**MSc Program, Electrical & Electronic Engineering Department**

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| **Course Unit Title** |

 | Electromagnetic Wave Propagation |
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| **Course Unit Code**  |

 | EE 512 |
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| **Type of Course Unit**  |

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| **Level of Course Unit**  |

 | MSc program |
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| **National Credits**  |

 | 3 |
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| **Number of ECTS Credits Allocated**  |

 | 10 |
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| **Theoretical (hour/week)**  |

 | 4 |
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| **Practice (hour/week)**  |

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| **Laboratory (hour/week)**  |

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| **Year of Study**  |

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| **Semester when the course unit is delivered**  |

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| **Course Coordinator**  |

 | Assist.Prof. Dr. Refet Ramiz |
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| **Name of Lecturer (s)**  |

 | Assist.Prof. Dr. Refet Ramiz |
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| **Name of Assistant (s)**  |

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| **Mode of Delivery**  |

 | Face to Face, |
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| **Language of Instruction**  |

 | English |
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| **Prerequisites**  |

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| **Recommended Optional Programme Components**  |

 | Mathematic skills |
| **Course description:**Fundamental Concepts and Theorems; Maxwell Equations; Electromagnetic Waves; Classifications of Waves; Guided Waves;Ground wave propagation;-Plane-earth reflection,-Plane-earth reflection,-Space wave,-Surface wave,-Elevated dipole antenna above a plane earth,-Wave tilt of the surface wave,-Spherical earth propagation,-Tropospheric waves,Ionospheric Propagation;-The ionosphere,-Effective permittivity and conductivity of an ionised gas,-Reflection and refraction waves by the ionosphere, -Attenuation factor for ionospheric propagtion,-Sky-wave trnasmission calculations,-Effect of the earth’s magnetic field,-Wave propoagtion in the ionosphere, |
| **Objectives of the Course:*** To provide a student with the necessary tools for the critical evaluation of existing and future electromagnetic wave phenomena
* To teach the concepts and principles of constructions of electromagnetic waves
* To enable a student to evaluate and choose an electromagnetic tools to match the problem
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| **Learning Outcomes** |
| At the end of the course the student should be able to | Assessment |
| 1 | Use of evaluation criteria for an assessment of electromagnetic waves  | 1, 2 |
| 2 | Demonstrate and reconstruct a specific electromagnetic wave problems | 1, 2 |
| 3 | Apply electromagnetic wave propagation principles for verification of the problems | 1, 2 |
| 4 | Analyze variables of electromagnetic waves problems | 1, 2 |
| 5 | Examine different concepts implemented in electromagnetic wave propagation problems | 1, 2 |
| 6 | Compare electromagnetic waves and propagation problems | 1, 2 |
| 7 |  |  |
|  Assessment Methods: 1. Written Exam, 2. Assignment, 3. Project/Report, 4. Presentation, 5. Lab. Work |
|  **Course’s Contribution to Program** |
|  |  | CL |
| 1 | Ability to understand and apply knowledge of mathematics, science, and engineering | 4 |
| 2 | An ability to analyze a problem, identify and define the computing requirements appropriate to its solution | 3 |
| 3 | Ability to design a product within realistic constraints | 3 |
| 4 | Ability to work with multi-disciplinary teams | 4 |
| 5 | Planning and carrying out experiments, as well as to analyze and interpret data | 3 |
| 6 |  Be able to understand professional and ethical responsibilities. | 3 |
| 7 |  Be able to understand the effect of engineering in a global, economic, environmental, and social setting.  | 3 |
| 8 | Ability to use the techniques, skills and modern engineering tools necessary for engineering practice | 3 |
| CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)  |
| **Course Contents** |
| Week | Chapter | Topics | Exam |
| 1 |  | Fundamental Concepts and Theorems.  |  |
| 2 |  |  Maxwell Equations |  |
| 3 |  | Electromagnetic WavesClassifications of Waves. Guided Waves.  |  |
| 4 |  | Ground wave propagation. -Plane-earth reflection |  |
| 5 |  | -Plane-earth reflection |  |
| 6 |  | -Space wave-Surface wave |  |
| 7 |  |  | Midterm |
| 8 |  | -Elevated dipole antenna above a plane earth-Wave tilt of the surface wave |  |
| 9 |  | -Spherical earth propoagtion-Tropospheric waves |  |
| 10 |  | Ionospheric Propagation-The ionosphere |  |
| 11 |  | -Effective permittivity and conductivity of an ionised gas |  |
| 12 |  | -Reflection and refraction waves by the ionosphere |  |
| 13 |  |  -Attenuation factor for ionospheric propagtion-Sky-wave trnasmission calculations |  |
| 14 |  | -Effect of the earth’s magnetic field-Wave propagation in the ionosphere |  |
| 15 |  |  | Final |
| **Recommended Sources****Textbook:****Supplementary Course Material*** Edward C. Jordan, Keith G. Balmain, ELECTROMAGNETIC WAVE AND RADIATING SYSTEMS.
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| **Assessment** |
| Attendance | 10 % |  |
| Assignment | - |  |
| Midterm Exam  | 40 % | Written Exam |
| Final Exam | 50 % | Written Exam |
| Total | 100 % |  |
| **Assessment Criteria**Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies |
| **Course Policies*** Attendance to the course is mandatory.
* Late assignments will not be accepted unless an agreement is reached with the lecturer.
* Students may use calculators during the exam.
* Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Near East University General Student Discipline Regulations
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| **ECTS allocated based on Student Workload** |
| Activities | Number | Duration (hour) | Total Workload(hour) |
| Course duration in class (including Exam weeks) | 15 | 3 | 45 |
| Labs and Tutorials | - | - | - |
| Assignment | 5 | 12 | 60 |
| Project/Presentation/Report | 1 | 10 | 10 |
| E-learning activities | - | - | - |
| Quizzes | - | - | - |
| Midterm Examination | 1 | 30 | 30 |
| Final Examination | 1 | 35 | 35 |
| Self Study | 14 | 8 | 112 |
| Total Workload | 292 |
| Total Workload/30(h) | 9.73 |
| ECTS Credit of the Course | 10 |