Institute of Aviation Studies

University of Management and Technology

Course Outline

Course Code: ET – 102L Course Title: Basic Aerodynamics Lab

Program	BSc. Aircraft Maintenance Engineering Technology
Credit Hours	1
Duration	16 weeks
Prerequisites	Nil
Resource Person	Engr. Zaid Ahmed Goharvi
Contact	zaid.goharvi@umt.edu.pk

Faculty Signature _____ **Date** _____

Chairman/Director Signature _____ **Date** _____

Dean's Signature _____ **Date** _____

Learning Objective

This course builds on the knowledge and understanding of basic aerodynamics and extends it to airplane aerodynamics. Concepts related to the properties of the atmosphere and the effects of forces on the aerodynamic characteristics of aircraft are discussed. The course includes the analysis of mechanics of flight and aircraft performance. Various key concepts related to design features which provide static and dynamic stability and the forces affecting aircraft stability are also discussed. Different experiments will be performed on aerofoil using the Ansys software.

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

CLOs	CLO Statement	PLOs	Learning Domain and Level
1	***Execution*** of lab work based on the principles of computational fluid dynamics using 'Ansys', to study flow characteristics over an aerofoil.	5	P4
2	***Analyze*** and communicate the experimental observations and results of aerodynamic characteristics and flow properties through report, viva, and presentation.	4	C4
3	***Participate*** effectively as an individual and as well as team member while performing lab experiments and projects and ***follow*** the given instructions and deadlines.	9	A2

Course Learning Outcomes (CLOs) and their Mapping to Program Learning Outcomes (PLOs)

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					**P4**							
2				**C4**								
3											**A2**	

Learning Methodology

- The lab course is designed through a series of lab experiments involving computational fluid dynamics through Ansys.
- Working on Ansys is included to ensure students being accustomed with principles, procedures and tools used for the analysis of different flow parameters.
- Students will be evaluated on the basis of **lab assessments** (performance, viva and lab report), broadly defined engineering technology – **term projec**t and practical **exam**.

Lab Handouts/Manual

A lab handouts/manual specific to this subject, comprising details of all labs/experiments to be performed, will be provided before the commencement of lab classes.

Reference/Recommended Text Books

- "Basic Aerodynamics" by AeroBildung (2nd Edition) Germany [2016].
- "Aircraft Engineering Principles" by Lloyd Dingle and Mike Tooley Published by Routledge (2004).
- "Basic Aerodynamics" – Aviation Maintenance Technician Certification Series by Aircraft Technical Book Company.

Grade Evaluation Criteria

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

Marks Evaluation	Marks Percentage
Lab Assessments (Performance, Viva, Lab Reports)	30%
Broadly Defined Engineering Technology – Term Project	20%
Final Exam	50%
Total	**100%**

List of Experiments

Sr. No.	Experiments	CLOs
1	Introduction to Computational Fluid Dynamics (CFD) and software.	CLO 1 CLO 2 CLO 3
2	To identify and create different Aerofoil sections.	
3	Studying the nature of airflow over flat plate.	
4	Studying the nature of airflow over a cylinder.	
5	Study of flow over NACA 0012 Aerofoil.	
6	Study of flow over NACA 0012 Aerofoil at different angle of attack.	
7	Study and compare flow over NACA 0012 and NACA 2412.	

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.