IF556: Pavement Analysis and Design

Teaching and Examination Scheme:

CREDITS = 5 (L=*3*, T=*2*, *P=0*)

M. Tech First year, 1st Semester

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Assessment Scheme				
				Theory		Practical		Total Marks
L	T	P	C	ESE	CE	ESE	CE	
3	2	0	5	70	30	30	20	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Introduction:** Factors Affecting Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane Distributions & Vehicle Damage Factors.	06
2	**Stresses in Flexible Pavement:** Vehicle-Pavement Interaction, Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts.	08
3	**Stresses in Rigid Pavement:** Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, and Stresses in Dowel Bars & Tie Bars.	08
4	**Design of Flexible Pavement Technique:** Factors effecting Design. Deflection studies in Flexible Pavements. Present Serviceability Index. IRC guidelines for Flexible Pavements. Pavement Performance and methods- AASHTO and Asphalt Institute Method. Pavement distresses, Need for Overlays, Overlays design methods for Flexible and Rigid pavements.	10
5	**Design of Rigid Pavements:**	10

Unit No.	Topics	Teaching Hours
	Design of Rigid Pavements: Factors effecting Design - Wheel load & its repetition, sub grade strength & proportion, strength of concrete- modulus of elasticity. Reinforcement in slab, design of joints, design of dowel bars, design of tie bars. IRC and AASHTO methods of Rigid Pavement design.	

List of References:

1. AF Stock, Concrete Pavements, Elsevier, Applied Science Publishers
2. IRC:37 & 58 Codes for Flexible and Rigid Pavements Design.
3. 3. Micheal Sargious , Pavement and Surfacing for Highway & Airports, Applied Science Publishers Limited.
4. Nai C. Yang, Design of functional pavements, McGraw Hill Publications.
5. S.K. Khanna, C.E.G. Justo, A. Veeraragavan, Highway Engineering (2014), Roorkee 247667, India
6. Yang H. Huang, Pavement Analysis & Design, Prentice Hall Inc.
7. Yoder.J. & Witzorac Mathew,Principles of Pavement Design, W. John Wiley & Sons Inc
8. 5. P. Raymond, "*Solid Mechanics for Engineering*", 1st Edition, John Willey & Sons, 2001.
9. 6. J. W. Dally and W. F. Riley, "*Experimental Stress Analysis*", 3rd Edition, McGraw HillPublishing Co., New York, 1991.