Module (Course Syllabus)
Catalogue 2022-2023

College/ Institute	Engineering technical	
Department	Highway and bridges	
Module Name	Pavement design	
Module Code	PAD801	
Degree	**Technical Diploma** ☐ **Bachler** Ok **High Diploma**	**Master** ☐ **Ph D**
Semester	8 th	
Qualification		
Scientific Title	Assistant professor	
ECTS (Credits)	6	
Module type	**Prerequisite** ☐ **Core:ok** ☐ **Assist.** ☐	
Weekly hours		
Weekly hours (Theory)	**(4)hr Class**	**(4)Total hrs Workload**
Weekly hours (Practical)	**( )hr Class**	**( )Total hrs Workload**
Number of Weeks	12	
Lecturer (Theory)	Dr. FARIS M. JASIM	
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Lecturer (Practical)		
E-Mail & Mobile NO.		
Websites		

Course Book

Course Description	Increase student knowledge and learn the principles and practices for the investigation, design, contracting, and construction of different types of pavements, including maintenance and rehabilitations processes for more durable with high performance active highway system Highway pavements are divided into two main categories: rigid and flexible. Th wearing surface of a rigid pavement usually is constructed of Portland cement concrete such that it acts like a beam over any irregularities in the underlying supporting material. The wearing surface of flexible pavements, on the other hand, usually is constructed of bituminous materials such that they remain in contact with the underlying material even when minor irregularities occur. Flexible pavements usually consist of a bituminous surface under laid with a layer of granular material and a layer of a suitable mixture of coarse and fine materials. Traffic loads are transferred by the wearing surface to the underlying supporting materials through the interlocking of aggregates
Course objectives	The main objectives to be achieved after the completion of this course are summarized below: 1. To understand pavement engineering, terminology, and concepts. 2. To understand the different types of pavements. 3. To recognize the different types of flexible pavements as well as rigid pavements. 4. To get to know and understand the engineering properties and characteristics of the different materials that concern the pavement engineer. 5. To understand testing and evaluation of soil, granular, and bituminous materials for pavement analysis and design. 6. To understand the different Superpave aggregate tests and requirements. 7. To be familiar with the Superpave asphalt binder tests and specifications. 8. To conduct analysis of flexible pavements for stresses, strains, and deflections in one-, two-, and three-layered systems. 9. To conduct analysis of different types of drainage systems with their suitable design for highway 10. To conduct analysis of rigid pavements for stresses, strains, and deflections. 11. To design flexible pavements using the AASHTO design procedure. 12. To design rigid pavements using the AASHTO design procedure. 13.Introduce the student to certain case studies
Student's obligation	a. To attend the classes regularly with minimum absence. b. To participate actively in the class discussion and Q&A session c. Study on daily basis to digest the class material d. To write note off-handouts e. Prepared for sudden Quizzes f. Vet through the references provided by the lecturer and to solve as much as possible of homework and exercises for the subjective materials.

	g. Prepare the assignment and the seminar as instructed by the lecturer.
Required Learning Materials	

Evaluation		**Task**	**Weight (Marks)**	**Due Week**	**Relevant Learning Outcome**
		Paper Review			
	Assignments	Homework	5		
		Class Activity	2		
		Report	10		
		Seminar	10		
		Essay			
		Project			
		Quiz	8		
		Lab.			
		Midterm Exam	25		
		Final Exam	40		
		Total	100		

Specific learning outcome:	By the end of the current course, the student shall be able to learn the major activities related to the pavement design which is the part the makes the backbone for any constructional project. This course is aimed at providing the Highway Engineering students with basic understanding of the Highway Engineering materials and the basic and fundamental design concept of highway pavements structures. Students will be able to design and analyse flexible pavements in addition, they will be able to understand the basic elements of rigid pavement design. Students will be able to conduct a thorough analysis of stresses, strains and deflections developed by different axle configurations and loads in multilayer flexible pavement structures. Students will study the effect of both traffic and environment on pavement damage. The pavement course provide sufficient coverage of highway materials using SUPERPAVE characterisation methods, hot mix asphalt design by using Marshall design methods. Students will learn how to design new pavement structure

Course References:	1- Pavement Design, Materials, Analysis, and Highways, July,2020 ,First Edition By:M. Rashad Islam, *Colorado State University , Pueblo, Colorado* Rafiqul A. Tarefder, *University of New Mexico, Albuquerque, New Mexico* 2-Principles of Highway Engineering and Traffic Analysis, Fifth Edition - 2013 by , Fred L. Mannering and Scott S. Washburn,,,,Purdue university ,*USA* 3- Highway and traffic engineering …by N.J. Garber and L.A. Hoel,,2009 4th edition.. University of Virginia,USA 4- Pavemen Design and Materials by A.T. Papagiannakis and E.A.Masad. 2007….University of Texas USA Foundation Analysis and Design: Joseph E. Bowles

Course topics (Theory)	Week	Learning Outcome
1. INTRODUCTION	1	
2. MATERIALS PROPERTIES AND TESTING REQUIREMENTS	2	
3. SOIL ENGINEERING AND EARTHWORK	3	
4. GRANULAR TYPES AND EVALUATIN 5. DRAINAGE DESIGN	4	
6. BITUMINOUS and PORTLAND CEMENT AS Binder MATERIALS	5-6	
7. PAVEMENT MIX DESIGN (Marshall and Superpave methods)	7-8	
8. PAVEMENT LAYERS DESIGN (AASHTO E-1993 , PCA ,and M-E /2008) a-flexible pavement design b- rigid pavement design c- Runway and Taxiway design d-composite design	9-10	
9. HIGHWAYS MAITENANCE AND REHABILITATION	11-12	

Practical Topics	Week	Learning Outcome

Questions Example Design

Extra notes:

External Evaluator