

GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Civil Engineering

Academic Year: **2016-17**

Semester: **EVEN**

COURSE PLAN

Semester: **VIII**

Subject Code& Name: **10CV833 & Pavement Design**

Name of Subject Teacher: **VIJAYA BHARATHI**

Name of Subject Expert (Reviewer): **SHREYAS H.C.**

For the Period: From: 06-02-17 to 19-05-17

Details of Book to be referred:

Text Books	T1. Highway Engineering- Khanna & Justo T2. Principles & Practices of Highway Engineering- L R Kadiyali & N.B. Lal T3. Pavement Analysis & Design - Yang H. Huang- II edition. T4. Relevant IRC codes
Reference Books	R1. Principles of Pavement Design- Yoder and Witzack - 2nd Edition, John Wileys and Sons R2. Principles of Pavement Design- Subha Rao

Lecture NO	Topic Planned	Practical Applications & Brief objectives	Book referred with Pg No.	Planned Date	Executed Date	Deviation Reasons thereof	How Made Good / Reciprocate arrangement	Remarks by HOD
1.	Unit-1: Introduction	Objective: To know about different types of pavement and the pavement layers.	T1, 330	06.02.17				
2.	Desirable characteristics of pavement.		T2, 339	07.02.17				
3.	Types and components of pavement.		T1, 331 T2, 341 T3, 9	08.02.17				

4.	Difference between Highway pavement and Air field pavement.	<p>Application: It helps in understanding the design of the different pavements.</p> <p>OUTCOME: Understanding of pavement layers and thickness to be provided.</p>	R1, 8	09.02.17				
5.	Design strategies of variables.		T3, 26	09.02.17				
6.	Functions of sub-grade, sub base. Functions of Base course, surface course.		T1, 333	13.02.17				
7.	Comparison between Rigid and Flexible pavement.		T2, 342	14.02.17				
8.	Revision / unit test		VTU question papers	15.02.17				
9.	UNIT-2: Fundamentals of Design of Pavements: Design life, Traffic factors.	<p>Objective: To understand the fundamentals and the various factors that affect the pavement design.</p> <p>Application: To design the road pavements based on the stresses produced on the pavement layers.</p> <p>OUTCOME: Design of pavement by various theories.</p>	T1, 335 T2, 345	16.02.17				
10.	Climatic factors, Road geometry. Sub-grade strength and drainage.		T1, 335 T2, 346, 351	16.02.17				
11.	Stresses and deflections.		T3, 45	20.02.17				
12.	Boussinesqs theory – principle.		T2, 353	21.02.17				
13.	Assumptions – limitations.		T2, 355	22.02.17				
14.	Numerical on Boussinesqs theory.		T2, 355	23.02.17				
15.	Burmister theory – Two layered analysis, Assumptions.		T1, 368 T3, 57	23.02.17				
16.	Numerical on Burmister theory.		T1, 370 T3, 59	27.02.17				
17.	Revision / unit test		VTU Question Paper	28.02.17				
18.	Unit-3: Design factors Design wheel load.		<p>Objective: To design the wheel load and to</p>	T1, 336	01.03.17			
19.	Contact pressure.	T1, 337		01.03.17				

20.	ESWL concept.	understand the various stress criteria occurring on the pavements Application: Using of ESWL and EWL concept for the pavement thickness.	T1, 338	02.03.17				
21.	Determination of ESWL by equivalent deflection criteria.		T1, 339	02.03.17				
22.	Stress criteria, EWL concept.		T1, 341	06.03.17				
23.	Numerical on ESWL.		T1, 340	07.03.17				
24.	Revision / unit test		VTU Question Paper	08.03.17				
25.	Unit-4: Flexible pavement design: Introduction.	Objective: Designing of the flexible pavement using the various methods. Application: Using these methods we can understand the various parameters for designing of pavements.	T1, 346	13.03.17				
26.	Assumptions of McLeod Method.		T1, 366	13.03.17				
27.	Kansas method – Tri-axial method.		T1, 363	14.03.17				
28.	CBR method – IRC Method (old).		T1, 356 T2, 364	15.03.17				
29.	CSA Method using IRC 37-2001.		T2, 370	15.03.17				
30.	Numerical on IRC method		T2, 367	16.03.17				
31.	Numerical on CSA method		T1, 370	16.03.17				
32.	Numerical on Tri-axial method		T1, 365	20.03.17				
33.	Revision / unit test		VTU Question Paper	21.03.17				
34.	Unit-5: Stresses in rigid pavement: Principle – factors - wheel load and its repetition.		Objective: To understand the stresses occurring in rigid pavement due to temperature and wrapping.	T2, 518	22.03.17			
35.	Properties of sub grade - properties of concrete.	T2, 519		23.03.17				
36.	External conditions – joints.	T2, 522		23.03.17				

