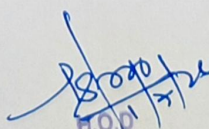


LESSON PLAN: a) Pavement Design & maintenance (CEPE301 TH:3) FOR THE SESSION 2026-27(WINTER-2026) BATCH-2024-27,GOVT. POLYTECHNIC,KANDHMAL,PHULABANI

Discipline: Civil Engineering	Semester: 5th	Name of the Teaching Faculty :GOURANG CHARAN PRADHAN,Sr Lecturer in Civil Engg
Subject: a) Pavement Design & maintenance (CEPE301 TH:3)	No. of days/ per week class allotted: 3	Semester From Date : 1/07/2026 to Date: 5/11/2026 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
1st	1st	Introduction to Pavement Engineering • Definition of pavement• Importance of pavements in transportation• Components of pavement structure
	2nd	Types of Pavements • Flexible pavement• Rigid pavement• Semi-rigid pavement• Typical cross-sections and applications
	3rd	Flexible and Rigid Pavements – Construction and Behaviour • Structural behaviour• Load transfer mechanism• Layer composition
2nd	1st	Comparison of Flexible and Rigid Pavements – Part I • Design precision• Service life• Initial cost• Maintenance requirements
	2nd	Comparison of Flexible and Rigid Pavements – Part II • Stages of construction• Availability of materials• Surface characteristics• Water penetration• Utility location• Glare and night visibility
	3rd	Functions and Characteristics of Pavements • Functions of pavement• Characteristics of a good pavement• Performance requirements
3rd	1st	Factors Affecting Selection of Pavement Type • Traffic volume and loading• Soil conditions• Climate• Drainage• Construction materials• Economy and maintenance
	2nd	Revision, Comparative Analysis and Evaluation • Revision of pavement types and characteristics• Comparative study of pavement systems• Doubt clarification• Unit test
	3rd	Introduction to Pavement Design • Concept and objectives of pavement design• Importance of pavement design• Design approach
4th	1st	Factors Affecting Pavement Design – Design Wheel Load • Wheel load concept• Axle load and load distribution• Importance in pavement thickness design
	2nd	Traffic Factors in Pavement Design • Traffic volume• Traffic growth rate• Vehicle damage factor (VDF)• Equivalent Standard Axle Load (ESAL) – Introduction
	3rd	Environmental Factors Affecting Pavement Design • Temperature• Rainfall• Moisture variation• Frost action and climate effects
5th	1st	Road Geometry and Pavement Materials • Effect of road geometry on pavement design• Pavement materials and their properties• Selection of suitable materials
	2nd	Characteristics of Soil and Drainage Situation • Soil properties affecting pavement design• Subgrade characteristics• Importance of drainage in pavement performance
	3rd	Revision, Case Studies and Evaluation • Review of all design factors• Case studies on pavement failures• Doubt clarification• Unit test
6th	1st	Introduction to Pavement Design • Overview of flexible and concrete pavement design• Design objectives and performance requirements
	2nd	Methods of Flexible Pavement Design • Theoretical method• Empirical method• Comparison of design methods
	3rd	Empirical Methods of Flexible Pavement Design • Design with soil strength test• Design without soil strength test• Introduction to CBR method
7th	1st	IRC:37 Guidelines for Flexible Pavement Design (Overview) • Scope of IRC:37• Design inputs• Traffic estimation• Pavement composition
	2nd	Factors Affecting Design of Concrete Pavement • Wheel load• Subgrade support• Concrete properties• Temperature and moisture effects
	3rd	IRC:58 Guidelines for Concrete Pavement Design (Overview) • Scope and objectives• Design parameters• Thickness determination• Stress considerations
8th	1st	Joints in Concrete Pavements – Need and Types • Purpose of joints• Expansion joints• Contraction joints• Construction joints• Longitudinal joints

	2nd	Requirements and Spacing of Joints • Joint spacing• Joint sealing materials• Load transfer devices (overview)• Codal recommendations
	3rd	Comparative Study of Flexible and Concrete Pavements • Design procedures• IRC guidelines comparison• Advantages and limitations• Practical applications
9th	1st	Revision and Evaluation • Review of IRC:37 and IRC:58 guidelines• Revision of pavement design concepts• Doubt clarification• Unit test
	2nd	Introduction to Pavement Evaluation • Definition of pavement evaluation• Objectives and importance• Role in pavement maintenance and rehabilitation
	3rd	Purpose and Need for Pavement Evaluation • Performance assessment• Maintenance planning• Rehabilitation and strengthening• Economic considerations
10th	1st	Methods of Pavement Evaluation – Overview • Functional evaluation• Structural evaluation• Visual and instrumental methods
	2nd	Visual Rating Method • Types of pavement distress• Visual inspection procedure• Recording observations• Advantages and limitations
	3rd	Pavement Serviceability Index (PSI) • Concept of serviceability• Present Serviceability Index (PSI)• Factors affecting serviceability
11th	1st	Roughness Measurement • Definition of pavement roughness• Importance of roughness evaluation• Methods of roughness measurement (overview)
	2nd	Benkelman Beam Deflection Method – Part I • Principle of Benkelman Beam test• Equipment and components• Test procedure
	3rd	Benkelman Beam Deflection Method – Part I • Principle of Benkelman Beam test• Equipment and components• Test procedure
12th	1st	Benkelman Beam Deflection Method – Part II • Deflection measurements• Interpretation of results• Applications and limitations
	2nd	Comparative Study of Pavement Evaluation Methods • Visual rating• PSI• Roughness measurement• Benkelman Beam method• Selection of suitable evaluation method
	3rd	Revision and Evaluation • Review of pavement evaluation techniques• Case studies• Doubt clarification• Unit test
13th	1st	Introduction to Pavement Maintenance • Definition and objectives• Importance of pavement maintenance• Types of maintenance – Routine, Periodic and Special
	2nd	Inspection and Maintenance Scheduling • Need for pavement inspection• Types of inspection• Maintenance planning and scheduling
	3rd	Causes of Pavement Failure • Traffic loading• Environmental factors• Poor drainage• Construction defects• Material deficiencies
14th	1st	Flexible Pavement Failures – Surface Defects and Cracks • Surface defects• Longitudinal, transverse, block and edge cracks• Causes and identification
	2nd	Flexible Pavement Failures – Deformations • Rutting• Fatigue cracking• Settlement• Upheaval• Causes and effects
	3rd	Rigid Pavement Damages • Cracking• Spalling• Slab rocking• Settlement• Joint sealant failure
15th	1st	Repair Methods for Rigid Pavements • Repair of spalled joints• Full-depth reconstruction• Replacement of dowel bars• Joint resealing
	2nd	Comparative Study of Flexible and Rigid Pavement Maintenance • Maintenance techniques• Failure patterns• Repair methods• Selection of appropriate maintenance strategy
	3rd	Revision and Evaluation • Review of pavement maintenance techniques• Case studies• Doubt clarification• Unit test


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