GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL (TRANSPORTATION ENGINEERING) (13)

PAVEMENT MANAGEMENT SYSTEM

SUBJECT CODE: 2731308

M.E. 3RD SEMESTER

Type of course: Major Elective - IV

Prerequisite: Pavement Design, Construction and Evaluation

Rationale: The efficient road network is essential for the safe, timely and economic movement of passengers and goods. The riding quality shall be better and retain for long duration at reasonable cost. It necessitates the knowledge of pavement construction and proper maintenance. The appropriate pavement management system shall be developed for the desirable outcomes. This subject will enable to provide the know-how of various aspects of pavement management system to the students.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks		Practical Marks				
L	T	P	C	ESE (E)	PA (M)	ESE (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Pavement Maintenance & Management Process:** Application of system concepts to pavement management, pavement management levels-Network & Project level, functions - Data need, Pavement life cycle, assessment of pavement performance, evaluation of pavement structural capacity, distress & safety, combined measures of pavement quality, data management.	10	25
2	**Determining Present and Future Needs:** Establishing criteria – development of models for pavement deterioration – determining the future needs – rehabilitation and maintenance strategies – developing combined programmes for maintenance & rehabilitation.	10	25
3	**Project Level Design:** Framework for pavement design, characterization of physical design inputs, basic structural response models – variability, reliability and risk – generating alternate design strategies, rehabilitation design procedures, Overlay design, economic evaluation of alternate pavement design strategies – selection of optimal design strategy.	11	25
4	**Implementation:** Major steps in implementing PMS – pavement construction management & pavement maintenance management – informations, research needs – cost and benefit of pavement management – future directions and need for innovations in pavement management, HDM applications.	11	25

Reference Books:

1. Haas R. C. G., Hudson W. Ronald, Zaniewski John P., Modern Pavement Management, Krieger Publishing Company, 1994
2. Oecd, Pavement Management Systems, O E C D 1987.
3. Shahin M. Y., Pavement management for airport, roads and parking lots, Chapman and hall 1994
4. Susan Brown, Pavement Management Systems, Transportation Research Board, 1993.
5. E.J.Yoder and M.W.Witczak, Principles of Pavement Design, John Wiley and Sons, New York, 1975
6. Tang, Pavement Design
7. Sharma & Shrama, Principles and Practice of Highway Engg.
8. IRC– 37, 2001, 2012, IRC – 58-1998, 2002.
9. Y.H.Huang, Pavement Analysis and Design. Prentice Hall, Englewood Cliffs, New Jersey, USA, 1993, ISBN-0-13-655275-7
10. H.N.Atkins, Highway Construction and Maintenance, Soils, and Concretes, Reston Publishing Company, Reston VA, 1983.
11. J.P.Watson, Highway Construction and Maintenance, Longman Scientific and Technical, New York, 1989.

Course Outcome:

After learning the course the students should be able:

1. To be aware of importance of Pavement Management System for maintaining better riding quality on the roads for longer time at the reasonable cost.
2. To know the techniques of assessment of pavement performance, data management, combined programming of maintenance and rehabilitation.
3. To enhance the knowledge regarding overlay design, optimal design strategy, implementation of PMS and related computer applications.

List of Experiments:

1. Benkelman beam deflection study.
2. Pavement unevenness measurement by Bump Integrator.
3. Traffic volume count for EWLF.
4. O-D survey on the highway.
5. Forecasting of traffic.
6. Design for overlay.
7. Economic evaluation of pavement management.
8. Computer applications for the above problems.

Design based Problems (DP)/Open Ended Problem:

Below mentioned problems are for reference only. Similar problems may be developed by individual teachers.

1. Carryout overlay design on a selected stretch of highway and evaluate the alternative designs.

Major Equipment:

1. Benkelman Beam
2. Bump Integrator

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers,

integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.