

University of Management and Technology

Course Outline

Course code: ET 234

Course title: Piston Engine

Program	BSc Aircraft Maintenance Engineering Technology	
Credit Hours	02+01	
Duration	15 weeks	
Prerequisites	Nil	
Resource Person	Zukhraf Jamil	
Counseling Timing (Room#)	Monday	10:00 to 13:00
	Wednesday	11:00 to 16:00
	Friday	10:00 to 14:00
Contact	Zukhraf.jamil@umt.edu.pk	

Chairman/Director signature.....

Dean's signature.....

Date.....

Learning Objective:

The course is designed to provide the students with a deeper understanding of piston engines, their characteristics, and performance parameters with relation to their operation in aircrafts.

Upon successful completion of the course, the student should be able to:

S No	CLO Statement	PLO	Learning Domain and level
1.	Understand the characteristics and operating principles of piston engines used in aerospace industry	1	C1
2.	Analyze and evaluate the characteristics and performance parameters of piston engines based on their needs and constraints	2	C4
3.	Use the obtained engineering knowledge to work on and maintain maintenance documents on piston engine components and systems effectively in an aircraft maintenance setup.	9	C3
4.	Conduct and Interpret the results of experiments conducted on engine.	3	P3
5.	Effectively communicate experiment results through both written reports and oral Presentation.	10	P3

1. CLO – PLO MAPPING:

CLOs	PLOs											
	Engineering Knowledge	Problem Analysis	Design / Development of Solutions	Investigation	Modern Tool Usage	The Engineering Technologist and Society	Environment and Sustainability	Ethics	Individual and Team Work	Communication	Project Management	Lifelong Learning
	1	2	3	4	5	6	7	8	9	10	11	12
1	C1											
2		C4				C2						
3									C3			
4			P3									
5										P3		

Learning Methodology:

- The course content is designed as a mixture of theory lectures and web tutorials.
- Practical workshop sessions, worked examples involving hands on practice are also designed as part of the course to ensure active participation and consolidate learning.
- Participants will be evaluated based on class/workshop assignments and quizzes from theory, worked examples and individual/group presentations.

Recommended Text Books:

“Piston Engine – Module 16”, Part 66 Basic Training” by Aero-Bildung, 2017.

Reference Books:

“A&P Technician Powerplant Textbook”; Jeppesen Sanderson Inc, 2011

Grade Evaluation Criteria

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

Theory:

Marks Evaluation	Marks in percentage
Quizzes (x6)	15%
Assignments (x2)	10%
Evaluation(Viva)	5%
Presentation	5%
Mid Term Examination	25%
End Term Examination	40%
Total	100 %

Practical:

Marks Evaluation	Marks Percentage
Class activity	5%
Team work	5%
Quizzes	15%
Viva	5%
Lab Report	10%
Final Evaluation	60%
Total	100%

Calendar of Course contents to be covered during semester

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Week	Course Contents	Reference Chapter(s)	Quiz	Assignments	CLOs
1	Fundamentals of engine parameters Operating principles, classification, designation, and firing order of reciprocating engines	16.1			
2	Basics of mechanics w.r.t engine performance: work, power, horsepower, engine performance curves	16.2	1	1	1,3,4
3	Description, interconnection, and working of mechanical parts of in-line, opposed, and rotary engine	16.3			
4	Carburation and carburetor types, fuel injection and fuel systems for carburetors, electronic engine controls for fuel management in reciprocating engines	16.4	1	0	1,3

5	Piston engine starting and ignition system	16.5			
6-7	Piston engine induction, exhaust, and cooling system Principles of Supercharging and Turbocharging Maintenance of superchargers and turbochargers	16.6 16.7	1	1	1,2
8	Mid Term Examination				
9	Aircraft lubricants, their characteristics, types, and handling practices Aircraft engine fuels, their specification, characteristics, and handling practices	16.8	1	1	1,3
10	Reciprocating engine lubrication system and system components	16.9			
11	Single and twin engine indication and monitoring instruments for reciprocating engines Basics of Nacelle configuration and powerplant installation	16.10 16.11	1	1	2,4

