**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification. |

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| Baghdad University | 1. Teaching Institution |
| College of Engineering/Department of Electrical Engineering | 2. University Department/Centre |
| Antenna and Propagation | 3. Course title/code |
| Electrical Engineering | 4. Programme(s) to which it contributes |
| Internal | 5. Modes of Attendance offered |
| Third Year Class | 6. Semester/Year |
| 90 | 7. Number of hours tuition (total) |
| 2013 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The student learns the fundamental solutions of time-varying Maxwell's equations, and applies them to design antennas. The student understands radio wave propagation phenomena in modern | |
| communication systems, and fundamentals of electromagnetic radiation with application to antenna theory and design. | |
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| 1. Knowledge and Understanding   A1. Concepts and theories of mathematics and sciences, appropriate to the antennas.  A2. Characteristics of engineering materials related to the  antennas.  A3. Principles of design including elements design, process and/or a system related to specific antennas.  A4. Current engineering technologies as related to antennas |
| B. Subject-specific skills  B1. Select appropriate mathematical and computer-based methods for modeling and analyzing problems.  B2. Select appropriate solutions for engineering problems based on analytical thinking.  B3. Investigate the failure of components, systems, and processes.  B4. Analyze results of numerical models and assess their limitations.  B5. Synthesis and integrate electronic systems for certain specific function using the right equipment. |
| Teaching and Learning Methods |
| -Lectures  - Tutorials  - case studies  - Research assignments |
| Assessment methods |
| - Weekly sheet exercises at class room  - Quizzes  - Case study for more demonstration.  - Midterm, and final exams |
| C. Thinking Skills  C1 Select appropriate mathematical and computer-based methods for modeling and analyzing problems.  C2. Select appropriate solutions for engineering problems based on analytical thinking.  C3. Investigate the failure of components, systems, and processes.  C4. Analyze results of numerical models and assess their limitations.  C4. Synthesis and integrate electronic systems for certain specific function using the right equipment |
| Teaching and Learning Methods |
| -Lectures  - Tutorials  - Case studies  - Research assignments |
| Assessment methods |
| - Weekly sheet exercises at class room  - Quizzes  - Case study for more demonstration.  - Midterm, and final exams |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Collaborate effectively within multidisciplinary team.  D2. Communicate effectively.  D3. Search for information and engage in life-long self learning antennas.  D4. Refer to relevant literatures |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exam | Lectures and Tutorials | Introduction to Maxwell's equations | B | 3 | 1 |
| Exam | Lectures and Tutorials | Antenna parameters | A+B+C+D | 3 | 2 |
| Exam | Lectures and Tutorials | Infinitesimal dipole | A+B+C+D | 3 | 3 |
| Exam | Lectures and Tutorials | Small dipole | A+B+C+D | 3 | 4 |
| Exam | Lectures and Tutorials | Finite length dipole | A+B+C+D | 3 | 5 |
| Exam | Lectures and Tutorials | Half wavelength dipole | A+B+C+D | 3 | 6 |
| Exam | Lectures and Tutorials | Image theory | A+B+C+D | 3 | 7 |
| Exam | Lectures and Tutorials | Loop antenna | A+B+C+D | 3 | 8 |
| Exam | Lectures and Tutorials | Helical Antenna | A+B+C+D | 3 | 9 |
| Exam | Lectures and Tutorials | Arrays | A+B+C+D | 3 | 10 |
| Exam | Lectures and Tutorials | Yagi-Uda Antenna | A+B+C+D | 3 | 11 |
| Exam | Lectures and Tutorials | Microstripe antenna | A+B+C+D | 3 | 12 |
| Exam | Lectures and Tutorials | Fractal antenna | A+B+C+D | 3 | 13 |
| Exam | Lectures and Tutorials | Radar Equation | A+B+C+D | 3 | 14 |
| Exam | Lectures and Tutorials | Propagation mechanisms | A+B+C+D | 3 | 15 |
| Exam | Lectures and Tutorials | Wave equation | A+B+C+D | 3 | 16 |
| Exam | Lectures and Tutorials | Type of Mediums | A+B+C+D | 3 | 17 |
| Exam | Lectures and Tutorials | Depth of penetration | A+B+C+D | 3 | 18 |
| Exam | Lectures and Tutorials | Polarization | A+B+C+D | 3 | 19 |
| Exam | Lectures and Tutorials | Reflection, refraction, and diffraction. | A+B+C+D | 3 | 20 |
| Exam | Lectures and Tutorials | Transmission Line | A+B+C+D | 3 | 21 |
| Exam | Lectures and Tutorials | Coupled lines | A+B+C+D | 3 | 22 |
| Exam | Lectures and Tutorials | Impedance matching | A+B+C+D | 3 | 23 |
| Exam | Lectures and Tutorials | S- parameters | A+B+C+D | 3 | 24 |
| Exam | Lectures and Tutorials | Two plate Wave guide | A+B+C+D | 3 | 25 |
| Exam | Lectures and Tutorials | Rectangular Wave guide | A+B+C+D | 3 | 26 |
| Exam | Lectures and Tutorials | Circular Wave guide | A+B+C+D | 3 | 27 |
| Exam | Lectures and Tutorials | Wave guide Resonator | A+B+C+D | 3 | 28 |
|  |  | Final Exam |  | 3 | 29 |

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| 12. Infrastructure | |
| 1. C. A. Balanis, “Antenna Theory: A Review,” Proc. IEEE, Vol. 80, No. 1, pp. 7–23,  January 1992.  2. L. V. Blake, Antennas, Wiley, New York, 1966, p. 289.  2. J. D. Kraus, Antennas, McGraw-Hill, New York, 1988. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| CST package, EZNEC software | 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 | |
|  | Pre-requisites |
| 40 | Minimum number of students |
| 50 | Maximum number of students |