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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **Course Unit Title** | | | | | | | Electromagnetic Wave Propagation | | | | | |
| |  | | --- | | **Course Unit Code** | | | | | | | EE 512 | | | | | |
| |  | | --- | | **Type of Course Unit** | | | | | | |  | | | | | |
| |  | | --- | | **Level of Course Unit** | | | | | | | MSc program | | | | | |
| |  | | --- | | **National Credits** | | | | | | | 3 | | | | | |
| |  | | --- | | **Number of ECTS Credits Allocated** | | | | | | | 10 | | | | | |
| |  | | --- | | **Theoretical (hour/week)** | | | | | | | 4 | | | | | |
| |  | | --- | | **Practice (hour/week)** | | | | | | | - | | | | | |
| |  | | --- | | **Laboratory (hour/week)** | | | | | | | - | | | | | |
| |  | | --- | | **Year of Study** | | | | | | |  | | | | | |
| |  | | --- | | **Semester when the course unit is delivered** | | | | | | |  | | | | | |
| |  | | --- | | **Course Coordinator** | | | | | | | Assist.Prof. Dr. Refet Ramiz | | | | | |
| |  | | --- | | **Name of Lecturer (s)** | | | | | | | Assist.Prof. Dr. Refet Ramiz | | | | | |
| |  | | --- | | **Name of Assistant (s)** | | | | | | | - | | | | | |
| |  | | --- | | **Mode of Delivery** | | | | | | | Face to Face, | | | | | |
| |  | | --- | | **Language of Instruction** | | | | | | | English | | | | | |
| |  | | --- | | **Prerequisites** | | | | | | |  | | | | | |
| |  | | --- | | **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 | | | | | | | | | | | |
| **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 Waves  Classifications 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. | | | | | | | | | | | |
| **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 | | | | | | | | | | | |
| **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 | | |