Republic of Iraq

Ministry of Higher Education & Scientific Research Supervision and Scientific Evaluation Directorate Quality Assurance and Academic Accreditation

International Accreditation Dept.

Academic Program Specification Form For The

Academic

Universitiy: Baghdad

College : Engineering

Number Of Departments In The College : 13

Date Of Form Completion : February, 2021

Dean ’s Name Prof. Dr. Saba JabBar Neamah

Date : / /

Signature

Dean ’s Assistant For

Scientific Affairs

Date : / / Signature

The College Quality Assurance

And University Performance

Manager Date : / / Signature

Quality Assurance And University Performance Manager

Date : / / Signature

**TEMPLATE FOR PROGRAMME SPECIFICATION**

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

**PROGRAMME SPECIFICATION**

This Programme Specification provides a concise summary of the main features of the programme 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 is supported by a specification for each course that contributes to the programme.

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| 1. Teaching Institution | College of Engineering, University of Baghdad |
| 2. University Department/Centre | Department of Electrical Engineering |
| 3. Programme Title | Electrical Engineering (General) |
| 4. Title of Final Award | B. Sc. in Electrical Engineering |
| 5. Modes of Attendance offered | Full time attendance |
| 6. Accreditation | Intention to conform with ABET accreditation |
| 7. Other external influences | none |
| 8. Date of production/revision of  this specification | February, 2021 |
| 9. Aims of the Programme | |
| 1. Preparing skilled electrical engineering staff to support various governmental establishments and ministries, besides supporting the work market needs to this important profession. | |
| 1. Prepare a generation of electrical engineers who have a well knowledge of their profession and can use it in a systematic procedure in each aspect related to the field of their specialization. | |
| 1. Support the academic staff at each governmental and civil universities and institutions with highly skilled staff who can catch up with the updates and the developments of this career. A staff who can do further post studied within worldwide well ranked universities and can transfer their knowledge easily to their home country universities. | |
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| 10. Learning Outcomes, Teaching, Learning and Assessment Methods |
| A. Cognitive goals  A1. Knowledge of basic Electrical Engineering profession requirements.  A2. Knowledge of analytical solution of different electrical engineering topics.  A3. Knowledge of various design procedures for electrical engineering systems.  A4. Knowledge of important precautions when dealing with real electricity.  A5. Knowledge of how the electrical engineering is important in developing countries. |
| B. The skills goals special to the programme .  B1. Analyze various electrical circuits.  B2. Electrical equipment used in experimentation and their importance to each electrical engineering aspect.  B3. Systematic analysis, design and performance study. |
| Teaching and Learning Methods |
| 1. Lectures, within department classrooms, and online meetings. 2. Seminars and discussions. 3. HomeWorks, assignments and laboratory experimentation with reports. 4. Graduation projects. |
| Assessment methods |
| 1. Short tests (quizzes). 2. Long tests (termly tests and finals). |
| C. Affectional and value goals  C1. Make the students like their profession.  C2. Make the students respect precautions and criteria of their profession.  C3. Make the students understand the importance of their profession to human’s daily life, and how important it is in developing their country. |
| Teaching and Learning Methods |
| 1. Seminars, workshops and discussions. 2. Specific assignments regarding electrical engineering various criteria. 3. Team work. |
| Assessment methods |
| None. |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Supporting software related to the field of electrical engineering.  D2. Report preparation, problem solving techniques and researching.  D3. Electrical engineering issues | | | | |
| Teaching and Learning Methods | | | | |
| 1. Lecturing (online). 2. YouTube videos. 3. Workshops and seminars. 4. Assignments. | | | | |
| Assessment Methods | | | | |
| None. | | | | |
