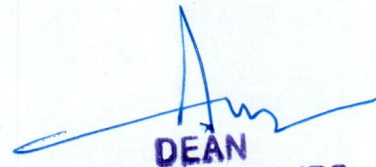
1. Edward K. Morlok; Introduction to Transportation Engineering an Planning; Mc Graw Hill Book Co.
2. John W. Dickey; Metropolitan Transportation Planning; Mc Graw Hill Co.
3. L.R. Kadiyali; Traffic Engineering and Transportation Planning; Khanna Publication Delhi.
4. Wohl Martin and Brien V. Martin; Traffic System Analysis for Engineers and Planners; Mc Graw Hill Book Co.
5. Bruce D. Hutkiinson; Principles of Urban Transport System Planning; Mc Graw Hill.

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

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School of Research and Technology   Department: Civil Engineering   Branch: Transportation Engineering

PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: **Master of Technology**   Specialization: Transportation Engineering.   Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (Nil)	Internal (Nil)	Total	External (70)	Internal (30)	Total (100)
MTTR206	Advanced Pavement Laboratory	-	-	2			(Nil)			Min:40 (D Grade)

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 Max. Marks: Nil

Pre, Requisite	Nil
Course Outcome	1. Able to analyze the properties of cement and do concrete mix design.
	2. Capable of analyzing the strength of soil by conducting CBR test.
	3. Able to test neat and modified bitumen.

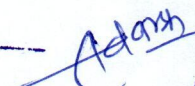| Unit	Contents (Theory)	Marks Weightage
I	**Coarse Aggregate:** Gradation, Routhfutch Method, Shape tests, Aggregate impact test, Los angeles abrasion test, Compressive strength of aggregates, Specific gravity test and water absorption test.	100
II	**Bitumen:** Penetration test, ductility test, Softening point test, Flash and fire point test, Viscosity test, Stripping test, Bitumen extraction, Marshall stability mix design analysis.	
III	**Cement Concrete:** Normal consistency test, Specific gravity test on cement, Fineness test cement, Compressive strength of cement, Tests on fresh concrete, Tests on fine aggregates. Cement concrete mix design.	
IV	**Soil:** Basic tests, Gradation, dry and wet, Hydrometer analysis, Atterberg limits, Compaction Test, Specific gravity test, Density, Sand replacement method, Core cutter method, CBR test.	
V	Preparation of feasibility report, DPR.	

Text Book/References Books/ Websites

1. S. K. Khanna and Justo C.G; Highway Engineering; Nem Chand, 1973.

2. A Veeraghavan; Nemchand Bros; Rookee; 2010 Relevant IS and IRC Publication.

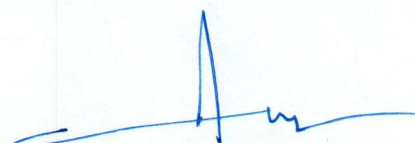**Suggested List of Laboratory Experiments :- (Expandable):**

1. Aggregate Crushing Value Test.
2. Determination of Aggregate Impact Value.
3. Determination of Los Angeles Abrasion Value.
4. Determination of California Bearing Ratio values.
5. Determination of Penetration value of bitumen.
6. Determination of Viscosity of bituminous material.
7. Determination of Softening Point of bituminous material.
8. Determination of Atterberg limit test.
9. Determination of CBR test

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PEOPLE'S UNIVERSITY, BHOPAL
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Programme: **Master of Technology**   Specialization: Transportation Engineering.   **Semester –II**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (35)	Internal (15)	Total (50) Min: 20 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR207	CAD in Transportation Engineering	-	-	2						

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 Max. Marks: Nil

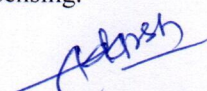| Pre, Requisite	Nil
Course Outcome	1. Student will understand planning and preparation Mx design.
	2. Student will learn about the civil engineering databases.
	3. Students will able to understand the worksheet calculation in civil engineering.

