



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 483	Course Title: Alternative Fuels and Power Systems	Academic Year/Level: 4th year / 8th semester
Specialization: Mechanical	No. of Instructional Units 3 credits	Lecture 2 hrs.
		Practical 2 hrs.

2- Course Aim

- To enable students to understand the different types of engine fuel systems and their components .
- To teach students fundamentals of alternative fuel and power system operation and engine systems.
- To help students acquire the ability to do simple design calculations
- To teach students the basics of dealing with alternative fuels in ICE

3- Intended Learning Outcomes

a- Knowledge and Understanding	Through knowledge and understanding, students will be able to: 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.1) Detailed knowledge and understanding of the themes and specialist subjects of the automotive
b- Intellectual Skills	Through intellectual skills, students will be able to: 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, b.a.3) Create solutions to automotive engineering especially to manufacturing and maintenance problems
c- Professional Skills	Through professional and practical skills, students will be able to: 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 overhaul c.a.3) Application of fault diagnosis procedures using the automotive industry special instrumentation to identify production and operation problems
d- General Skills	Through general and transferable skills, students will be able to:

4- Course Content

Week No.1 Natural gas engine construction and maintenance

- Week No.2** Hydrogen engine theory of operation
- Week No.3** Hydrogen engine construction and maintenance
- Week No.4** Methanol& ethanol theory of operation
- Week No.5** Gas Turbine theory of operation
- Week No.6** Gas turbine construction
- Week No.7** Gas turbine fuel system / 7th week evaluation
- Week No.8** Striling engine
- Week No.9** Steam engine
- Week No.10** Rotary engine
- Week No.11** Electrical vehicle
- Week No.12** Hybrid vehicle / 12th week evaluation
- Week No.13** Bio-Diesel & vegetables oil engine.
- Week No.14** Bio-Gas engine
- Week No.15** Rivision
- Week No.16** 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

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)	• M.L. Poulton, "Alternative Engines for road vehicles" – Latest Edition.
c- Recommended Books	• Ron Hodgkinson, John Fenton, Light weight electric/ hybrid vehicle design" • M.L. Poulton, "Alternative fuels for road vehicles" • M.L. Poulton, "Alternative Engines for road vehicles"
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:

