ME 417: Course Outline

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ME 417: Internal Combustion Engines
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ME 417: Syllabus

- Basic engine types, their operation and testing
- Idealized cycles and processes
- IC engine fuels: Stoichiometry, properties and tests
- Combustion: SI engine, CI engine and gas turbines
- Exhaust gas analysis and air pollution: pollution formation mechanism, measurement and control
- Fuel metering: SI engines, CI engines
- Air capacity of engines: two and four stroke cycles, naturally aspirated and supercharged
- IC engine cooling and lubrication systems
- Performance and design: Naturally aspirated engines and supercharged engines, design considerations, application of principle of similitude in engine design.

Tentative Lecture Plan [2023]

	Topic	Lectures
1.	Engine basics & classifications	-
2.	Idealized cycles and processes	-
3.	Combustion (SI & CI engines, & gas turbines)	6
4.	IC engine fuels: Stoichiometry, properties and tests	2
5.	Air capacity of engines	6
6.	Fuel metering: SI engines, CI engines	-
7.	Engine design, performance & similitude in design	6
8.	Air pollution & exhaust gas analysis	-
9.	Engine cooling system	2
10.	Engine lubrication system	2
11.	Engine testing	2

Topics 1, 2, 6 & 8 (1 cr hr) will be covered by Dr. Kazi Arafat Rahman.

Reference Books

- Heywood (2018), *Internal Combustion Engine Fundamentals*, McGraw-Hill.
- Ferguson & Kirkpatrick (2015), *Internal Combustion Engines - Applied Thermosciences*, J. Wiley & Sons.
- McAllister, Chen & Pello (2011), *Fundamentals of Combustion Processes*, Springer.
- Ragland & Bryden (2011), *Combustion Engineering*, McGraw-Hill.