Unit	Contents (Theory)	Marks Weightage
	Transportation Software: MX Road, REI heads, HDM4, TRIPS, MIGRAN GIS and Remote Sensing, Packages, ArcGIS, Geo-Concept,GRAM++, ENVI, ERDAS Imagine. **Computer Aided Drafting**: DBMS concepts, Civil engineering databases, Data entry & reports. Spreadsheet concepts, Worksheet calculations in civil engineering, Regression & matrix inversion.	07

Text Book/References Books/ Websites

1. V. Rajaraman; Computer Oriented Numerical Methods; Prentice; Hall of India, 1995.
2. Chapra S.C., and Canale R.P., Numerical Methods for Engineers, McGraw - Hill, 2004.

Suggested List of Laboratory Experiments :-

- Practicing worksheet calculation in civil engineering database.
- Practicing on spreadsheet concept.
- Practicing on GIS & Remote sensing.

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Programme: **Master of Technology**　　Specialization: Transportation Engineering.　　Semester –II

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (35)	Internal (15)	Total (50) Min: 20 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR208	Audit Course , II (English For Research Paper Writing)	-	-	-						

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 Max. Marks: Nil

Pre, Requisite	Nil	
Course Outcome	1.	Student will understand planning and preparation.
	2.	Student will learn about the skills are needed when writing the methods
	3.	Students will able to understand the review of the literature, methods, results, discussion& conclusions.

Unit	Contents (Theory)	Marks Weightage
I	Planning and Preparation, Word Order, Breaking up long sentences, Structuring paragraphs and Sentences, Being concise and removing, redundancy, Avoiding ambiguity and vagueness.	07
II	Clarifying who did what, Highlighting your findings, Hedging and criticizing, Paraphrasing and plagiarism, Sections of a paper, Abstracts, Introduction.	07
III	Review of the literature, Methods, Results, Discussion, Conclusions, The final check.	07
IV	Skills are needed when writing the methods are needed when writing abstract, Key skills are needed when writing an introduction, Skills needed when writing a review of the literature.	07
V	Skills are needed when writing the methods, Skills needed when writing the results, Skills are needed when writing the discussion, Skills are needed when writing the conclusions, Useful phrases, How to ensure paper is as good as it could possibly be the first, Time submission	07

Text Book/References Books/ Websites

1. R. Goldbort (2006); Writing for Science; Yale University Press (available on Google Books).
2. R. Day (2006); How to Write and Publish a Scientific Paper; Cambridge University Press.
3. N Highman; (1998), Handbook of Writing for the Mathematical Sciences; SIAM. Highman's book.
4. Adrian Wallwork; English for Writing Research Papers; Springer New York Dordrecht Heidelberg London, 2011

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

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Programme: **Master of Technology**   Specialization: Transportation Engineering   Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR3101	Industrial Safety	3	1	-			Min: 40 (D Grade)			

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	Environmental Engineering & Sanitary Engineering
Course Outcome	1. They will have knowledge in industrial safety & fundamentals of maintenance engineering.
	2. Student will understand various concepts of wear and corrosion.
	3. After successfully studying this course student will understand periodic and preventive maintenance.

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.	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	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.	14

Text Book/References Books/ Websites:

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

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

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Programme: **Master of Technology**   Specialization: Transportation Engineering   Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR3102	Waste to Energy	3	1	-			Min: 40 (D Grade)			

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 will be able to know about energy from waste.
	2. Students will have knowledge in technologies for waste to energy biochemical conversion.
	3. Student will understand various centralized and decentralized waste to energy plants.

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.	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, Indian scenario on waste to energy production distribution and use in India, Role of the government in promoting 'Waste to Energy'.	14

Text Book/References Books/ Websites:

1. Sunil pandey;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

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

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Programme: **Master of Technology**   Specialization: Transportation Engineering   Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR3103	Cost Management of Engineering Projects	3	1	-			Min: 40 (D Grade)			

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	Quantity surveying & Estimation and PERT/CPM
Course Outcome	1. They possess the skill to solve the problem in overview of the strategic
	2. Student will apply their knowledge in project commissioning.
	3. The Student will have an idea of pricing strategies, quantitative techniques.

