



Arab Academy for Science, Technology & Maritime Transport  
 College of Engineering & Technology  
 Mechanical Engineering Department

**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: <b>ME 586</b>	Course Title: <b>Vehicle Design &amp; Engineering</b>	Academic Year/Level: <b>5th year / 10th semester</b>	
Specialization: <b>Mechanical</b>	No. of Instructional Units <b>3 credits</b>	Lecture <b>2 hrs.</b>	Practical <b>2 hrs.</b>

**2- Course Aim**

- To enable students to understand the design criteria for vehicles
- To teach students fundamentals of body design.
- To help students acquire the ability to do design calculations
- To teach students the basics of dealing with vehicle noise and vibration

**3- Intended Learning Outcomes**

<b>a- Knowledge and Understanding</b>	<b>Through knowledge and understanding, students will be able to:</b> a.6) Quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues. a.7) Business and management principles relevant to engineering. a.p.4) The constraints which mechanical power and energy engineers have to judge to reach at an Optimum solution a.a.3) The current practices in manufacturing relevant to the core modules of the program
<b>b- Intellectual Skills</b>	<b>Through intellectual skills, students will be able to:</b> b.12) Create systematic and methodic approaches when dealing with new and advancing technology. b.a.1) The capacity at an appropriate level to identify project management knowledge and skills used in an automotive engineering context 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
<b>c- Professional Skills</b>	<b>Through professional and practical skills, students will be able to:</b> c.p.5) Design, operate, repair and maintain fluid hydraulic power systems for diverse applications c.p.7) Work in mechanical power and energy operations, maintenance and

	<p>overhaul</p> <p>c.a.2) Experience at an appropriate level to use computer-aided design, analysis, logistics and maintenance packages relevant to automotive engineering</p> <p>c.a.3) Application of fault diagnosis procedures using the automotive industry special instrumentation to identify production and operation problems</p>
<b>d- General Skills</b>	<b>Through general and transferable skills, students will be able to:</b>

#### 4- Course Content

<b>Week No.1</b>	Modern materials and vehicle design
<b>Week No.2</b>	Body design: The styling process
<b>Week No.3</b>	Body design: The styling process (cont.)
<b>Week No.4</b>	Body design: Aerodynamics
<b>Week No.5</b>	Body design: Aerodynamics (cont.)
<b>Week No.6</b>	Chassis design and analysis
<b>Week No.7</b>	Chassis design and analysis (cont.) / 7th week evaluation
<b>Week No.8</b>	Crash worthiness
<b>Week No.9</b>	Noise, vibration and harshness
<b>Week No.10</b>	Occupant accommodation
<b>Week No.11</b>	Suspension systems and components
<b>Week No.12</b>	Control systems in vehicles / 12th week evaluation
<b>Week No.13</b>	The design of engine characteristics for vehicle use.
<b>Week No.14</b>	Transmissions and driveline
<b>Week No.15</b>	Braking systems
<b>Week No.16</b>	Final Examination

#### 5- Teaching and Learning Methods

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

## 6-Teaching and Learning Methods for Students with Special Needs

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

### Engineering Requirements and Design Considerations in college Buildings and its Leading Passages

- 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.
- 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

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

	Total	100%
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**8- List of References:**

<b>a- Course Notes</b>	N/A
<b>b- Required Books</b> (Textbooks)	<ul style="list-style-type: none"> <li>• Julian happian, Smith “An introduction to Modern Vehicle Design” BUTTERWORTH HEINEMANN</li> </ul>
<b>c- Recommended Books</b>	<ul style="list-style-type: none"> <li>• Ron Hodgkinson, John Fenton, “Light Weight Electric/ Hybrid Vehicle Design”</li> </ul>
<b>d- Periodicals, Web Sites, etc.</b>	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: