

COURSE OUTLINE FOR STUDENTS AT NTU

Academic Year	2020	Semester	1
Course Coordinator	Associate Professor Chai Gin Boay		
Course Code	MA2072		
Course Title	Laboratory Experiments (AE)		
Pre-requisites	Nil		
No of AUs	1		
Contact Hours	Laboratory: 3 hours per week for 10 weeks		
Proposal Date	February 2020		

Course Aims

The main objective is to provide you with the opportunity to demonstrate the concepts and analytical methods learned in Year 2 core courses in aerospace engineering and to familiarize yourself with basic operations of equipment employed in the laboratory experiments. You will also be able to master basic skills in designing experiments and analyse the results in log-sheets for nine (9) experiments and practice formal Technical Report writing skills with critical discussions for one (1) experiment.

Intended Learning Outcomes (ILO)

Upon successful completion of the course, you will be able to:

- 1) carry out experiments to verify theories relating to
 - a) materials, components and manufacturing;
 - b) mechanics, thermodynamics, fluids mechanics and energy balance;
 - c) air traffic management, and
- 2) document experimental results in a professional manner as expected of aerospace engineers.

Course Content

Experiments	
1.	E2.1AE Behaviour of Aerospace Frame Structures
2.	E2.2AE Study of fan performance using dimensional analysis
3.	E2.3AE Energy balance in a compressor
4.	E2.4AE Tensile and viscoelastic properties of materials
5.	E2.5AE Two-dimensional strain measurement
6.	E2.7AE Real-Time ATC Radar Simulator
7.	E2.8AE Non-destructive testing

8.	E2.9AE Balancing of rotating masses
9.	E2.11AE Hands-on Machining Practice - Lathe
10.	E2.12AE Hands-on Machining Practice - Milling

For the 10 experiments, each student will submit nine log-sheets (on the same day) and one Technical Report (within 1 week).

Assessment (includes both continuous and summative assessment)

Component	Course LO Tested	Related Programme LO or Graduate Attributes	Weighting	Team/ Individual	Assessment rubrics
1. Log-Sheets: (a) Continuous assessment	1	a, b, d, e, i	40%	Individual	
(b) Written assessment			40%	Team	
2. Technical Report: (a) Continuous assessment	1, 2	b, d, j	10%	Individual	
(b) Report writing			10%	Individual	
Total			100%		

Formative feedback

The feedback will consist of: (1) discussion between the instructor and the students during each experiment, in the form of simple questions and responses, and (2) qualitative grades given to students' experimental log-sheets and formal reports.

Learning and Teaching approach

Approach	How does this approach support students in achieving the learning outcomes?
Briefing by laboratory instructor	A briefing at the beginning of an experimental session will highlight: (1) the basic theory, analysis and approach of the experiment, (2) experimental procedures, including apparatus set-up, measurements, documentation and safety aspects, (3) assumptions, errors, uncertainties and critical observations, and (4) academic integrity in reporting the experimental results.

Oral assessment	The instructor will pose questions and invite students to answer, with an aim to: (1) enable each student to discover his or her own depth of knowledge, (2) encourage critical/creative thinking, and (3) motivate students' interest in the experiments.
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Reading and References

Textbook

Nil

References

Nil

Course Policies and Student Responsibilities

As a student of the course, you are required to abide by both the University Code of Conduct and the Student Code of Conduct. The Codes provide information on the responsibilities of all NTU students, as well as examples of misconduct and details about how students can report suspected misconduct.

The university also has the Student Mental Health Policy. The Policy states the University's commitment to providing a supportive environment for the holistic development of students, including the improvement of mental health and wellbeing. These policies and codes concerning students can be found in the following link.