37.	Reinforcement – Analysis of stresses, Assumptions.	<p>Application: Determination of stresses occurring at corner, edge and center of the pavement surface.</p> <p>OUTCOME: Design of pavement by various theories.</p>	T2, 523	27.03.17				
38.	Westergaard's Analysis – Modified Westergaard equations.		T1, 374	28.03.17				
39.	Critical stresses – Wheel load stresses, Warping stress.		T1, 379	30.03.17				
40.	Frictional stress – combined stresses (using chart / equations).		T1, 382	30.03.17				
41.	Numerical on Westergaard's Analysis.		T1, 377	03.04.17				
42.	Numerical on Wrapping stress.		T1, 378	04.04.17				
43.	Numerical on Wheel load stress.		T1, 372	04.04.17				
44.	Revision / unit test		VTU Question Paper	05.04.17				
45.	Unit-6: Design of Rigid Pavement Design of C.C. Pavement by IRC: 38 – 2002 for dual and Tandem axle load.	<p>Objective: Designing of the rigid pavement using the various methods. Types of joints in the rigid pavement.</p> <p>Application: To design the joints, dowel bars and tie bars and to do reinforcement of slabs.</p> <p>OUTCOME: Using of IRC 38 for design of rigid</p>	FROM IRC 38: 2000 CODE BOOK	06.04.17				
46.	Reinforcement in slabs. Requirements of joints.		T2, 534	06.04.17				
47.	Types of joints – Expansion joint – contraction joint – warping joint.		T2, 536	10.04.17				
48.	Construction joint – longitudinal joint.		T2, 538	11.04.17				
49.	Design of joints, Design of Dowel bars.		T2, 539	12.04.17				
50.	Design of Tie bars.		T2, 541	12.04.17				
51.	Numerical on design of joints.		T2, 535	13.04.17				

52.	Numerical on dowel bar.	pavements. Designing of dowel bars can be done.	T2, 540	13.04.17				
53.	Numerical on Tie bar.		T2, 542	20.04.17				
54.	Revision / unit test		VTU Question Paper	20.04.17				
55.	UNIT-7: Flexible Pavement Failures, Maintenance and Evaluation: Introduction.	<p>Objective: Maintenance measures required for the flexible pavement. Functional and structural evaluation of pavement.</p> <p>Application: Evaluation of the pavements for its long life. Use of various methods for evaluation.</p> <p>OUTCOME: Designing of runway and airfield pavements and the various factors considered.</p>	T1, 490	24.04.17				
56.	Types of failures, causes.		T1, 493	24.04.17				
57.	Remedial/maintenance measures in flexible pavements.		T1, 498	25.04.17				
58.	Functional Evaluation by visual inspection and unevenness measurements.		T1, 501	26.04.17				
59.	Structural Evaluation by Benkelman Beam Deflection Method.		T1, 509 T2, 578	27.04.17				
60.	Falling weight deflectometer, GPR Method.		T2, 581 T3, 665	27.04.17				
61.	Design factors for Runway Pavements. Design methods for Airfield pavements.		T2, 821	02.05.17				
62.	Numerical on design of Runway Pavements.		T2, 833	03.05.17				
63.	Numerical on design of Airfield Pavements.	T2, 833	04.05.17					
64.	Revision / unit test	VTU Question Paper	04.05.17					
65.	Unit-8: Rigid pavement failures, maintenance and evaluation: Types of	Objective: To know about various types of rigid	T1, 495 T2, 597	08.05.17				

	failures, causes.	<p>pavement failures and the causes of failure.</p> <p>Application: Maintenance and the remedial measures for the long life of pavements.</p> <p>OUTCOME: We will be able to design the airport pavements and the factors considered for airfield pavements.</p>							
66.	Remedial/maintenance measures in rigid pavements.		T1, 504 T2, 599	09.05.17					
67.	Functional Evaluation by visual inspection and unevenness measurements.		T1, 506 T2, 614	15.05.17					
68.	Design factors for Runway Pavements.		T2, 822	16.05.17					
69.	Design methods for Airfield pavements.		T2, 825	16.05.17					
70.	Numerical on design of Runway Pavements.		T2, 833	17.05.17					
71.	Tutorial		VTU Question Paper	18.05.17					
72.	Revision			18.05.17					

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