

EEE 475 Fundamentals of Avionics Systems

| Course Code | Course Name | Semester | | |
|-------------|----------------------------------|--|--------|------|
| EEE 475 | Fundamentals of Avionics Systems | Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Summer <input type="checkbox"/> | | |
| Hours | | | Credit | ECTS |
| Theory | Practice | Lab | 3 | 5 |
| 3 | -- | -- | | |

| Course Details | |
|------------------------------|---|
| Department | Electrical and Electronics Engineering |
| Course Language | English |
| Course Level | Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> |
| Mode of Delivery | Face to Face <input checked="" type="checkbox"/> Online <input type="checkbox"/> Hybrid <input type="checkbox"/> |
| Course Type | Compulsory <input type="checkbox"/> Elective <input checked="" type="checkbox"/> |
| Lecturer(s) | Prof. Dr. İsmail Hakkı ALTAŞ |
| Course Objectives | <ul style="list-style-type: none">- To enable students to understand the concepts of Avionics sub-systems separately and as a whole system that work together in coordination for Module 11.- Teaching students, the basics of propagation, we're equipping them with knowledge that has practical applications in the field of avionics.- It provides the students with information on basic antenna theory in terms of directivity, gain, and efficiency.- To Introduce students to the combination of aviation and electronics structures,- To familiarize the students with the behaviors of avionics subsystems in accordance with electrical and RF behavior.- To provide students with a theoretical background for data and voice communication. |
| Course Content | |
| Course Method/ Techniques | Lecture <input type="checkbox"/> Question & Answer <input type="checkbox"/> Presentation <input type="checkbox"/> Discussion <input type="checkbox"/> |

| | |
|---|--|
| Prerequisites/ Corequisites | |
| Work Placement(s) | |
| Textbook/References/Materials | |
| <ul style="list-style-type: none">M.Tooley, D.Wyatt; Aircraft Communications and Navigation Systems, Biblioteca Central.A. Helfrick; Principles of Avionics; Avionics Comms Inc. | |

| | | | |
|--------------------------------|-------------------------------------|------------|--------------------------|
| Course Category | | | |
| Mathematics and Basic Sciences | <input type="checkbox"/> | Education | <input type="checkbox"/> |
| Engineering | <input checked="" type="checkbox"/> | Science | <input type="checkbox"/> |
| Engineering Design | <input checked="" type="checkbox"/> | Health | <input type="checkbox"/> |
| Social Sciences | <input type="checkbox"/> | Profession | <input type="checkbox"/> |

| Weekly Schedule | | |
|------------------------|--|-----------------|
| No | Topics | Materials/Notes |
| 1 | Introduction to RF Propagation | |
| 2 | Antenna Theory | |
| 3 | Antenna Theory | |
| 4 | Receiver (Rx)/Transmitter (Tx) Structures | |
| 5 | Aircraft Communication (VHF/HF) | |
| 6 | Internal Communication Systems | |
| 7 | ELT (Emergency Locator Tx) | |
| 8 | Midterm Exam | |
| 9 | Fundamentals of Navigation | |
| 10 | Radar Basics | |
| 11 | NDB (Non-Directional Beacon) /ADF | |
| 12 | VOR (VHF Omni-range)/TACAN (Tactical Air Navigation) | |
| 13 | DME (Distance Measuring Equipment) | |
| 14 | INS, GPS | |
| 15 | Instrument Landing Systems (ILS/MLS) | |
| 16 | Final Exam | |

| Assessment Methods and Criteria | | |
|---|-----------------|-------------------|
| In-term studies | Quantity | Percentage |
| Attendance | -- | -- |
| Lab | -- | -- |
| Practice | -- | -- |
| Fieldwork | -- | -- |
| Course-specific internship | -- | -- |
| Quiz/Studio/Criticize | 2 | 15% |
| Homework | -- | -- |
| Presentation / Seminar | -- | -- |
| Project | 1 | 15% |
| Report | -- | -- |
| Seminar | -- | -- |
| Midterm Exam | 1 | 20% |
| Final Exam | 1 | 50% |
| Total | | 100% |
| Contribution of Midterm Studies to Success Grade | | 50% |
| Contribution of End of Semester Studies to Success Grade | | 50% |
| Total | | 100% |

