The Hong Kong University of Science and Technology

UG Course Syllabus

Avionics Systems

MECH3680

3 Credits

Pre-requisites: ELEC2420 AND (COMP1021 OR COMP1022P OR COMP2011)

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Office Hours: By email appointments

Course Description:

This course is required for BEng in Aerospace Engineering. It covers avionic systems and communications, including analog and digital systems, aviation frequency bands, satellite and aircraft communications, selective calling, emergency locator transmitter, omni-directional range, instrument and microwave landing systems, and automatic direction finder. Other relevant topics may also be covered.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

A. Understand basic concepts of avionics and its system structure (POC1, POC3, POC4, POC5);
B. Analyze basic requirements and specs for individual avionics systems (POC1, POC3, POC4, POC5);

C. Recognize basic applications and integration of different avionics systems (POC1, POC3, POC4, POC5);
D. Envision future trends of avionics development (POC9, POC10);

Program Outcomes:

POC1	Ability to identify and formulate problems in multidisciplinary environment with an understanding of engineering issues and constraints.
POC2	Ability to design and conduct experiments as well as analyze and interpret data.
POC3	Ability to apply knowledge of mathematics, science, and engineering for problem solving in aerospace engineering and related sectors or for further education in research career.
POC4	Ability to develop specification and to design system, component, or process to meet needs.
POC5	Ability to understand the design, operation, and maintenance of aircraft components and systems.
POC6	Ability to use modern engineering tools, techniques, and skills in engineering practice.
POC7	Ability to communicate effectively.
POC8	Ability to function in multi-disciplinary teams and provide leadership.
POC9	Broadly educated with an understanding of the impact of engineering solutions on issues such as economics, business, politics, environment, health and safety, sustainability, and societal context.
POC10	Clear understanding of professional and ethical responsibilities

Course Topics:

(1) Human-machine interface with an emphasis on displays

(2) Navigation systems and RADAR

(3) Electrical systems and electric airplanes

(4) Air sensors and flight data system

(5) Payload and flight mission avionics

(6) Fly-by-wire systems

Course Objectives:

Fundamental understanding of avionics systems for MAE students to partially fulfill Program Objectives (P-O1) and (P-O5).

Course Format:

Lectures: Present key concepts and theories, and impart analysis skills with practical examples. (Course Outcomes A–D)

Assessment:

15% Homework (3 sets planned)

35% Midterm

45% Final examination

5% Attendance

Textbook/Required Material: (HKUST library or online)

Collinson, R.P.G., Introduction to Avionics Systems, 3rd Edition, Springer, 2011

Attendance:

Attendance is mandatory and will be checked randomly during the term.

For anticipated absences, students must request permission via email before class.

Examinations:

The exam schedule is final except for (i) direct conflicts with other scheduled exams, or (ii) students with three or more exams on the same day.

No accommodation will be made for work schedules or travel arrangements.

Missed exams due to medical reasons require documentation from a healthcare provider.

Homework:

No late submissions will be accepted for homework assignments.

Extensions for medical reasons require documentation from a healthcare provider.

Zero tolerance for academic dishonesty

Academic honesty is expected of all students in all examinations, papers, reports, homework and academic transactions and records. There will be zero tolerance for dishonesty in this class. Formal procedures will be triggered automatically once a suspected behavior has been discovered.