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

Text Book/References Books/ Websites:

1. Charles T. Horngren; Cost Accounting A Managerial Emphasis; Prentice Hall of India; New Delhi.
2. Charles T. Horngren and George Foster; Advanced Management Accounting; FT Prentice Hall.
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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PEOPLE'S UNIVERSITY, BHOPAL
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Programme: **Master of Technology** Specialization: Transportation Engineering Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR3201	Highway Construction Practice	3	1	-						

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

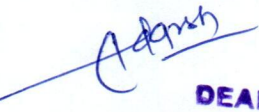| Pre-Requisite	Nil
Course Outcome	1. They possess the skill to solve different problem in landslides.
	2. The Student will have an idea about hill roads construction.
	3. Student will be able to understand stability of slopes.

Unit	Contents (Theory)	Marks Weightage
I	**Embankment Construction:** Formation cutting in soil and hard rock, Preparation of Sub-grade, Ground improvement, Retaining and breast walls on hill roads, Granular and stabilized, Sub–bases/bases, Water bound macadam (WBM), Wet mix macadam (WMM), Cement treated bases, Dry lean concrete (DLC).	14
II	**Bituminous Constructions:** Types of bituminous constructions, Interface treatments, Bituminous surfacing and wearing courses for roads and bridge deck slabs, Selection of wearing course under different climatic and traffic conditions, IRC specifications, Construction techniques and quality control.	14
III	**Concrete Road Construction:** Test on concrete mixes, Construction equipments, Method of construction of joints in concrete pavements, Quality control in construction of concrete pavements, Construction of continuously reinforced, Pre-stressed,	14
IV	**Steel Fibre Reinforced (SFRC) Pavements:** IRC, MORT&H, ACI Specifications, AASHTO Specifications, Recycled pavements, Non-conventional pavements, Overlay construction.	14
V	**Hill Roads Construction:** Stability of slopes, Landslides - causes and control measures, Construction of bituminous and cement concrete roads at high altitudes, Hill road drainage, Construction and maintenance problems and remedial measures.	14

Text Book/References Books/ Websites:

1. Alberto Munguia Mireles; Highway Construction and Inspection Field book; Project Construction Management Book
2. E. B. Sanford Thompson; Concrete In Highway Construction A Text-Book For Highway Engineers And Supervisors; Nabu Press

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

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Programme: **Master of Technology**   Specialization: Transportation Engineering   Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR3202	Intelligent Transportation Systems	3	1	-			Min: 40 (D Grade)			

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 will able to know about automated highway systems.
	2. Student will know about the importance of telecommunications in the ITS. System.
	3. The student will have an idea of historical background of ITS.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction to Intelligent Transportation Systems (ITS):** Definition of ITS and identification of ITS objectives, Historical background, Benefits of ITS - ITS data collection techniques, Detectors, Automatic vehicle location (AVL), Automatic vehicle identification (AVI), Geographic information systems (GIS), Video data collection.	14
II	**Telecommunications in ITS :** Importance of telecommunications in the ITS system, Information management, Traffic management centres (TMC). Vehicle - road side communication, Vehicle positioning system	14
III	**ITS Functional Areas:** Advanced traffic management systems (ATMS), Advanced traveler information systems (ATIS), Commercial vehicle operations (CVO), Advanced vehicle control systems (AVCS), Advanced public transportation systems (APTS), Advanced rural transportation systems (ARTS).	14
IV	**ITS User Needs and Services :** Travel and traffic management, Public transportation management, Electronic payment, Commercial vehicle operations, Emergency management, Advanced vehicle safety systems, Information management.	14
V	**Automated Highway Systems :** Vehicles in platoons, Integration of automated highway systems. ITS programs in the world, Overview of ITS implementations in developed countries, ITS in developing countries.	14

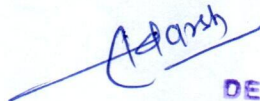Text Book/References Books/ Websites:

1. Kan Paul Chen and John Miles; ITS Hand Book 2000; Recommendations for world road association (PIARC).
2. J.M. Sussman; Perspective on ITS; Artech House Publishers; 2005.
3. National ITS Architecture Documentation; US Department of Transportation; 2007 (CD-ROM).