| 11. Programme Structure | | | | 12. Awards and Credits |
| Level/Year | Course or  Module  Code | Course or Module  Title | Credit rating |
| Year One | | | | |
| Y1 | **GE101** | **Mathematics I** | **6** | Bachelor Degree  Requires ( 156) credits |
| Y1 | **EE102** | **Computer Programming** | **4** |
| Y1 | **GE103** | **English** | **2** |  |
| Y1 | **GE104** | **Fundamental of Mechanical Engineering** | **4** |
| Y1 | **GE105** | **Engineering Drawing** | **2** |
| Y1 | **EE106** | **Electrical Engineering Laboratory** | **3** |
| Y1 | **EE107** | **Fundamentals of Electrical Engineering** | **6** |
| Y1 | **EE108** | **Electronic Physics** | **6** |
| Y1 | **EE109** | **Digital Techniques** | **5** |
| Y1 | **GE110** | **Arabic Language** | **-** |
| Year Two | | | | |
| Y2 | **EE201** | **Microprocessor and Computer Architecture** | **4** |  |
| Y2 | **GE202** | **Human Rights** | **1** |  |
| Y2 | **EE203** | **Electrical Machines I** | **4** |  |
| Y2 | **EE204** | **Numerical Analysis and Statistics** | **4** |  |
| Y2 | **EE205** | **Theory of Electrical Field** | **4** |  |
| Y2 | **EE206** | **Electronics I** | **4** |  |
| Y2 | **EE207** | **Electrical Circuits** | **6** |  |
| Y2 | **EE208** | **Electrical Engineering Laboratory** | **6** |  |
| Y2 | **GE209** | **Mathematics II** | **6** |  |
| Y2 | **GE210** | **English II** | **1** |  |
| Year Three | | | | |
| Y3 | **EE301** | **Antenna & wave Propagation** | **6** |  |
| Y3 | **EE302** | **Electronics II** | **6** |  |
| Y3 | **EE303** | **Signals and Systems** | **4** |  |
| Y3 | **EE304** | **Electrical Power I** | **4** |  |
| Y3 | **EE305** | **Electrical Machines II** | **4** |  |
| Y3 | **EE306** | **Communications I** | **6** |  |
| Y3 | **EE307** | **Electrical Engineering Laboratory** | **6** |  |
| Y3 | **EE308** | **Advanced Microprocessors** | **4** |  |
| Year Four | | | | |
| Y4 | **EE401** | **Control System Design** | **6** |  |
| Y4 | **EE402** | **Engineering Project** | **4** |  |
| Y4 | **EE403** | **Electronics III** | **4** |  |
| Y4 | **EE404** | **Communications II** | **4** |  |
| Y4 | **EE405** | **Electrical Power II** | **4** |  |
| Y4 | **EE406** | **Machine & Power Electronics** | **4** |  |
| Y4 | **EE407** | **Computer Networks** | **4** |  |
| Y4 | **EE408** | **Electrical Engineering Laboratory** | **6** |  |
| Y4 | **EE409** | **Digital Signal Processing** | **4** |  |
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| 13. Personal Development Planning |
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| 14. Admission criteria . |
| 1. High School graduation certificate. |
| 15. Key sources of information about the programme |
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| **Curriculum Skills Map** | | | | | | | | | | | | | | | | | | | |
| **please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed** | | | | | | | | | | | | | | | | | | | |
|  | | | | **Programme Learning Outcomes** | | | | | | | | | | | | | | | |
| Year / Level | Course  Code | Course  Title | Core (C) Title or Option (O**)** | Knowledge and understanding | | | | Subject-specific skills | | | | Thinking Skills | | | | General and Transferable Skills (or) Other skills relevant to employability and personal development | | | |
| **A1** | **A2** | **A3** | **A4** | **B1** | **B2** | **B3** | **B4** | **C1** | **C2** | **C3** | **C4** | **D1** | **D2** | **D3** | **D4** |
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**COURSE SPECIFICATION – Year One**

**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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| University of Baghdad-College of Engineering | | 1. Teaching Institution |
| Electrical engineering Department | | 2. University Department/Centre |
| **Computer I / EE102** | | 3. Course title/code |
| Full time | | 4. Modes of Attendance offered |
| 2020-2021 (annual) | | 5. Semester/Year |
| 60 | | 6. Number of hours tuition (total) |
| 2021 | | 7. Date of production/revision of this specification |
| 8. Aims of the Course | | |
| This course aims to teach students the main principles of the computer programming language and how a computer deals with it, as well as this course, gives a wide view of the purpose of using programming languages and allows students to solve complex algorithms by using a programming language. Also, this course will cover the advanced part of the programming language. | | |

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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1.  A2. |
| B. Subject-specific skills  B1.  B2.  B3. |
| Teaching and Learning Methods |
| 1.Face to Face Lectures.  2. Seminars  3. Group Exercises. |
| Assessment methods |
| A module assessment will have two components:  1.weekly Quizes 30% weight.  2. Final written Exam. 70% weight. |
| C. Thinking Skills  C1.  C2.  C3.  C4. |
| Teaching and Learning Methods |
| 1.Face to Face Lectures.  2. Seminars  3. Group Exercises. |
| Assessment methods |
| A module assessment will have two components:  1.weekly Quizes 30% weight.  2. Final written Exam. 70% weight. |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.  D2.  D3.  D4. |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Weekly Quizes and written final Exam | Face to face lecture | Introduction to programming languages |  | 2 | 1 |
| = | = | C++ Syntax, Output (Print Text),CommentsVariables, User Input |  | 2 | 2 |
| = | = | C++ Data Types, Operators, C++ Strings,Booleans |  | 2 | 3 |
| = | = | **Arithmetic Operators** |  | 2 | 4 |
| = | = | |  | | --- | | Assignment Operators | |  | 2 | 5 |
| = | = | Comparison Operators |  | 2 | 6 |
| = | = | Logical Operators |  | 2 | 7 |
| = | = | |  | | --- | | Conditions and If Statements | |  | 2 | 8 |
| = | = | Conditions and If Statements |  | 2 | 9 |
| = | = | While Loop,  For Loop, Break and Continue |  | 2 | 10 |
| = | = | While Loop,  For Loop, Break and Continue |  | 2 | 11 |
| = | = | Flow chart and operation |  | 2 | 12 |
| = | = | Flow chart and operation |  | 2 | 13 |
| = | = | 1st Midterm exam |  | 2 | 14 |
| = | = | Intrduction to windows |  | 2 | 15 |
| = | = | Windows operation system |  | 2 | 16 |
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| = | = | Windows operation system |  | 2 | 17 |
| = | = | Windows operation system |  | 2 | 18 |
| = | = | Arrays with operations |  | 2 | 19 |
| = | = | Arrays and Conditions and If Statements |  | 2 | 20 |
| = | = | Arrays and While Loop,  For Loop, Break and Continue |  | 2 | 21 |
| = | = | Arrays and Loops |  | 2 | 22 |
| = | = | Conditions and If Statements with Arrays |  | 2 | 23 |
| = | = | 2nd Midterm exam |  | 2 | 24 |
| = | = | |  | | --- | | C++ Pointers | | Get Memory Address and ValueModify the Pointer Value | |  | 2 | 25 |
| = | = | Object-Oriented Programming. |  | 2 | 26 |
| = | = | Classes and Objects |  | 2 | 27 |
| = | = | Class Methods |  | 2 | 28 |
| = | = | C++ Constructors |  | 2 | 29 |
| = | = | C++ Access Specifiers |  | 2 | 30 |

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| 11. Infrastructure | |
| * Stroustrop, Bjarne*. The C++ Programming Language.* 4th ed. Addison-Wesley Professional, 2013. ISBN: 9780321563842. * [Bjarne Stroustrop](http://www.stroustrup.com/) is the creator and eternal guru of C++; the 4th edition is very recently updated for C++11, so this is an excellent resource. * Meyers, Scott*. Effective C++: 55 Specefic Ways To Improve Your Programs And Designs.* Addison-Wesley Professional, 2005. ISBN: 9780321334879*.*[Preview with [Google Books](http://books.google.com/books?id=Qx5oyB49poYC&pg=PAfrontcover)] * ———*. More Effective C++: 35 New Ways To Improve Your Programs And Designs.* Addison-Wesley Professional, 1996. ISBN: 9780201633719. [Preview with [Google Books](http://books.google.com/books?id=azvE8V0c-mYC&pg=PAfrontcover)] * ———*. Effective STL: 50 Specific Ways to Improve Your Use of Standard Template Library*. Addison-Wesley Professional, 2001. ISBN: 9780201749625. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Using IDE (code Block) and implement a programming code as many as you can as well as using internet to get wide range of ideas | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Electrical Engineering Department | 2. University Department/Centre |
| **English Language (I) / GE103** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 (annual) | 5. Semester/Year |
| 30 | 6. Number of hours tuition (total) |
|  | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| The aim of this course is to empower students with the language and life skills they need to | |
| carry out their goals. To this end it provides ample opportunities for students to build | |
| awareness and practice language in real-life scenarios. The integrated skills approach of the | |
| course develops the student's self-confidence to survive and succeed in professional and | |
| social encounters within an English-speaking global community. | |
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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1. Understanding texts using effective learning strategies for reading and building vocabulary.  A2. Finding and understanding information about vocabulary, pronunciation, usage, and grammar in reference texts, online resources, and English language dictionaries.  A3. Demonstrating an appropriate level of control of grammatical accuracy and lexical appropriacy in written and oral communication. |
| B. Subject-specific skills  B1. Building sentences  B2. Writing composition  B3. Making an oral presentation |
| Teaching and Learning Methods |
| 1. Lectures  2. Exercises about the topics |
| Assessment methods |
| 1. Oral and written quizzes throughout the academic year 30%  2. Final written exam 70% |
| C. Thinking Skills  C1. The ability to form a personal opinions about issues through reading and listening  C2. The ability to discuss and defend an attitude in a clear organized way using sources through writing and speech |
| Teaching and Learning Methods |
| Lectures and discussions within the classroom |
| Assessment methods |
| Oral and written exams throughout the academic year in addition to the final written exam. |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Effective written and oral communication in English  D2. Team work |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Oral and written exams throughout the academic year in addition to the final written exam | lectures | Introduction to the course |  | 1 | 1 |
| = | = | Unit One: Hello (p.6) 1.Grammar[(am/are/is),(my/your),(This is…)] 2.Vocabulary[(How are you?), (What's this in English?), (Numbers1-10and plurals)]  3. Skills Work[Speaking] 4.Everyday English[Good Morning!...] |  |  | 2 |
| = | = | Parts of speech and Types of phrases |  |  | 3 |
| = | = | Types of clauses |  |  | 4 |
| = | = | Types of sentences |  |  | 5 |
| = | = | Unit Two: Your World (p.12)  1.Grammar[(he/she/  they, his/her), (Questions)] 2.Vocabulary[(Countries), (Adjectives), (Nouns)]  3. Skills Work[Reading and Speaking] 4.Everyday English[Numbers 11-30] |  |  | 6 |
| = | = | Unit Three: All about you (p.18)  1.Grammar[(am/is/  are), (Negatives), (Questions), (Short answers)] 2.Vocabulary[(Jobs),(Personal Information)]  3. . Skills Work[(Reading and Speaking), (Roleplay)] 4.Everyday English[Social expressions(1)] |  |  | 7 |
| = | = | Unit Four: Family and Friends (p.24)  1.Grammar  [(Possessive adjectives),(Possessive 's),(has/have), (Adjective+ noun) ] 2.Vocabulary[(The family),(Describing a friend)]  3. Skills Work[(Reading and Writing), (Listening)] 4.Everyday English[(The alphabet), (On the phone), (Saying email addresses)] |  |  | 8 |
| = | = | Exam (1) |  |  | 9 |
| = | = | Unit Five: The Way I live (p.32)  1.Grammar[(Present Simple I/you/we/they),(a and an), (Adjective +noun)] 2.Vocabulary[  (Sports/Food/Drink), (Adjectives), (Verbs), (Language and nationalities)]  3. Skills Work[(Listening), (Listening and speaking), (roleplay)] 4.Everyday English[How much is it?] |  |  | 10 |
| = | = | Unit Five: The Way I live (p.32)  1.Grammar[(Present Simple I/you/we/they),(a and an), (Adjective +noun)] 2.Vocabulary[  (Sports/Food/Drink), (Adjectives), (Verbs), (Language and nationalities)]  3. Skills Work[(Listening), (Listening and speaking), (roleplay)] 4.Everyday English[How much is it?] |  |  | 11 |
| = | = | Unit Six: Every day (p.40)  1.Grammar[(Present Simple he/she), (Questions and negatives), (Adverbs of frequency)] 2.Vocabulary[ (The time), (Verbs and nouns), (Verbs), (Nouns), (Words that go together)]  3. Skills Work[Speaking] 4.Everyday English[(Days of the week), (Prepositions of time)] |  |  | 12 |
| = | = | Unit Six: Every day (p.40)  1.Grammar[(Present Simple he/she), (Questions and negatives), (Adverbs of frequency)] 2.Vocabulary[ (The time), (Verbs and nouns), (Verbs), (Nouns), (Words that go together)]  3. Skills Work[Speaking] 4.Everyday English[(Days of the week), (Prepositions of time)] |  |  | 13 |
| = | = | Unit Seven: My favourites (p.48)  1.Grammar [(Question words), (Pronouns), this/that]  2.Vocabulary [(Adjectives), (Opposite adjectives),(Places)]  3. Skills Work[(Reading and Writing), (Roleplay)] 4.Everyday English[Can I…?] |  |  | 14 |
| = | = | Unit Seven: My favourites (p.48)  1.Grammar [(Question words), (Pronouns), this/that]  2.Vocabulary [(Adjectives), (Opposite adjectives),(Places)]  3. Skills Work[(Reading and Writing), (Roleplay)] 4.Everyday English[Can I…?] |  |  | 15 |
| = | = | **Mid-Year Break** |  |  | 16 |
|  |  | **Mid-Year Break** |  |  | 17 |
| = | = | Unit Eight: Where I live (p56)  1. Grammar  [(There is/are…),(Prepositions)]  2.Vocabulary [(Rooms and furniture),(In and out of town)]  3. Skills work ([Reading and vocabulary),(Listening and writing)]  4. Everyday English [Directions] |  |  | 18 |
| = | = | Unit Eight: Where I live (p56)  1. Grammar  [(There is/are…),(Prepositions)]  2.Vocabulary [(Rooms and furniture),(In and out of town)]  3. Skills work ([Reading and vocabulary),(Listening and writing)]  4. Everyday English [Directions] |  |  | 19 |
| = | = | Exam (2) |  |  | 20 |
| = | = | Unit Nine: Times past (p.64)  1. Grammar  [(was/were born), (Past Simple-irregular verbs)]  2.Vocabulary [(Saying years),(People and jobs), (Irregular verbs),(have,do,go)]  3. Skills work [(Listening and speaking), (Reading and speaking)]  4. Everyday English [When’s your birthday?] |  |  | 21 |
| = | = | Unit Nine: Times past (p.64)  1. Grammar  [(was/were born), (Past Simple-irregular verbs)]  2.Vocabulary [(Saying years),(People and jobs), (Irregular verbs),(have,do,go)]  3. Skills work [(Listening and speaking), (Reading and speaking)]  4. Everyday English [When’s your birthday?] |  |  | 22 |
| = | = | Unit Ten: We had a great time! (p.72)  1. Grammar  [(Past Simple-regular and irregular),( Questions), (Negatives), (ago) ]  2.Vocabulary [(Weekend activities),(Time expressions), (Sports and leisure), (play or go?), (Seasons)]  3. Skills work [(Speaking), (Listening and speaking), (Speaking and writing)]  4. Everyday English [(Making conversation), (showing interest), (Going sightseeing)] |  |  | 23 |
| = | = | Unit Ten: We had a great time! (p.72)  1. Grammar  [(Past Simple-regular and irregular),( Questions), (Negatives), (ago) ]  2.Vocabulary [(Weekend activities),(Time expressions), (Sports and leisure), (play or go?), (Seasons)]  3. Skills work [(Speaking), (Listening and speaking), (Speaking and writing)]  4. Everyday English [(Making conversation), (showing interest), (Going sightseeing)] |  |  | 24 |
| = | = | Unit Eleven: I can do that! (p.80)  1. Grammar  [(can/can’t), (Adverbs), (Requests and offers) ]  2.Vocabulary [(Verbs), (Verb+noun), (Adjective+noun), (Opposite adjectives)]  3. Skills work [Reading and listening]  4. Everyday English [Everyday problems] |  |  | 25 |
| = | = | Unit Eleven: I can do that! (p.80)  1. Grammar  [(can/can’t), (Adverbs), (Requests and offers) ]  2.Vocabulary [(Verbs), (Verb+noun), (Adjective+noun), (Opposite adjectives)]  3. Skills work [Reading and listening]  4. Everyday English [Everyday problems] |  |  | 26 |
| = | = | Unit Twelve: Please and thank you (p.88)  1. Grammar  ([I’d like…), (some and any),( like and would like)]  2.Vocabulary [(Shopping), (Food), (In a restaurant), (Roleplay)]  3. Skills work [(Listening), (Reading and speaking)]  4. Everyday English [(Roleplay), (signs all around)] |  |  | 27 |
| = | = | Unit Twelve: Please and thank you (p.88)  1. Grammar  ([I’d like…), (some and any),( like and would like)]  2.Vocabulary [(Shopping), (Food), (In a restaurant), (Roleplay)]  3. Skills work [(Listening), (Reading and speaking)]  4. Everyday English [(Roleplay), (signs all around)] |  |  | 28 |
| = | = | Unit Thirteen: Here and now (p.96)  1. Grammar  [(Present Continuous), (Present Simple and Present Continuous)]  2.Vocabulary [(Colours), (Clothes), (Opposite verbs)]  3. Skills work [Reading and listening]  4. Everyday English [What’s the matter] |  |  | 29 |
| = | = | Unit Thirteen: Here and now (p.96)  1. Grammar  [(Present Continuous), (Present Simple and Present Continuous)]  2.Vocabulary [(Colours), (Clothes), (Opposite verbs)]  3. Skills work [Reading and listening]  4. Everyday English [What’s the matter] |  |  | 30 |
| = | = | Unit Fourteen: It’s time to go! (p.104)  1. Grammar  [(Future plans), (Revision)]  2.Vocabulary [ (Transport), (Revision)]  3. Skills work [(Reading and speaking), (A mini autobiography)]  4. Everyday English [Social expressions (2)] |  |  | 31 |
|  |  | Unit Fourteen: It’s time to go! (p.104)  1. Grammar  [(Future plans), (Revision)]  2.Vocabulary [ (Transport), (Revision)]  3. Skills work [(Reading and speaking), (A mini autobiography)]  4. Everyday English [Social expressions (2)] |  |  | 32 |

