UNESCO-UNITWIN
OCW/OER INITIATIVE
HANDONG GLOBAL UNIVERSITY

[A-3]COURSE SYLLABUS

1. COURSE DESCRIPTION (Approximately 100 words)

This course elaborates on the fundamentals of internal combustion engines and what affects their performance, operation, fuel requirements and environmental impact. The course considers thermodynamic, combustion, heat transfer and friction phrnomena, and fuel properties, relevant to engine power, efficiency and emissions, and examines design feature and operating characteristics of different types of internal combustion engines; including spark-ignition, diesel, stratified-charge, and mixed-cycle engines.

2. COURSE GOALS AND OBJECTIVES (Approximately 100 words)

Upon completion of this course, students will be able to:
-conduct complete thermodynamic analyses of internal combustion engines including the effects of residual mass fraction, finite heat release, valve timing, and heat losses;
-describe the basic operation of different internal combustion engines including the method of combustion, engine speed control and all of the major components;
-conduct performance analysis of internal combustion engines based on engineering parameters such as mean-effective pressure and volumetric efficiency;
-carry out calculations of combustion reactions for hydrocarbon fuels using simple stiochimetric analysis, and general chemical equilibrium modelling;
-quantify the impact of air/fuel equivalency ratio, mixing and combustion temperature on emissions; emission control;

3. TEXTBOOK (Title, Author, Publisher, Year of Publication, etc.)

1. Heywood, J.B., "Internal Combustion Engine Fundamentals" McGraw Hill.
2. Taylor, C.F., "The Internal Combustion Engine in Theory and Practice", 2 vols., MIT Press.
3. Pulkrabek, W.W., "Engineering Fundamentals of the Internal Combustion Engine", Prentice Hall, New Jersey.
4. Qodirov. Internal Combustion Engine

4. REFERENCE

www.edu.uz
http://ocw.mit.edu/terms.
http://ocw.mit.edu

5. Course Requirements and Grades

Formal problem sets will be assigned in weeks 4, 7, respectively, and each shall be graded weighted toward 39 of the final course grade. The student should learn to solve these problems in good professional style. These peoblems will be assessed and handed back to the students in a timely manner. Note that the precise dates for the formal problem sets are subject to change due to the pace of delivery of the course.

Assignments	35
Project	35
Final exam	30

6. Course Calendar

Week	Main Content
1	Lecture 1_Introduction, Principles of Internal Combustion Engine operation.
2	Lecture 2 _Principles engine operation, Classification, 2-stroke engines, 4-sr
3	Lecture 3 _Ideal standart cycles, thermal efficiences, comparisons
4	Lecture 4_Engine characteristics and performance.
5	Lecture 5_Classification of engine fuels.
6	Lecture 6_Characteristics of engine fuels, knock resistance, ignition tendenc
7	Lecture 7_Real engine strokes, induction stroke, volumetric efficiency.
8	Lecture 8_Compression stroke, combustion in engines and influencing parar
9	Lecture 9_Abnormal combustion, parameters influencing knock and early igr
10	Lecture 10_Combustion in Internal Combustion Engines.
11	Lecture 11_Combustion in Internal Combustion Engines, parameters influen
12	Lecture 12_Expension and exhaust strokes, exhaust emissions.
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