Marwadi University

Syllabus for Master of Technology

Civil Engineering (Geotechnical)

Pavement Engineering

01GT0105 (EPC)

Objective of the Course: Objectives of introducing this subject at first year level in Masters of civil engineering are:

1. Explain the pavement types and its design
2. Role of subgrade and its quality impact on pavement performance
3. IS code & IRC requirements for pavement design
4. Applications of the soil stabilization methods

Credits earned:5

Students learning outcomes:

After the successful completion of the course student will be able to..

1. Design the rigid pavement & flexible pavement
2. Monitor and ensure quality of the subgrade laid
3. Suggest appropriate soil stabilization method if soil is not suitable for the subgrade

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	CSE (M)	Internal (I)	Viva (V)	Term Work (TW)	
4	0	2	5	50	20	30	25	25	150

Marwadi University

Syllabus for Master of Technology

Civil Engineering (Geotechnical)

Detailed Syllabus

Sr No.	Title of the unit	Number of hours
1	**Basic Concepts**	
	Pavements types & Approaches to pavement design	1
	vehicle and traffic considerations	2
	behaviour of road materials under repeated loading	2
	Stresses and deflections in layered systems.	2
2	**Flexible Pavement**	
	Material characterization for analytical pavement design	3
	CBR and stabilometer tests, Resilient modulus	2
	Fatigue subsystem	1
	failure criteria for bituminous pavements	1
	IRC design guidelines.	2
3	**Rigid Pavement**	
	Design procedures for rigid pavement	2
	IRC guidelines	2
	Airfield pavements	2
	Highway pavement	2
	CRC pavements	1
4	**Pavement Evaluation And Rehabilitation**	
	condition and evaluation surveys	2
	PSI models	1
	Serviceability index of rural roads	1
	Overlay design	2
	pavements maintenance management	1
	Pavement for sustainable development	1
	Recycling of pavement	1
5	**Stabilization Of Soils For Road Constructions**	
	The need for a stabilized soil	1
	Design criteria and choice of stabilizers	3
	Testing and field control	2
	Stabilisation in India for rural roads	1
	Use of geofabrics in unpaved road construction	2
	Case studies.	1

Suggested lists of experiments

1. Tests on Aggregates
2. Tests on Bitumen
3. Marshal stability mix design
4. CBR for soil subgrade

Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	5%	20%	30%	20%	20%

Instructional Method and Pedagogy:

1. Use of Learning Management system like canvas
2. Demonstration through ppt and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

F. Recommended Study Material:

Reference Books:

1. Yang H Huang "Pavement Analysis and Design", Prentice Hall.
2. Wright, P.H., Highway Engineers, John Wiley & Sons, Inc., New York, 1996
3. Khanna S.K and Justo C.E.G, Highway Engineering, New Chand and Brothers, Roorkee, 1998
4. Croney, D., Design and Performance of Road Pavements, HMO Stationary Office, 1979.
5. EJ Yoder and MW Witczak, "Principles of Pavement Design", John Wiley & Sons
6. Design and Specification of Rural Roads (Manual), Ministry of rural roads, Government of India, New Delhi, 2001
7. AASHTO Guide for Design of Pavement Structures", American Association of State Highway and Transport Officials.
8. IRC:37-2001 "Guidelines for the Design of Flexible Pavements", Indian Roads Congress, New Delhi.
9. IRC:58-2002, "Guidelines for the Design of Plain Jointed Rigid Pavements for Highways", Indian Roads Congress, New Delhi.
10. IRC:81-1997, "Guidelines for Strengthening of Flexible Road Pavements using Benkelman beam deflection techniques", Indian Roads Congress, New Delhi.

Web Resources:

1. nptel.ac.in/courses/105101087
2. nptel.ac.in/courses/105104098
3. nptel.ac.in/courses/105105107

***