



University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Mechanical Engineering

Form no. (12): Course Specification

1- Course Data

Course Code: ME 381	Course Title: Internal Combustion Engines (1)	Academic Year/Level: 3rd year / 5th semester
Specialization: Mechanical	No. of Instructional Units 3 credits	Lecture 2 hrs.
		Practical 2 hrs.

2- Course Aim

- To enable students to identify and understand the different types of internal combustion engines and their components .
- To teach students fundamentals of engine operation and engine systems.
- To help students acquire the ability to do simple design calculations
- To teach students the basics of engine testing

3- Intended Learning Outcomes

a- Knowledge and Understanding	Through knowledge and understanding, students will be able to: a.1) Concepts and theories of mathematics and sciences, appropriate to the discipline a.4) Principles of design including elements design, process and/or a system related to specific disciplines. a.p.2) Internal combustion, pumps, turbines and compressors, classification, construction design concepts, Operation and characteristics\ a.p.7) Basic theories and principles of some other engineering and mechanical engineering disciplines Providing support to mechanical power and energy disciplines. a.a.1) Detailed knowledge and understanding of the themes and specialist subjects of the automotive a.a.6) The drivability, safety limitations and compulsory tests especially applied in automotive
b- Intellectual Skills	Through intellectual skills, students will be able to: b.4) Combine, exchange, and assess different ideas, views, and knowledge from a range of sources. b.p.4) Analyze the performance of the basic types of internal combustion engines and hydraulic b.a.2) The ability to assess and analyze information in support of problem solving, design and development, Critical evaluation of alternatives and performance data b.a.3) Create solutions to automotive engineering especially to manufacturing and maintenance problems in a creative way, taking account of industrial and commercial constraints
c- Professional Skills	Through professional and practical skills, students will be able to: c.a.1) Using special automotive test & measurement equipment and conducting experimental laboratory
d- General Skills	Through general and transferable skills, students will be able to: d.2) Work in stressful environment and within constraints.

	d.4) Demonstrate efficient IT capabilities.
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4- Course Content

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| <p>Week No.1 Engine types</p> <p>Week No.2 Engine parts</p> <p>Week No.3 Valve timing; effects on P-V diagram</p> <p>Week No.4 Spark ignition vs compression ignition</p> <p>Week No.5 Engine charging and volumetric efficiency</p> <p>Week No.6 Fuel properties</p> <p>Week No.7 Carburetors / 7th week evaluation</p> <p>Week No.8 Carburetor calculations</p> <p>Week No.9 Thermodynamics of combustion</p> <p>Week No.10 Engine heat transfer</p> <p>Week No.11 Energy balance of engines</p> <p>Week No.12 Engine performance and testing (I) / 12th week evaluation</p> <p>Week No.13 Engine performance and testing (II).</p> <p>Week No.14 Octane and cetane ratings</p> <p>Week No.15 Revision</p> <p>Week No.16 Final examination</p> |
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5- Teaching and Learning Methods

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| <ul style="list-style-type: none">• Lectures• Tutorials• Reports & sheets• Laboratories• Seminars |
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6-Teaching and Learning Methods for Students with Special Needs

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| <ul style="list-style-type: none">• Lectures• Tutorials• Reports & sheets• Laboratories• Seminars |
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Engineering Requirements and Design Considerations in college Buildings and its Leading Passages

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| <ul style="list-style-type: none">• The design of college buildings and pedestrian passages leading to it are sloppy to allow the transportation of the handicapped;• Doors are wide enough to let wheel chairs pass through easily and conveniently.• Lifts are provided for movement between floors. |
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- Doors are made from light weight materials to make it easy for the handicapped suffering from weakness in limb muscles or those handicapped using prosthetic limbs to deal with them with the least muscular effort.
- Class floors are made from non-slippery materials to prevent falls on the part of the handicapped.
- Sudden changes in the floor level are prevented.

Design Considerations of the Classes

- Class boards are placed at 60 cm high to allow wheeled chair users or those suffering from limited arm mobility use them.
- Enough spaces are left between seats and benches to prevent hindering the movement of wheeled chairs between them.
- Handicapped students sit among normal people in class to be able to interact with them. Nevertheless, in urgent cases according to the nature of the disability, the handicapped students sit in fixed suitable places whether at the front or the back of the class.
- Handicapped students sit close to the main exits of the class to be able to evacuate in case of emergencies.

Academic Support:

- The general academic advisor appoints an academic supervisor for handicapped students.
- Continuous follow ups are made for handicapped students after each assessment to evaluate their academic level of achievement

7- Student Assessment

a-Procedures used	1-Written Examinations to assess The Intended Learning Outcomes.	
	2-Class Activities (Reports, Discussions, -----) to assess The Intellectual and general Skills.	
b- Schedule:	Assessment 1	7 th Week Assessment
	Assessment 2	12 th Week Assessment
	Assessment 3	Continuous Assessments
	Assessment 4	16 th Week Final Written Exam
c- Weighing of Assessment	7 th Week Evaluation	30 %
	12 th Week Evaluation	20 %
	Final-term Examination	40 %
	Oral Examination	00 %
	Practical Examination	00 %
	Semester Work	10 %
	Total	100%

8- List of References:

a- Course Notes	N/A
b- Required Books (Textbooks)	• Willard W. Pulkrabek , “engineering fundamental of the internal combustion engine” , Pearson, Prentice Hall, latest edition
c- Recommended Books	• J.B. Heywood, " Internal Combustion Engine Fundamentals," McGraw-Hill, Latest Edition • - Willard W. Pulkrabek , “engineering fundamental of the internal combustion engine” , Pearson, Prentice Hall, Lastest edition
d- Periodicals, Web Sites, etc.	N/A

Course Instructor: Dr. Walid Abdel Ghaffar

Head of Department: Prof. El-Sayed Saber

Program Manager: Prof. El-Sayed Saber

Dean of College of Engineering and Technology of AASTMT

Name: **Prof. Moustafa Hussein Aly**

Signature:

Executive Manager of Quality Assurance Center of AASTMT

Name: **Prof. Aziz Ezzat**

Signature:

