



# Course Book

<b>Course Description</b>	<p>This is an entry-level course for first stage students of road construction departments to introduce them the materials that are mostly used in road construction such as asphalt and aggregates. The course consists of two hours theory and two hours laboratory tests on asphalt and other construction material that are used in the pavement process.</p>
<b>Course objectives</b>	<ul style="list-style-type: none"> <li>• The objective of this course is to introduce Technical Road Department students the fundamentals, basics, principles, and applications of asphalt.</li> <li>• Explaining the information about asphalt in detail and the importance of this material, its advantages and disadvantages and how to use in road construction.</li> <li>• Develop understanding the other construction materials used in road construction in detail such as aggregates and bitumen.</li> <li>• Distinguishing the advantages and disadvantages of all the materials that collaborate in constructing roads.</li> <li>• Develop knowledge and skills about asphalt and the other materials used in road construction through standard laboratory tests according to the S.O.R.B standard and site visits.</li> </ul>
<b>Student's obligation</b>	<p>Students are obliged to</p> <ul style="list-style-type: none"> <li>• Attend all the lectures.</li> <li>• Participate in all quizzes and exams.</li> <li>• Hand over home assignment before its due date.</li> <li>• Participate in seminars.</li> <li>• Hand weekly reports for the tests undertaken in the</li> </ul>

	laboratory..			
<b>Required Learning Materials</b>				
<b>Evaluation</b>	<b>Task</b>		<b>Weight (Marks)</b>	<b>Due Week</b>
	Paper Review			
	Assignment	Homework	5%	2, 4
		Class Activity	2%	
		Report	10%	5
		Seminar		8
	Quiz		8%	3,5 ,9
	Lab.		10%	
	Midterm Exam	Theory	10%	
		Practical	15%	
	Final Exam		40%	
	Total		100%	
<b>Specific learning outcome:</b>	<ol style="list-style-type: none"> <li>1- Review basic definitions and concepts required for understanding manners and behaviors of asphalt.</li> <li>2- Demonstrate comprehensive knowledge on the use of asphalt and bitumen in constructing roads.</li> <li>3- Conduct different types of experiments on different types of materials that used in road construction such as aggregates, soil and bitumen.</li> <li>4- Develop experimental reports to display the test results, and then discuss them by comparing them to the specifications.</li> <li>5- Be able to select the suitable and economic materials for different construction work especially road construction.</li> </ol>			
<b>Course References:</b>	<ol style="list-style-type: none"> <li>1- American Assosiation of state highway and transportation officials, AASHTO Materials. Part 2 tests. 12th edition, 1978</li> <li>2- S.O.R. B. (المواصفات القياسية للطرق والجسور) / IRQ.1979.</li> <li>3- James G. Speight. Asphalt Materials Science and</li> </ol>			

	<p>Technology. 1st Edition, 2016, Elsevier.</p> <p>4- Patrick Lavin. Asphalt Pavements: A Practical Guide to Design, Production and Maintenance for Engineers and Architects. 1st Edition, 2003, Spon Press.</p> <p>5- Athanassios Nikolaides. Highway Engineering: Pavements, Materials and Control of Quality. 1st Edition, 2015, CRC Press.</p>
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Course topics (Theory)	Week	Learning Outcome
Introduction and Historical background of Roads - Evolution of Paved Roads.	1	
Classification of Roads and Their Details.	2	
Asphalt, History, Use, and Production	3	
Types of Asphalt and their application.	4	
The Chemical and Physical Properties of Asphalt	5	
Fundamental Mechanical Properties of Asphalts.	6	
Prime Coat and Tack Coat	7	
Advantages of Using Prime Coat and Tack Coat	8	
Determination of Prime Coat and Tack Coat Quantity.	9	
Aggregates and their types and tests.	10	
Fillers, types and Properties.	11	
Hot asphalts	12	
Practical Topics	Week	Learning Outcome
Introduction to the Laboratory work	1	
Permeability Test of Asphalt	2	

Penetration Test of Asphalt	3	
Asphalt ductility Test	4	
Asphalt Softening point Test	5	
Asphalt Viscosity Test	6	
Asphalt Specific Gravity Test	7	
Asphalt Flash and Fire Point Test	8	
Marshall Stability Test	9	
Methods of Sampling Aggregate Materials Aggregate Sieve Analysis	10	
Aggregate Impact Test Aggregate Crushing Value Test	11	
Aggregate Abrasion Value Test	12	

## Questions Example Design

### 1. Compositional:

In this type of exam, the questions usually start with Explain how, what are the reasons for...? Why...? How....?

#### Example

Q\Define (5) Of the following terms in brief (with Sketches when necessary)? fillers, Fine aggregate, tar, prime coat, cutback asphalt, emulsion.

### 2.

#### Example

Write a comparison for or compare Hot mixes and cold mixes.

### 3. Choose the right answer for the following:

#### Example

It is the asphalt cement which has been liquefied by blending with petroleum solvents

A. Emulsified Asphalt    B. Cutback asphalt    C. Pulverized Asphalt

### 4. fill in the blanks with the correct answer

#### Example

Air blowing asphalt is to be used for a purpose other than paving, such as;.....,.....

And ..... .

**5. Explain the following questions accurately?**

**Example**

**Subgrade layer, should be properly compacted to the desired density, near the optimum moisture content.**

**Extra notes:**

**I have no notifications**

**External Evaluator**

The course book prepared by my colleague is properly arranged, it covers the main requirements of this lesson. The lecturing procedures identified, degree distributions, ways of evaluating the students, lecture topics mentioned promises best output and successful graduated students.

Assistant Professor  
Dr.Ganjeena Jalal Madhat  
ganjeena.madhat@epu.edu.iq