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

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Programme: **Master of Technology**   Specialization: Transportation Engineering   Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100) Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Total (Nil)
MTTR3203	Transportation Network Analysis & Optimization	3	1	-						

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

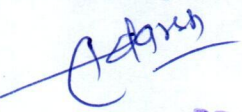| Pre-Requisite	Strength of Material & Theory of Structural Engineering
Course Outcome	1. Student will have an idea of concepts of search algorithms.
	2. They will have knowledge in minimum cost network assignment.
	3. Student will apply their knowledge in computer software.

Unit	Contents (Theory)	Marks Weightage
I	**Network Flows:** Applications, Definitions, Graphs, Paths, Trees, Cycles, Loops, Walk, Network representation (adjacency list and matrices) and basic network transformations, **Network Algorithms:** Complexity, Search algorithms, Strategies for designing polynomial algorithms.	14
II	**Shortest Path Algorithms:** Label setting, Dijkstra's and dial's algorithms, Optimality conditions, label correcting algorithms and optimality conditions, Detecting negative cycles,. All pair shortest path algorithms, Pre-flow push polynomial time algorithms, Capacity scaling techniques.	14
III	**Minimum Cost Network Assignment:** Optimality conditions, Cycle-cancelling algorithm, Successive shortest path algorithm, Other polynomial time variants, Network equilibrium analysis, Principles and optimisation formulations, Frank-wolfe algorithm; Special cases and variants.	14
IV	**Applications:** Applications of minimum cost, Maximum flow and shortest path algorithms to transportation and infrastructure networks, Transportation networks, Airline, Freight, Facility location, Logistics, Network design, Project scheduling, Reliability of distribution systems, Telecommunication/Power networks etc.	14
V	**Computer Software:** Principles of TRIPS, SATURN, EMME/2, CUBE, Demo versions, Case studies.	14

Text Book/References Books/ Websites:

1. R. Ahuja, T.L. Magnanti, and J. B. Orlin; Network Flows; Theory Algorithms and Application, Prentice Hall; New Jersey; 1993.
2. M.G. Bell; Transportation Networks; Elsevier Science Publishers; 1999.

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

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(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: **Master of Technology**　　Specialization: Transportation Engineering　　Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (Nil)	Internal (Nil)	Total (Nil)	External (200)	Internal (100)	Total (300) Min: 120 (D Grade)
MTTR303	Pre-Dissertation	-	-	6						

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. Students will have an idea of methodology adopted involving scientific research.
	2. Students will apply engineering principles through efficient handling of project.
	3. Students will have knowledge about 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

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School of Research and Technology　　*Department: Civil Engineering*　　*Branch: Transportation Engineering*

PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2022-23 onwards)

Programme: **Master of Technology**   Specialization: Transportation Engineering   **Semester - IV**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (Nil)	Internal (Nil)	Total	External (500)	Internal (Nil)	Total (500)
MTTR401	Dissertation	-	-	16			(Nil)			Min: 200 (D Grade)

Duration of Theory (Externals): 3 Hours

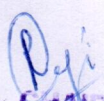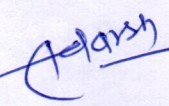| Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: Nil	Lab work & Sessional - Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil

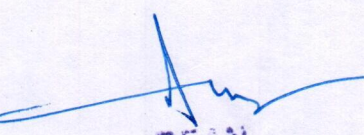| Pre-Requisite	Knowledge of concerned discipline of engineering.	
Course Outcome	1. Students will have an idea ti solve complex engineering problems by applying appropriate techniques and tools.
	2. Students will have good communication skill to the engineering community and society.
	3. Students will able to demonstrate professional ethics and work culture.

Unit	Contents (Theory)	Marks Weightage
	Dissertation: It will be extension of research work on the topic identified in Pre-Dissertation – Continuous assessment should be done of the work done by adopting the methodology decided involving numerical analysis/ conduct experiments, Collection and analysis of data etc. The first defense, for the dissertation work, Should be held within one month. The student must present the power point presentation and progress reports at the interval of four weeks during the semester. Minimum two presentations will be held during the semester. Detail dissertation Report must be submitted in specified format to the people's university through department for evaluation purpose at the end of academic term. After the approval, External examiner is called for the viva-voce to assess along with guide.	500

Text Book/References Books/ Websites: Nil

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

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