MNE3207: AVIONIC POWER SYSTEMS

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Avionic Power Systems

Subject Code
MNE - Mechanical Engineering
Course Number
3207

Academic Unit
Mechanical Engineering (MNE)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
MNE2029 Electrical and Electronic Principles I

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Additional Information
#Prerequisites which are not part of the Major Requirement are waived for students admitted with Advanced Standing.

Part II Course Details

Abstract

This course introduces the student to the need for Avionics and the key elements involved in modern avionics. The electrical power systems used on aircraft, artificial satellites and spacecraft will be described and students will learn about the type of communications systems, navigation and system management of sensors, fuel, engine and flight control.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Understand the underlying principles of avionics and the management systems associated with the electronics used on aircraft and spacecraft.			x	
2	To be able to define preliminary design requirements of an avionics system such as electrical power specifications, purpose, range and type of essential management systems.			x	
3	Demonstrate problem solving skills and derive solutions for tasks linked to avionics requirements.			x	
4	Present results, analyses and conclusions from experiments or simulations in a written report such that a technically qualified person can obtain a clear understanding of the findings.			x	

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Students will engage in formal lectures that include a combination of lectures and tutorial classes on avionics accompanied by in-class design problem solving sessions and case studies.	1, 2, 3	3 hrs/week

2	Laboratory	Students will carry out exercises to understand the functions of avionic systems and the methods used to ensure effective management and safety systems. These will be reported in the form of a short and concise technical report.	3, 4	3 hrs/week for 2 weeks

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Test and Assignments	1, 2, 3	20	2-3 assignments to be submitted.	Yes
2	Laboratory Reports	3, 4	20	2 reports to be submitted	Yes

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

3

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained.

Assessment Rubrics (AR)

Assessment Task

Test and Assignments

Criterion

To be able to describe and assess the various elements of avionic systems with respect to power requirements and system management.

Excellent (A+, A, A-)

High (75%-100%)

Good (B+, B, B-)

Significant (60%-74%)

Fair (C+, C, C-)

Moderate (45%-59%)

Marginal (D)
Basic (40%-44%)

Failure (F)
Not even reaching marginal levels (<40%)

Assessment Task
Laboratory Reports

Criterion
Ability to explain the methodology and procedures used and analyse the data, discuss the findings with concise conclusions.

Excellent (A+, A, A-)
High (Strong evidence of critical thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge of the experimental matters concerned.)

Good (B+, B, B-)
Significant (Evidence of grasp of subject, some evidence of critical thinking and analytic ability; reasonable understanding of issues; evidence of familiarity with experiment.)

Fair (C+, C, C-)
Moderate (Student who is profiting from the laboratory class; understanding of the subject; ability to develop solutions to the experiment.)

Marginal (D)
Basic (Sufficient familiarity with the laboratory content to enable the student to move onto other laboratory materials.)

Failure (F)
Not even reaching marginal levels (Little evidence of familiarity with the laboratory class materials; weakness in critical and analytic skills; limited, or irrelevant use of data.)

Assessment Task
Examination

Criterion
Demonstrate an understanding of the basic avionics system requirements, communications, navigation and aircraft management systems.

Excellent (A+, A, A-)
High (Strong evidence of original thinking; good organization, capacity to analyse; superior grasp of subject matter; evidence of extensive knowledge base.)

Good (B+, B, B-)
Significant (Significant evidence of grasp of subject, some evidence of critical thinking and analytic ability; reasonable understanding of issues; evidence of familiarity with course matter.)

Fair (C+, C, C-)
Moderate (Student is profiting from the university experience; understanding of avionic power systems; ability to develop solutions to simple problems in the course.)

Marginal (D)

Basic (Basic familiarity with the subject matter to enable the student to progress without repeating the course.)

Failure (F)

Not even reaching marginal levels (Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; very limited demonstration of correctly using knowledge in avionic power systems.)

Additional Information for AR

Note: For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained.

Part III Other Information

Keyword Syllabus

Purpose of the avionics system, Electrical power supply and distribution, Flight Control management, Electronics flight instrument systems, Fuel systems, Communications, Navigation, Engine control and management, Sensor systems, Display technologies, An introduction to Satellite and spacecraft avionics.

In addition to the examination and in-class test, students are required to learn through collaborative lab sessions in order to improve their understanding on strategic thinking, problem solving, team working processes, the relationships and interactions between the fields of knowledge that they have learnt in this and other courses.

Reading List

Compulsory Readings

	Title
1	Principles of Avionics, A Helfrick, American Institute of Aeronautics and Astronautics, 2000

Additional Readings

	Title
1	Design and development of aircraft systems, I Moir, American Institute of Aeronautics, 2nd edition, 2012