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| 11. Infrastructure | |
| 1. New Headway Plus [Beginner] by John and Liz Soars, Oxford: Oxford University Press (2010), 2. Internet links and videos related to the topics discussed in the lectures. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Electrical engineering Department | 2. University Department/Centre |
| **Electronic Physics / EE108** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 | 5. Semester/Year |
| 120 | 6. Number of hours tuition (total) |
| 20-1-2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| 1. To understand the physical operation of electronic devices, particulary silicon based devices. | |
| 1. To use electronic devices effectively in the design of circuits | |
| 1. To be able to do device characterization and modeling | |
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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1. Understanding the physical properties and working principles of electronic devices  A2. Applications of electronic devices across various domains |
| B. Subject-specific skills  B1.  B2.  B3. |
| Teaching and Learning Methods |
| * Lectuers * Homework * Discussions |
| Assessment methods |
| * Sessional exams (60 minutes) + Quizes (15 minutes) [weight: 30% of the overall grade] * Final exam (3 hours - written) [weight: 70% of the overall grade] |
| C. Thinking Skills  C1.  C2.  C3.  C4. |
| Teaching and Learning Methods |
| Exams |
| Assessment methods |
| Grades achieved in homework, sessional exams, quizzes, and final exam |

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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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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Quizes + Sessional exams | Online Lectures | Course Introduction: Syllabus, Policy, Semiconductor History. |  | 4 | 1 |
| = | = | Atomic structure and bonding theory |  | 4 | 2 |
| = | = | Atomic structure and bonding theory |  | 4 | 3 |
| = | = | Atomic structure and bonding theory |  | 4 | 4 |
| = | = | PN Junction |  | 4 | 5 |
| = | = | PN junction (open circuit) |  | 4 | 6 |
| = | = | PN junction with an applied voltage |  | 4 | 7 |
| = | = | Capacitive effects in PN junction |  | 4 | 8 |
| = | = | Diodes – The ideal diode |  | 4 | 9 |
| = | = | Diodes – Terminal characteristics of junction diodes |  | 4 | 10 |
| = | = | Diodes – Modeling the diode forward characteristics |  | 4 | 11 |
| = | = | Diodes – Operating in the reverse breakdown region – Zener diode + Voltage regulation and ripple factor |  | 4 | 12 |
| = | = | Diodes – Rectifier circuits |  | 4 | 13 |
| = | = | The harmonic components in rectifier circuits |  | 4 | 14 |
| = | = | Capacitive filters + Inductive filters |  | 4 | 15 |
| = | = | π-section filters + L-section filters |  | 4 | 16 |
|  |  | **Half – year break** |  |  |  |
| = | = | BJT – Device structure and physical operation |  | 4 | 17 |
| = | = | BJT – Device structure and physical operation |  | 4 | 18 |
| = | = | BJT – Current-voltage characteristics |  | 4 | 19 |
| = | = | BJT – Circuits at DC |  | 4 | 20 |
| = | = | BJT – Applying the BJT in amplifier design |  | 4 | 21 |
| = | = | BJT – Applying the BJT in amplifier design |  | 4 | 22 |
| = | = | BJT – Applying the BJT in amplifier design |  | 4 | 23 |
| = | = | MOS – Device structure and physical operation |  | 4 | 24 |
| = | = | MOS – Current-voltage characteristics |  | 4 | 25 |
| = | = | MOS – MOSFET circuit at DC |  | 4 | 26 |
| = | = | MOS – Applying the MOSFET in amplifier design |  | 4 | 27 |
| = | = | Other devices – Light emitting diode + Other devices – Solar cells |  | 4 | 28 |
| = | = | Other devices – Laser diode |  | 4 | 29 |
| = | = | Other devices – SCR + Other devices – Thyristor |  | 4 | 30 |
|  |  | Electron ballistics |  |  |  |
|  |  | Electron ballistics |  |  |  |

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| 11. Infrastructure | |
| Textbook:  Sedra, Adel S. and Kenneth C. Smith, “*Microelectronic circuits”*, New York: Oxford University Press | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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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| University Of Baghdad | 1. Teaching Institution |
| College of Engineering/Electrical Engineering Department | 2. University Department/Centre |
| **Digital Techniques** | 3. Course title/code & Description |
| Full time attendance | 4. Modes of Attendance offered |
| 2020-2021 (annual) | 5. Semester/Year |
| Semester ( 1 ) 45 hours  Semester ( 2 ) 30 hours + 30 hours Partially | 6. Number of hours tuition (total) |
| 2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| Digital techniques is essential to understanding the design and working of a wide range of applications, from consumer and industrial electronics to communications; from embedded systems, and computers to security and military equipment. As the devices used in these applications decrease in size and employ more complex technology, it is essential for engineers and students to fully understand both the fundamentals and also the implementation and application principles of digital electronics. | |

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| 9· Learning Outcomes, teaching, learning and assessment methods |
| 1. Common number systems (Binary, Octal, Decimal & Hexadecimal) & numbers base conversion. 2. Knowledge and understanding with skills:  * Sign magnitude binary representation & complements of numbers * Arithmetic operations in Binary, BCD, Octal, and Hexadecimal systems * Binary codes (BCD, Excess-3, Gray, etc.), Error Detecting & Correcting codes  1. Logic gates & universal building blocks    * Fundamentals of Boolean algebra    * Minterms & Maxterms in Boolean S.O.P. AND P.O.S. Expressions    * Karnaugh maps (2, 3, 4 & 5 variables) & Don't care conditions    * Quine McClusky method  * Arithmetic circuits (adders, subtractors, BCD adder & carry look-ahead adder) * Design of Parity Generators / Checkers * Design & Applications of Encoders and Decoders * Design & Applications of Multiplexers & De-multiplexers * Design of Digital Comparators * Design of some common logic circuits  1. Introduction to Sequential Logic Circuits  * SR Flip Flops * D, JK, and T Flip Flops * Flip Flop Triggering, Edge – Triggered Flip Flops * Master / Slave Flip Flops * Conversion from One Type of Flip Flop to Another * Analysis of Asynchronous Counters * Design of Asynchronous Counters * Analysis of Synchronous Counters * Design of Synchronous Counters * Up / Down Counters; Shift Registers * Common Types of Counters (Ring Counters, Johnson Counters, etc.) * Ring Oscillator |
| Teaching and Learning Methods |
| Lecturing and Class discussions. |
| Assessment Methods  Exams, quizzes, Homework. |

