



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

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|--|---|---|-------------|--|---|--------------------------------|---|------------|---|
| Course Title | | Digital Communications | | | | | | | |
| Course Code | | EEE535 | | Course Level | | Second Cycle (Master's Degree) | | | |
| ECTS Credit | 8 | Workload | 200 (Hours) | Theory | 3 | Practice | 0 | Laboratory | 0 |
| Objectives of the Course | | The objective of this course is to introduce the theoretical aspects of digital communication, to realize a complete digital communications system and to evaluate its performance | | | | | | | |
| Course Content | | Basic elements of a digital communication system, digital modulation techniques including Phase Shift Keying, Frequency Shift Keying and Quadrature Amplitude Modulation, Performance of Digital communication in AWGN and fading channels, diversity and coding in digital communication systems | | | | | | | |
| Work Placement | | N/A | | | | | | | |
| Planned Learning Activities and Teaching Methods | | | | Explanation (Presentation), Discussion, Project Based Study, Individual Study, Problem Solving | | | | | |
| Name of Lecturer(s) | | Lec. Mümtaz YILMAZ | | | | | | | |

Assessment Methods and Criteria

| Method | Quantity | Percentage (%) |
|---------------------|----------|----------------|
| Midterm Examination | 1 | 25 |
| Final Examination | 1 | 35 |
| Assignment | 5 | 20 |
| Project | 1 | 20 |

Recommended or Required Reading

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| 1 | Digital Communications, J. G. Proakis, M. Salehi, Mcgraw Hill |
| 2 | Digital Communications Over Fading Channels, M.K. Simon and M.S. Alouini; Wiley |

| Week | Weekly Detailed Course Contents | |
|------|---------------------------------|--|
| 1 | Theoretical | Digital Modulation Techniques |
| 2 | Theoretical | Optimum Receivers for AWGN Channels |
| 3 | Theoretical | Carrier and Symbol Synchronization |
| 4 | Theoretical | Phase-Shift-Keying, Quadrature Amplitude Modulation |
| 5 | Theoretical | Minimum-Shift-Keying |
| 6 | Theoretical | Continuous Phase Modulation |
| 7 | Theoretical | Error probability calculations for digital modulation in Gaussian channels |
| 8 | Intermediate Exam | Midterm Exam |
| 9 | Theoretical | Digital Communication over Fading Channels |
| 10 | Theoretical | Optimum Receivers for Fading Channels |
| 11 | Theoretical | Error probability calculations for digital signals in fading channels |
| 12 | Theoretical | Performance of multichannel receivers, diversity combining |
| 13 | Theoretical | Coded communication over fading channels |
| 14 | Theoretical | Capacity of fading channels |
| 15 | Theoretical | Project Presentations |
| 16 | Final Exam | Final Exam |

Workload Calculation

| Activity | Quantity | Preparation | Duration | Total Workload |
|---------------------|----------|-------------|----------|----------------|
| Lecture - Theory | 14 | 3 | 3 | 84 |
| Assignment | 5 | 5 | 0 | 25 |
| Project | 1 | 20 | 0 | 20 |
| Individual Work | 14 | 3 | 0 | 42 |
| Midterm Examination | 1 | 12 | 2 | 14 |



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|---|---|----|---|-----|
| Final Examination | 1 | 13 | 2 | 15 |
| Total Workload (Hours) | | | | 200 |
| [Total Workload (Hours) / 25*] = ECTS | | | | 8 |
| *25 hour workload is accepted as 1 ECTS | | | | |

Learning Outcomes

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|---|--|
| 1 | To acquire knowledge about fundamental blocks of a digital communication system |
| 2 | To be able to realize various digital modulation and demodulation techniques |
| 3 | To evaluate the performance of a digital communication system in both AWGN and fading channels |
| 4 | To be able to design optimum receivers for fading channels |
| 5 | To be able to apply coding and diversity techniques in digital communication systems |

Programme Outcomes (Electrical and Electronics Engineering Master)

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|---|--|
| 1 | Developing and intensifying knowledge that requires expertise in the area of Electrical-Electronics Engineering, and gaining the skills necessary to analyze and solve problems using this knowledge |
| 2 | Grasping the inter-disciplinary interaction related to Electrical-Electronics Engineering, interpreting and forming new types of knowledge by combining the knowledge from Electrical-Electronics Engineering and the knowledge from various other disciplines |
| 3 | Developing new approaches to solve the complex problems arising in Electrical-Electronics Engineering, coming up with solutions while taking responsibility and carrying out a specific study independently |
| 4 | Assessing the knowledge and skill gained in the area of Electrical-Electronics Engineering with a critical view |
| 5 | Transferring the current developments and one's own work in Electrical-Electronics Engineering, to other groups in written, oral and visual forms |
| 6 | The ability to control the collecting, interpreting, practicing and announcing processes of the Electrical-Electronics Engineering related to data taking into consideration scientific, cultural and ethical values and the ability to teach these values to others |
| 7 | Developing application plans concerning the subjects related to Electrical-Electronics Engineering and the ability to evaluate the end results of these plans within the frame of quality processes |

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

| | L1 | L2 | L3 | L4 | L5 |
|----|----|----|----|----|----|
| P1 | 4 | 4 | 4 | 4 | 4 |
| P2 | 4 | 4 | 4 | 4 | 4 |
| P3 | 4 | 4 | 4 | 4 | 4 |
| P4 | 4 | 4 | 4 | 4 | 4 |
| P5 | 4 | 4 | 4 | 4 | 4 |
| P6 | 4 | 4 | 4 | 4 | 4 |
| P7 | 4 | 4 | 4 | 4 | 4 |

