Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Mechanical Engineering Department

SYLLABUS

Code/Name	MCE 409.5 / Combustion and Engines
Type	Required
Credit/ECTS	3/5
Hour per Week	3 (3+0+0)
Level/Year	Undergraduate/4
Semester	Fall
Classroom	D204
Content	Engine types. Four-stroke and two-stroke reciprocating engine operation. Engine design and operating characteristics. Engine parameters. Ideal and actual engine cycles. Thermochemistry and engine fuels. Air and fuel induction systems. Combustion in spark-ignition and combustion-ignition engines. Exhaust flow and turbochargers. Heat transfer in engines. Engine emissions and control. Hybrid engine systems and electric vehicles.
Prerequisites	NA
Textbooks	***Primary*** Willard W. Pulkrabek, Engineering Fundamentals of the Internal Combustion Engine, 2nd edition, Prentice Hall, 2004. ***Supplementary*** John B. Heywood, Internal Combustion Engine Fundamentals, McGraw-Hill, 1988.
Objectives	• To develop an intuitive understanding of operation and performance parameters of actual and ideal spark-ignition and compression-ignition engine cycles. • To analyze effect of design and operating parameters on engine performance and efficiency. • To develop an understanding of intake, combustion, exhaust, and pollutant control systems.
Course Outcomes	In this course you will be able to: CO1 Describe classifications of internal combustion engines and understand the general terminology used in engine technology, and evaluate main engine components CO2 Calculate operating characteristics of reciprocating engines. CO3 Analyze air standard cycles as well as actual engine cycles, and compare performances of Otto, Diesel, and Dual cycles. CO4 Understand various engine processes including intake, combustion, and exhaust flow. CO5 Distinguish between different engine fuels including gasoline and diesel fuel and understand their characteristics such as knock, octane number, and cetane number. C06 Describe emissions generated from engines and understand methods and systems of emission control.

Weekly Schedule of Topics

W	Topic
1	Engine types and their operation
2	Engine types and their operation
3	Engine design and operating characteristics
4	Engine design and operating characteristics
5	Engine cycles
6	Engine cycles
7	Engine cycles

8	Thermochemistry and fuels
9	Thermochemistry and fuels
10	Air and fuel induction systems
11	Combustion in engines
12	Exhaust flow and turbochargers
13	Pollution formation and control
14	Heat transfer in engines and cooling systems

Professional Contribution	Ability to understand, analyze, and assess the performance of internal combustion engines

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	0	0	5	0	0	2	0	0	2	0
CO2	5	0	0	5	0	0	0	0	0	3	0
CO3	5	0	0	5	0	0	0	0	0	3	0
CO4	2	0	0	5	0	0	2	0	0	2	0
CO5	5	0	0	5	0	0	0	0	0	3	0
CO6	2	0	0	2	0	0	5	0	0	0	0

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	• Students work in groups for project and presentations.
Requirements	NA
Evaluation	Midterm Exam 40% Quizzes 20% Final Exam 40% Total 100%
Rubric	NA
Course Policy	1. Students are required to attend at least 70% of the theoretical courses and 80% of the courses with lab/application sessions including add-drop period. Otherwise, you will receive a grade of DZ. Health reports and other official or nonofficial excuses are not accepted. 2. Be in the class on time. Late attendance may result in grade deductions. 3. English should always be used to communicate with one another. 4. Mobile phone should be switched off and put away during the class. 5. Illegal copies of the textbooks and other illegal course materials cannot be used for the classwork and exams.
Cheating & Plagiarism	• Copying or letting someone to copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures and tables from the web sources or any other electronic source is plagiarism. • A consequence of academic dishonesty is to receive a grade of FF for the course.

Instructor

Name/Surname	Mehmet Kanoglu	Email	mehmet.kanoglu@alanya.edu.tr
Room	121	Office Hours	

Prepared by Mehmet Kanoğlu