<http://www.ntu.edu.sg/SAO/Pages/Policies-concerning-students.aspx>

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors

Instructor	Office Location	Phone	Email
(overall coordinator) A/P Chai Gin Boay	N3-02c-88	67905756	mgbchai@ntu.edu.sg
(E2.1AE) A/P Ng Teng Yong	N3-02c-70	6790 4797	MTYNg@ntu.edu.sg
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Planned Weekly Schedule – Semester Example
(Please check your timetable for updated schedule)

Monday (9.30am – 12.30pm)		Thursday (1.30pm – 4.30pm)	
Session 1 (ILO 1,2)	Expt No	Monday	Thursday
	E2.1AE	AE01	BE01
	E2.2	AE02	BE02
	E2.3	AE03	BE03
	E2.4AE	AE04	BE04
	E2.5	AE05	BE05
	E2.11	AF01	BF01
	E2.7AE	AF02	BF02
	E2.8	AF03	BF03
	E2.9	AF04	BF04
E2.12	AF05	BF05	
Session 2 (ILO 1,2)	Expt No.	Monday	Thursday
	E2.1AE	AF05	BF05
	E2.2	AE01	BE01
	E2.3	AE02	BE02
	E2.4AE	AE03	BE03
	E2.5	AE04	BE04
	E2.11	AE05	BE05
	E2.7AE	AF01	BF01
	E2.8	AF02	BF02
	E2.9	AF03	BF03
E2.12	AF04	BF04	
Session 3 (ILO 1,2)	Expt No.	Monday	Thursday
	E2.1AE	AF04	BF04
	E2.2	AF05	BF05
	E2.3	AE01	BE01
	E2.4AE	AE02	BE02
	E2.5	AE03	BE03
	E2.11	AE04	BE04
	E2.7AE	AE05	BE05
	E2.8	AF01	BF01
	E2.9	AF02	BF02
E2.12	AF03	BF03	
Session 4 (ILO 1,2)	Expt No.	Monday	Thursday
	E2.1AE	AF03	BF03
	E2.2	AF04	BF04
	E2.3	AF05	BF05
	E2.4AE	AE01	BE01
	E2.5	AE02	BE02
	E2.11	AE03	BE03
	E2.7AE	AE04	BE04
	E2.8	AE05	BE05
	E2.9	AF01	BF01
E2.12	AF02	BF02	
Session 5 (ILO 1,2)	Expt No.	Monday	Thursday
	E2.1AE	AF02	BF02
	E2.2	AF03	BF03
	E2.3	AF04	BF04
	E2.4AE	AF05	BF05
	E2.5	AE01	BE01
	E2.11	AE02	BE02
	E2.7AE	AE03	BE03
	E2.8	AE04	BE04
	E2.9	AE05	BE05
Session 6 (ILO 1,2)	Expt No.	Monday	Thursday
	E2.1AE	AF01	BF01
	E2.2	AF02	BF02
	E2.3	AF03	BF03
	E2.4AE	AF04	BF04
	E2.5	AF05	BF05
	E2.11	AE01	BE01
	E2.7AE	AE02	BE02
	E2.8	AE03	BE03
	E2.9	AE04	BE04

	E2.12	AF01	BF01		E2.12	AE05	BE05
Session 7 (ILO 1,2)	Expt No.	Monday	Thursday	Session 8 (ILO 1,2)	Expt No.	Monday	Thursday
	E2.1AE	AE05	BE05		E2.1AE	AE04	BE04
	E2.2	AF01	BF01		E2.2	AE05	BE05
	E2.3	AF02	BF02		E2.3	AF01	BF01
	E2.4AE	AF03	BF03		E2.4AE	AF02	BF02
	E2.5	AF04	BF04		E2.5	AF03	BF03
	E2.11	AF05	BF05		E2.11	AF04	BF04
	E2.7AE	AE01	BE01		E2.7AE	AF05	BF05
	E2.8	AE02	BE02		E2.8	AE01	BE01
	E2.9	AE03	BE03		E2.9	AE02	BE02
E2.12	AE04	BE04	E2.12	AE03	BE03		
Session 9 (ILO 1,2)	Expt No.	Monday	Thursday	Session 10 (ILO 1,2)	Expt No.	Monday	Thursday
	E2.1AE	AE03	BE03		E2.1AE	AE02	BE02
	E2.2	AE04	BE04		E2.2	AE03	BE03
	E2.3	AE05	BE05		E2.3	AE04	BE04
	E2.4AE	AF01	BF01		E2.4AE	AE05	BE05
	E2.5	AF02	BF02		E2.5	AF01	BF01
	E2.11	AF03	BF03		E2.11	AF02	BF02
	E2.7AE	AF04	BF04		E2.7AE	AF03	BF03
	E2.8	AF05	BF05		E2.8	AF04	BF04
	E2.9	AE01	BE01		E2.9	AF05	BF05
E2.12	AE02	BE02	E2.12	AE01	BE01		