GOVERNMENT POLYTECHNIC, BOLANGIR
DEPARTMENT OF CIVIL ENGINEERING

Discipline: CIVIL ENGG.	**Semester: 5TH**	**Name of the Teaching Faculty: - Sri Anupama Das [LECT. Stage-I, Civil Engg.]**
Subject: TH:3(A)-PAVEMENT DESIGN & MAINTENANCE	**No. of days/week class allotted: 03**	**Total contact Hours-45Hrs** **Total Marks-100** **Assessment: Internal Assessment -30, End term-70**
COURSE OUTCOMES	**CO1: Identify the components and functions of different types of pavements.** **CO2: Suggest suitable pavement types for different site and traffic conditions.** **CO3: Design flexible pavements using IRC provisions.** **CO4: Design concrete pavements using IRC provisions.** **CO5: Decide suitable maintenance and rehabilitation measures under different pavement damage conditions**	

Class Day	Main Topic	Sub-Topics	Teaching Aids / Activities	Course Outcome
1	Introduction to Pavements	Importance and functions of pavements	Highway photographs, discussion	CO1
2	Types of Pavements	Flexible, rigid and semi-rigid pavements	Pavement cross-section diagrams	CO1
3	Components of Flexible Pavement	Subgrade, sub-base, base and wearing course	Pavement models, charts	CO1
4	Components of Rigid Pavement	Subgrade, DLC, PQC and joints	Pavement section drawings	CO1
5	Comparison of Flexible and Rigid Pavements	Cost, maintenance, construction and service life	Comparison charts	CO1
6	Pavement Characteristics	Strength, durability, riding quality and safety	Case studies	CO1
7	Functions of Pavement	Structural and functional	Layer models	CO1

Class Day	Main Topic	Sub-Topics	Teaching Aids / Activities	Course Outcome
	Layers	requirements		
8	Selection of Pavement Type	Factors affecting pavement selection	Problem-based discussion	CO2
9	Introduction to Pavement Design	Need and objectives of pavement design	Road project examples	CO2
10	Design Wheel Load	Concept and significance	Numerical illustrations	CO2
11	Traffic Factors in Pavement Design	Traffic volume, axle load and growth rate	Traffic data examples	CO2
12	Environmental Factors	Rainfall, temperature and moisture effects	Case studies	CO2
13	Effect of Road Geometry	Camber, gradient and alignment considerations	Road drawings	CO2
14	Pavement Materials	Material properties affecting design	Material samples	CO2
15	Characteristics of Subgrade Soil	Strength and bearing capacity	Soil test reports	CO2
16	Drainage Considerations	Importance and drainage provisions	Drainage layout drawings	CO2
17	Review of Design Factors	Discussion and tutorial problems	Quiz and numerical session	CO2
18	Introduction to Flexible Pavement Design	Design philosophy and concepts	Pavement design charts	CO3
19	Flexible Pavement Design Methods	Theoretical and empirical methods	Flow charts	CO3
20	Soil Strength-Based Design	CBR concept and applications	Laboratory reports	CO3

Class Day	Main Topic	Sub-Topics	Teaching Aids / Activities	Course Outcome
21	IRC 37 Guidelines	Introduction and design parameters	IRC charts and tables	CO3
22	Traffic Estimation for IRC Design	Design traffic calculations	Numerical examples	CO3
23	CBR-Based Pavement Thickness Design	Thickness determination	Design exercises	CO3
24	Flexible Pavement Design Example	Complete design procedure	Worked numerical example	CO3
25	Flexible Pavement Design Practice	Numerical problems	Tutorial session	CO3
26	Introduction to Concrete Pavement Design	Design concepts and features	Pavement photographs	CO4
27	Factors Affecting Concrete Pavement Design	Wheel load, temperature and subgrade support	Charts and examples	CO4
28	IRC 58 Guidelines	Design parameters and concepts	IRC tables and charts	CO4
29	Concrete Pavement Stresses	Load and temperature stresses	Numerical illustrations	CO4
30	Joints in Concrete Pavement	Need and functions of joints	Joint models and photographs	CO4
31	Types of Joints	Expansion, contraction, longitudinal and construction joints	Joint details	CO4
32	Spacing and Requirements of Joints	IRC provisions	Design examples	CO4
33	Concrete Pavement Design Example	Overview of design procedure	Worked example	CO4

Class Day	Main Topic	Sub-Topics	Teaching Aids / Activities	Course Outcome
34	Flexible vs Concrete Pavement Design	Comparative study	Discussion activity	CO4
35	Introduction to Pavement Evaluation	Definition and objectives	Pavement condition photographs	CO5
36	Visual Rating Method	Procedure and applications	Condition survey sheets	CO5
37	Pavement Serviceability Index	Concept and evaluation	Numerical examples	CO5
38	Roughness Measurement	Methods and significance	Roughness data samples	CO5
39	Benkelman Beam Deflection Method	Principle and applications	Equipment photographs and data sheets	CO5
40	Pavement Maintenance	Routine, periodic and special maintenance	Maintenance schedules	CO5
41	Flexible Pavement Failures	Cracking, rutting, settlement and upheaval	Failure photographs	CO5
42	Flexible Pavement Repairs	Slurry seal, fog seal, liquid seal and patching	Repair case studies	CO5
43	Rigid Pavement Failures	Cracking, spalling, slab rocking and joint failures	Pavement distress photographs	CO5
44	Repair of Rigid Pavements	Joint repair, dowel bar replacement, reconstruction	Repair procedure charts	CO5
45	Pavement Maintenance Planning	Selection of maintenance measures, revision and assessment	Case study discussion, quiz	CO5

LEARNING RESOURCES

1. Kadiyali, L.R., Highway Engineering, Khanna Book Publishing House, New Delhi.
2. Chakroborty, Partha Das and Animesh Das, Principles of Transportation Engineering, PHI Learning.
3. Khanna, S.K., Justo, C.E.G. and Veeraragavan, A., Highway Engineering.
4. IRC: 37 – Guidelines for the Design of Flexible Pavements.
5. IRC: 58 – Guidelines for the Design of Plain Jointed Rigid Pavements.
6. IRC Codes and Relevant Highway Engineering Manuals.

30/06/26

SIGNATURE OF CONCERNED FACULTY

30/6/26

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