

College of Engineering Civil Engineering Department

Semester: 2020/2021

**About The Course**

**Course Title**: Pavement lab

**Course No**: 901407

**Credit Hours**: 1

Obligatory/ Optional: Obligatory

**Class**: 4

**Lecture Room**: 102

**Text Book**:

1. Y. H. Huang, Pavement Analysis and Design, Prentice Hall, 2nd Edition, 2004.
2. Laboratory notes

**The Instructor**

**Name**: Yasser Ibrahim Osman Yahia

**Title**: Tutor **Office**

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**Course Description**

This course makes sure the students understand different pavement types, terminology, and concepts, Understand the engineering properties and characteristics of the different materials that concern the pavement engineer, to be familiar with Marshal asphalt binder and aggregate tests and specifications, and to design flexible pavements using the AASHTO design procedure through several lab experiments .

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| --- |
| **Course Objectives** |
| 1. To study the physical consensus and source properties of aggregate  materials using traditional test methods |
| 2. To measure and study the physical properties of asphalt binders |
| 3. To present the ASTM specifications for asphalt binder tests. |
| 4. To evaluate and design asphalt paving mixtures prepared from available aggregates and asphalt binders using Marshall Mixture  Design Method |

**Learning Outcome**

1. Understand the engineering properties and characteristics of materials that concern the pavement design.
2. To be familiar with marshal tests and specifications.
3. Design flexible pavements using the AASHTO design procedure.

**Course Outline and Time schedule**

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| --- | --- |
| **Week** | **Course Outline** |
| 1st week | Penetration Test |
| 2nd week | Ring and Ball Softening Point Test |
| 3rd week | Ductility Test |
| 4th week | Flash and Fire Points Test |
| 5th week | Specific Gravity Test |
| 6th week | Marshall Mixture Design Method: |
| 7th week | **Midterm Exam** |
| 8th week | Aggregate and Asphalt Preparation and Evaluation |
| 9th week | Preparation of Marshall Specimens |
|  | Marshall Stability and Flow Test |
|  | Volumetric (Density and Voids) Analysis |
|  | Selection of Design Asphalt Content |
| 14th week | **Final exam** |

# Presentation methods and techniques

## Methods of teaching varied according to the type of text, student and situation. The following techniques are usually used:

1- Lecturing with active participations. 2- Problem solving.

1. Cooperative learning.
2. Discussion.
3. Learning by activities.
4. Connecting students with different sources of information

**Assessment Strategy and its tools**

## The assigned syllabus is assessed and evaluated

Through: feedback and the skills that are acquired by the students

The tools:

* 1. Diagnostic tests to identify the students level and areas of weakness
  2. Formal (stage) evaluation
     1. Class Participation
     2. Midterm Exam
     3. Activity file

**Tool & Evaluation**

Tests are permanent tools & assessment, in addition to the activity file which contains curricular and the co-cussiculor activities, research, report papers and the active participation of the student in the lecture.

The following table clarifies the organization of the assessment schedule:

|  |  |  |
| --- | --- | --- |
| **Test** | **Date** | **Grade** |
| Midterm Exam | According to the department schedule | 20% |
| Reports | According to the department schedule | 20% |
| Activities &  Participation | Students should be notified about  their marks | 20% |
| Final Exam | According to the department schedule | 40% |

**Activities and Instructional Assignment**

1- Practical assignments to achieve the syllabus objectives. 2- Weekly Pop quiz

3- Weekly reports

**Regulations to maintain the Teaching-Learning Process in the Lecture:**

1. Regular attendance.
2. Respect of commencement and ending of the lecture time. 3- Positive relationship between student and teacher.
3. Commitment to present assignments on time.
4. High commitment during the lecture to avoid any kind of disturbance and distortion.
5. High sense of trust and sincerity when referring to any piece of information and to mention the source.
6. The student who absents himself should submit an accepted excuse.
7. University relevant regulations should be applied in case the student’s behavior is not accepted.
8. Allowed Absence percentage is (15%).

**Internet websites**

1. American Society for Testing and Materials [ASTM]: https:/[/www.astm.org](http://www.astm.org/)/
2. Laboratory standards: [https://www.astm.org/search/fullsite- search.html?query=pavements&toplevel=products-and- services&sublevel=standards-and-publications](https://www.astm.org/search/fullsite-search.html?query=pavements&toplevel=products-and-services&sublevel=standards-and-publications)
3. [American Association of State Highway and Transportation Officials](https://www.transportation.org/) [AASHTO]:

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# References:

1. Standard Specifications for Transportation Materials and Methods of Sampling and Testing, Part II-Tests, Twenty Second Edition, American Association of State Highway and Transportation Officials (AASHTO), Washington D. C., 2002.
2. AASHTO Provisional Standards, Standard Test Methods and Standard Practices, Interim Edition, American Association of State Highway and Transportation Officials, Washington D. C., 2001.
3. ASTM Standard Test Methods, American Standards of Testing and Materials, 1996.

**Syllabus Classification**

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| --- | --- | --- |
| **Objectives** | ***Learning outcomes*** | ***Assessment tools*** |
| 1- | Students are able to identify engineering  problems | Assignments, projects,  and exams |
| 2- | Students are able to design a component  to meet certain constraints | Assignments, projects,  and exams |
| 3- | Students are able to use modern engineering tools for engineering  practice | Assignments, projects, and exams |
| 4- | Students are able to recognize the impact of engineering solutions in an  environmental context | Assignments, projects, and exams |
| 5- | Students are able to formulate a  collective solution to a Problem | Assignments, projects,  and exams |