

University of Management and Technology

Course Outline

Course code: ET 341

Course title: Gas Turbine Engine - I

Program	BSc Aircraft Maintenance Engineering Technology	
Credit Hours	02+1/2	
Duration	15 weeks	
Prerequisites	ET234 Piston Engine PH205 Heat and Thermodynamics	
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 directed towards the description, performance, classification, and applications of gas turbine engines. For comprehensive analysis and understanding, the course has been divided into two parts: Engine Description & Performance and Engine Classification and systems.

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

S No	CLO Statement	PLO	Learning Domain and level
1.	Understand and comprehend the fundamental principles of mechanics and thermodynamics involved in the processes occurring in gas turbine engines.	1	C2
2.	Apply the engineering knowledge to analyze and solve the performance factors of gas turbine engine components.	5	C3
3.	Conduct and Interpret the results of experiments based on the principles of gas turbine engine.	3	P3
4.	Effectively communicate experiment results through both written reports and oral Presentations.	10	P3

1. CLO – PLO MAPPING:

CLOs	PLOs											
	Engineering Technology 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,C2											
2					C3							
3			P3									
4										P3		

Learning Methodology:

- The course content is designed as a mixture of theory lectures and web tutorials.
- 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 assignments and quizzes from theory, worked examples and individual/group presentations.

Recommended Text Books:

“Gas Turbine Engine, Cat B1 – Module 15, Part 66 Basic Training” by Aero-Bildung, 2017.

Reference Books:

“Gas Turbine Theory”, fifth edition, by H. Cohen and GFC. Rogers, published by Pearson Education Ltd, 2001.

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 Thermodynamics and Fluid Mechanics Thermodynamics of a turbo engine The Bryton Cycle Thermodynamic processes	15.1	1	1	1
2-3	Basic operating principle of Jet engines Construction and operation of Turbo-Jet, Turbo-Fan, Turbo-prop, Turbo-shaft, and Ramjet engine	15.1, Online tutorials			
4	Jet engine station numbers Engine thrust equation, Choked nozzle thrust & thrust distribution Engine by-pass ratio Engine power & Specific Fuel Consumption	15.2, Additional notes	2	1	1
5	Engine efficiencies & Engine pressure ratio Gas flow pressure, temperature, and velocity Engine ratings Influence of speed, altitude, and climate on engine performance Limitations	15.2, Additional notes			

6	Types of turbine engine inlets Compressor inlet screens, sand and ice separators&Inlet ice protection	15.3 Online tutorials			
7	Construction and operation of compressors (centrifugal and axial) Operating conditions of compressors and Airflow control Compressor material and balancing Task and types of combustion chambers Performance analysis of combustion chambers Materials used in combustion chamber	15.3 Online tutorials 15.4	1	1	1,2
8	Mid Term Examination				
9, 10	Fundamentals and Types of turbine Analysis and evaluation of Performance parameters of turbines	15.6 Additional notes Onlinetutorials			
11	Exhaust systems in gas turbine engines Basics of gas flow in exhaust Thrust reversers	15.7 Online tutorials	1	1	1
12	Types and characteristics of bearings and seals used in gas turbine engines	15.8			

13-14	Principles of engine lubrication Turbine engine lubricants Gas turbine engine fuels Quality of fuel Fuel identification	15.9	1	1	2
15	Application, description, and components of gas turbine engine lubrication system Semester Project Presentation & Evaluation	15.10 Additional notes			

Gas Turbine Engine – I Lab Outline

SR No.	Experiment Title.	CLOs
1.	Compare and contrast two types of compressors in terms of components and performance	3,4
2	Interpret engine performance graphs and log data	
3.	Identify various inlet types and their arrangements on turbine engines	
4	Identify major sections of turbine engines in workshop	
5	Inspect and log on the types of turbines and turbine arrangements in engine in workshop	
6	Perform procedures for inter mixing of oils and lubricants	

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.....