12-13	Engine ground run checks and adjustments Factors affecting engine operation	16.12			
14-15	Maintenance procedures and techniques for piston engine overhaul, disassembly, cleaning, inspection, repair, and assembly Engine storage and preservation	16.12 16.13	1	1	04

Piston Engine Lab Outline

SR No.	Experiment Title.	CLO
1	To study the constructional details of the Internal Combustion engines (Piston Engine and Wankel Engine) and difference between SI engine and IC engine	4,5
2	To study the working principles of two-stroke/four-stroke SI engine	
3	To determine Brake Power (BP) of the petrol engine	
4	To determine Air Fuel Ratio of the petrol engine	
5	To determine brake specific fuel consumption petrol engine	
6	To determine brake thermal efficiency of petrol engine	
7	To perform constant speed performance test on a Four-Stroke Single-Cylinder Diesel Engine & Draw curves of (i) BP vs Fuel Rate, Air Rate and A/F ratio and (ii) BP vs BMEP, Mechanical Efficiency & BSFC	
8	To study and draw the valve timings diagram Four-Stroke, Single-Cylinder Diesel Engine.	

Class Policy

STUDENTS ARE REQUIRED TO READ AND UNDERSTAND ALL ITEMS OUTLINED IN THE PARTICIPANT HANDBOOK

CLASS ATTENDANCE: Students need to be in class at the assigned time. After 10 minutes past the assigned time, the students will be marked absent.

TURN OFF MOBILE PHONE! It is unprofessional to be texting or otherwise.

READ EMAILS! Participants should regularly check their university emails accounts regularly and respond accordingly. Students would be responsible if they miss a deadline because of not reading the emails.

CLASS ATTENDANCE POLICY: A minimum of 80% attendance is required for a participant to be eligible to sit in the final examination. Being sick and going to weddings is absence and will not be counted as present. Participants with less than 80% of attendance in a course will not be allowed to take end term exams. International students who will be leaving for visa during semester should not use any days off except for visa trip to avoid reaching short attendance.

MOODLE: UMT –LMS (Moodle) is an Open Source Course Management System (CMS), also known as a learning Management System (LMS). Participants should regularly visit the course website on MOODLE Course Management system, and fully benefit from its capabilities. In case of any problem while using MOODLE, visit <http://oit.umt.edu.pk/moodle>. For queries email moodle@umt.edu.pk

HARASSMENT POLICY: Sexual or any other harassment is prohibited and is constituted as punishable offence. Sexual or any other harassment of any participant will not be tolerated. All actions categorized as sexual or any other harassment when done physically or verbally would also be considered as sexual harassment when done using electronic media such as computers, mobiles, internet, emails etc.

USE OF UNFAIR MEANS/ HONESTY POLICY: Any participant found using unfair means or assisting another participant during a class test/quiz, assignments or examination would be liable to disciplinary action.

PLAGIARISM POLICY: All students are required to attach a “Turnitin” report on every assignment, big or small. Any student who attempts to bypass “Turnitin” will receive “F” grade which will count towards the CGPA. The participants submit the plagiarism report to the resource person with every assignment, report, project, thesis etc. If student attempts to cheat Turnitin, a second “F” will be awarded that will count towards the CGPA. There are special rules on plagiarism for final reports etc. all outlined in your handbook.

COURSE WITHDRAWAL POLICY: Students may withdraw from a course till the end of the 12th week of the semester. Consequently, grade 'W' will be awarded to the student which shall have no impact on the calculation of the GPA of the student. A Student withdrawing after the 12th week shall be automatically awarded "F" grade which shall count in the GPA.

COMMUNICATION OF RESULTS: The results of quizzes and assignments are communicated to the participants during the semester and answer books are returned. It is the responsibility of the course instructor to keep the participants informed about his/her progress during the semester. The course instructor will inform a participant at least one week before the final examination related to his or her performance in the course.

Faculty Signature

Date.....