**COURSE SPECIFICATION**

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| . To study the fundamentals of wave propagation based on Maxwell's equations for time varying fields and his contribution of displacement current density which lead to the invention of wireless communication, and to cover the basic of antenna principles , study basic aperture antenna, antenna arrays , and basic of radar system,Friis equation , ionosphere HF communication and rhombic antenna**.** |

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| University of Baghdad | 1. Teaching Institution |
| College of Engineering / Electronics and Communications Department | 2. University Department/Centre |
| Antenna and Propagation | 3. Course title/code |
| communication systems ,  optical communication systems  ,digital communication systems | 4. Programme(s) to which it contributes |
| In class face-to-face mode | 5. Modes of Attendance offered |
| 1st-2nd  / 2015-2016 | 6. Semester/Year |
| 3 hrs per week , 90 hrs total | 7. Number of hours tuition (total) |
| 25/4/2016 | 8. Date of production / revision of this specification |
| 9. Aims of the Course | |
| To make the student familiar with the propagation characteristics of electromagnetic waves for time varying field for different media and to study different types of antenna ,antenna parameters and antenna arrays | |
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1electromagnetic wave propagation in different media  A2.  A3.  A4.  A5.  A6 . |
| B. Subject-specific skills  B1.antenna parameters  B2.basic antenna types  B3antenna array  B4. Ionosphere communications  B5.  B6. |
| Teaching and Learning Methods |
| 1- Lectures.  2- Tutorials.  3- Homework and Assignments.  4- Tests and Exams.  5- In-Class Questions and Discussions |
| Assessment methods |
| 1. Quizzes: 10% 2. 1st term exam: 10% 3. 2nd term exam: 10% 4. Final exam: 70% |
| C. Thinking Skills  C1.  C2.  C3.  C4. |
| Teaching and Learning Methods |
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| Assessment methods |
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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.  D2.  D3.  D4. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Quiz/Exam | Lectures | **Maxwell,s equations for time varying fields.** |  | 3 | 1 |
| Quiz/Exam | Lectures | **Displacement current principle.** |  | 3 | 2 |
| Quiz/Exam | Lectures | **Magnetic vector potential.** |  | 3 | 3 |
| Quiz/Exam | Lectures | **Wave equations.** |  | 3 | 4 |
| Quiz/Exam | Lectures | **Uniform plane wave propagation.** |  | 3 | 5 |
| Quiz/Exam | Lectures | **Wave propagation in lossy dielectric.** |  | 3 | 6 |
| Quiz/Exam | Lectures | **Attenuation and phase constant.** |  | 3 | 7 |
| Quiz/Exam | Lectures | **Intrinsic impedance.** |  | 3 | 8 |
| Quiz/Exam | Lectures | **Wave propagation in perfect dielectric.** |  | 3 | 9 |
| Quiz/Exam | Lectures | **Wave propagation in good conductors.** |  | 3 | 10 |
| Quiz/Exam | Lectures | **Skin effect and skin depth.** |  | 3 | 11 |
| Quiz/Exam | Lectures | **Power and Poynting vector.** |  | 3 | 12 |
| Quiz/Exam | Lectures | **Wave polarization.** |  | 3 | 13 |
| Quiz/Exam | Lectures | **Reflection of plane wave at normal incidence.** |  | 3 | 14 |
| Quiz/Exam | Lectures | **Standing wave ratio.** |  | 3 | 15 |
| Quiz/Exam | Lectures | **Reflection of plane wave at oblique incidence.** |  | 3 | 16 |
| Quiz/Exam | Lectures | **Total reflection and total transmission.** |  | 3 | 17 |
| Quiz/Exam | Lectures | **Wave propagation in optical fiber system.** |  | 3 | 18 |
| Quiz/Exam | Lectures | **Numerical aperture and Brewster angle.** |  | 3 | 19 |
| Quiz/Exam | Lectures | **Antenna basics: antenna basic parameters.** |  | 3 | 20 |
| Quiz/Exam | Lectures | **Anenna pattern, and beam solid angle .** |  | 3 | 21 |
| Quiz/Exam | Lectures | **Directivity and gain.** |  | 3 | 22 |
| Quiz/Exam | Lectures | **Radio communication link and Friis equation.** |  | 3 | 23 |
| Quiz/Exam | Lectures | **Radar principle and RADAR equation.** |  | 3 | 24 |
| Quiz/Exam | Lectures | **Hertizian short dipole antenna.** |  | 3 | 25 |
| Quiz/Exam | Lectures | **λ/2 dipole antenna and loop antenna..** |  | 3 | 26 |
| Quiz/Exam | Lectures | **Array of two isotropic point sources.** |  | 3 | 27 |
| Quiz/Exam | Lectures | **Linear broadside and endfire array.** |  | 3 | 28 |
| Quiz/Exam | Lectures | **Binomial array.** |  | 3 | 29 |
| Quiz/Exam | Lectures | **Yagi-Uda array and folded dipole VHF/UHF antenna.** |  | 3 | 30 |

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| 12. Infrastructure | |
| 1. Engineering Electromagnetics  By: William H .Hyte JR. and John A. Buck  McGraw-Hill International Edition  7th edition 2006   * 2.Antenna for all applications * By;John D. Kraus   Mccraw –Hill , 3rd edition,2002 | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| None | Special requirements (include for example workshops, periodicals, IT software, websites) |
| None | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 13. Admissions | |
| According to ministry requirements | Pre-requisites |
| 20 | Minimum number of students |
| 50 | Maximum number of students |