| ECTS Allocated Based on Student Workload | | | |
|---|-----------------|-----------------------|-----------------------|
| Activities | Quantity | Duration (Hrs) | Total Workload |
| Course Hours | 14 | 3 | 42 |
| Lab | 0 | 0 | 0 |
| Practice | 0 | 0 | 0 |
| Fieldwork | 0 | 0 | 0 |
| Course-specific Work Placement | 0 | 0 | 0 |
| Out-of-class study time | 14 | 2 | 28 |
| Quiz/Studio/Criticize | 2 | 5 | 10 |
| Homework | 0 | 0 | 0 |
| Presentation / Seminar | 0 | 0 | 0 |
| Project | 1 | 15 | 15 |
| Report | 0 | 0 | 0 |
| Midterm Exam and Preparation for Midterm | 1 | 15 | 15 |
| Final Exam and Preparation for Final Exam | 1 | 25 | 25 |
| Total Workload | | | 125 |
| Total Workload / 25 | | | 125/5 |
| ECTS Credit | | | 5 |

Course Learning Outcomes

| No | Outcome |
|----|---|
| L1 | Students will learn about propagation, antennas, and transmitter/receiver background. |
| L2 | Students will learn the rules of air navigation and the related avionics systems. |
| L3 | Students will be able to understand the communication system in aviation. |
| L4 | Students will be able to select suitable avionics systems for appropriate situations. |
| L5 | Students will learn the total avionics structure of an aircraft. |

Contribution of Course Learning Outcomes to Program Competencies/Outcomes

Contribution Level: 1: Very Slight, 2: Slight, 3: Moderate, 4: Significant, 5: Very Significant

| | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | P11 | | | | | | Total |
|--------------|----|----|----|----|----|----|----|----|----|-----|-----|--|--|--|--|--|-------|
| L1 | 4 | 4 | 4 | | | | | | | | | | | | | | - |
| L2 | 3 | 3 | 3 | | | | | | | | | | | | | | - |
| L3 | 4 | 4 | 3 | | | | | | | | | | | | | | - |
| L4 | | | 3 | 3 | | | | | | | | | | | | | - |
| L5 | | | 3 | 3 | | | | | | | | | | | | | - |
| Total | | | | | | | | | | | | | | | | | - |

i. Sufficient knowledge in the fields of mathematics, natural sciences, and related engineering disciplines; the ability to apply theoretical and practical knowledge in solving complex engineering problems.


ii. The ability to identify, formulate, and solve complex engineering problems; the ability to select and apply appropriate analysis and modeling methods for this purpose.

iii. The ability to design a complex system, process, device, or product to meet specific requirements under realistic constraints and conditions; the ability to apply modern design methods for this purpose.

iv. The ability to select and use modern techniques and tools required for the analysis and solution of complex problems encountered in engineering applications; the ability to effectively use information technologies.

v. The ability to design experiments, conduct experiments, collect data, analyze results, and interpret findings for the investigation of complex engineering problems or discipline-specific research topics.

vi. The ability to work effectively in intra-disciplinary and multidisciplinary teams; the ability to work independently.

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|  | FACULTY OF ENGINEERING COURSE SYLLABUS FORM | Doküman No | MF.FR.003 |
| | | Revizyon Tarihi | 13.11.2024 |
| | | Revizyon No | 01 |
| | | Sayfa No | 5 / 5 |

vii. The ability to communicate effectively both orally and in writing; proficiency in at least one foreign language; the ability to write effective reports, understand written reports, prepare design and production reports, make effective presentations, and give and receive clear and understandable instructions.

viii. Awareness of the necessity of lifelong learning; the ability to access information, track developments in science and technology, and continuously renew oneself.

ix. Acting in accordance with ethical principles, knowledge of professional and ethical responsibilities, and the standards used in engineering applications.

x. Knowledge of business practices such as project management, risk management, and change management; awareness of entrepreneurship and innovation; knowledge of sustainable development.

xi. Knowledge of the impact of engineering practices on health, environment, and safety at global and societal levels, and awareness of contemporary engineering issues; awareness of the legal consequences of engineering solutions.