

Thermodynamics

Basic Course Specification					
Course Title	Course Code	Program on which the course is given			
Thermodynamics	ME 231 T	Bachelor			
Academic Year	Specialization (hr/week)	Pre-Requisites			
2020 - 2021	<ul style="list-style-type: none"> • Theoretical (2) • Application (3) • Credit (3Cr.) 	Physics 2 (BA 114)			
Overall Course Objectives					
<ul style="list-style-type: none"> • This course provides description of thermodynamics. It introduces and classifies: heat engine cycles, steam cycles and gas turbine cycles. • This syllabus covers the requirements of the STCW-78, as amended. In particular Chapter III, Section A-III/1 for the function “Marine Engineering at the Operational Level”, STCW-78, as amended. The syllabus is so designed with the guide of IMO Model course 7.04, version 2014, function1 					
Course Learning Outcomes. By successful completion of the course each student will be able to:					
Topic	Linking to PLOs	7th Week Assessment	12th Week Assessment	Class Activities	Final Exam
By successful completion of the course each student will be able to:					
1) apply the first and second laws of thermodynamics for the complete thermal analysis of vapor power cycle.	B	√	√		√
2) Demonstrate knowledge on the principle of operation, layouts, components, construction, selection criteria and maintenance and troubleshooting aspects of different types of power plants and industrial utility systems	A,c	√	√	√	√
3) derive and analyze Otto, Diesel and Dual cycle air standard thermal efficiencies	e	√	√	√	√
4) demonstrate the implications of thermodynamics power, refrigeration, and air-conditioning systems on the environmental and future sustainability.	A,b,d		√	√	√
Course Content					
Lec./ Week #	Topic	Hrs. #	Theoretical	Application	
1	-Introduction to thermodynamics (Revision)-Revision	5	2	3	
2	-Heat Engine Cycles (Introduction, Carnot Cycle) - Heat Engine Cycles (Carnot Cycle)	5	2	3	
3	-Heat Engine Cycles (Constant Pressure Cycle, Constant Volume Cycle). -Heat Engine Cycles(Constant Pressure Cycle, Constant Volume Cycle)	5	2	3	
4	-Heat Engine Cycles (Diesel Cycle, Dual Cycle) and Heat Engine Cycles (Diesel Cycle, Dual Cycle)	5	2	3	

Course Content				
Lec./ Week #	Topic	Hrs. #	Theoretical	Application
5	-Heat transfer(Fourier's Law, Newton's Law, Stefan-Boltzmann Law) and Heat transfer (Composite wall).	5	2	3
6	-Heat Transfer (The Composite wall and the electrical analogy) -Heat Transfer (cylinder & sphere)	5	2	3
7	-Heat Transfer (Heat flow through a cylinder & a sphere) - 7th Week Exam	5	2	3
8	Steam Cycle (Rankin Cycle) Steam Cycle (Using Steam Chart)	5	2	3
9	-Steam Cycle (Using Steam Chart).	5	2	3
10	-Gas Turbine Cycle (The practical gas turbine cycle)	5	2	3
11	-Gas Turbine Cycle (use of a power turbine).	5	2	3
12	Positive Displacement Machine (Reciprocating Compressors) -12th Exam	5	2	3
13	-Positive Displacement Machine (Multi stage compression). - Positive Displacement Machine	5	2	3
14	-Refrigeration and Air Conditioning (Reversed heat engine & vapor Compression cycle). - Refrigeration and Air Conditioning	5	2	3
15	-Refrigeration and Air Conditioning (Using Refrigeration charts). -Refrigeration and Air Conditioning (Using Refrigeration charts)	5	2	3
16	Final Assessment			
Total Hours		75	30	45

Teaching & Learning Methods		Facilities Required for Teaching & Learning Methods	
<ul style="list-style-type: none"> Explaining and demonstrating the lesson contents Share practical experience and knowledge Discussing and asking questions to interact with students 		<ul style="list-style-type: none"> White board and data show Lab. 	
Students Assessment Methods			
Assessment Schedule			
Assessment#1		Week 7	
Assessment#2		Week 12	
Assessment#3		Continuous Assessments	
Assessment#4		Week 16	
Grading Method			
7th Week Assessment	Written Exam	30%	
12 th week Assessment	Written Exam	20%	
Class Activities	Participation and Quiz	10%	
Final Exam	Written Exam	40%	
Total		100 %	

Grading Method	
Assessment criteria meets the standards of the STCW 78 convention "as amended"; and in the light of the related IMO model courses.	
Staff Requirements	
Marine Chief Engineer/ Ph.D.	
List of References	
Course Notes	Essential Books
Lecturer notes and sheets	Applied thermodynamics for engineers technologist, 9781782730439
Recommended Books	Periodicals and Publications
	None
Others (websites, e-books...etc)	
N/A	

Accreditation Bodies
*Egyptian Authority for Maritime Safety (EAMS)
European Commission (EC)
*ISO (9001 – 2015) DNV-GL
*Central Evaluation and Accreditation Agency Hanover, Germany (ZEVA)
*Ministry of Education (KSA)
*Ministry of Higher Education (Greece)
*Ministry of Higher Education (Oman)
*Commission for Academic Accreditation (CAA), Ministry of higher Education (UAE)
*University of Plymouth, United Kingdom (dual degree)

Prepared by: Course Coordinator

A. Swidan

Reviewed by: Head of Department

Nasr Abdelrahman

Date: November 2020