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| 10. Course Structure | | | | | |
|  | Assessment Method | Teaching Method | Unit/Module or topic Title | Hours | Week |
|  | Exam | Lecturing Discussions and Exercises | Common number systems (Binary, Octal, Decimal & Hexadecimal) & numbers base conversion | 3 | 1 |
|  | Exam | Lecturing Discussions and Exercises | Sign magnitude binary representation & complements of numbers | 3 | 2 |
|  | Exam | Lecturing Discussions and Exercises | Arithmetic operations in Binary, BCD, Octal, and Hexadecimal systems | 3 | 3 |
|  | Exam | Lecturing Discussions and Exercises | Binary codes (BCD, Excess-3, Gray, etc.), Error Detecting & Correcting codes | 3 | 4 |
|  | Exam | Lecturing Discussions and Exercises | Logic gates & universal building blocks | 3 | 5 |
|  | Exam | Lecturing Discussions and Exercises | Fundamentals of Boolean algebra | 3 | 6 |
|  | Exam | Lecturing Discussions and Exercises | Minterms & Maxterms in Boolean S.O.P. AND P.O.S. Expressions | 3 | 7 |
|  | Exam | Lecturing Discussions and Exercises | Karnaugh maps (2, 3, 4 & 5 variables) & Don't care conditions | 3 | 8 |
|  | Exam | Lecturing Discussions and Exercises | Quine McClusky method | 3 | 9 |
|  | Exam | Lecturing Discussions and Exercises | Arithmetic circuits (adders, subtractors, BCD adder & carry look-ahead adder) | 3 | 10 |
|  | Exam | Lecturing Discussions and Exercises | Design of Parity Generators / Checkers | 3 | 11 |
|  | Exam | Lecturing Discussions and Exercises | Design & Applications of Encoders and Decoders | 3 | 12 |
|  | Exam | Lecturing Discussions and Exercises | Design & Applications of Multiplexers & De-multiplexers | 3 | 13 |
|  | Exam | Lecturing Discussions and Exercises | Design of Digital Comparators | 3 | 14 |
|  | Exam | Lecturing Discussions and Exercises | Design of some common logic circuits | 3 | 15 |
|  | Exam | Lecturing Discussions and Exercises | Introduction to Sequential Logic Circuits | 2 | 16 |
|  | Exam | Lecturing Discussions and Exercises | SR Flip Flops | 2 | 17 |
|  | Exam | Lecturing Discussions and Exercises | D, JK, and T Flip Flops | 2 | 18 |
|  | Exam | Lecturing Discussions and Exercises | Flip Flop Triggering, Edge – Triggered Flip Flops | 2 | 19 |
|  | Exam | Lecturing Discussions and Exercises | Master / Slave Flip Flops | 2 | 20 |
|  | Exam | Lecturing Discussions and Exercises | Conversion from One Type of Flip Flop to Another | 2 | 21 |
|  | Exam | Lecturing Discussions and Exercises | Analysis of Asynchronous Counters | 2 | 22 |
|  | Exam | Lecturing Discussions and Exercises | Design of Asynchronous Counters | 2 | 23 |
|  | Exam | Lecturing Discussions and Exercises | Analysis of Synchronous Counters | 2 | 24 |
|  | Exam | Lecturing Discussions and Exercises | Design of Synchronous Counters | 2 | 25 |
|  | Exam | Lecturing Discussions and Exercises | Up / Down Counters | 2 | 26 |
|  | Exam | Lecturing Discussions and Exercises | Shift Registers | 2 | 27 |
|  | Exam | Lecturing Discussions and Exercises | Common Types of Counters (Ring Counters, Johnson Counters, etc.) | 2 | 28 |
|  | Exam | Lecturing Discussions and Exercises | Ring Oscillators | 2 | 29 |
|  | Exam | Lecturing Discussions and Exercises | Some Applications of Sequential Logic Circuits | 2 | 30 |

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| 11. Infrastructure | |
| M. MORRIS MANO / MICHAEL D. CILETTI “DIGITAL DESIGN “4th Edition 2007 | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet web sites, Digital Techniques | 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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| 12. The development of the curriculum plan |
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**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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| 1. Teaching Institution | Collage of Engineering, University of Baghdad |
| 2. University Department/Centre | Department of Electrical Engineering |
| 3. Course title/code | **Fundamentals of electrical engineering**  **EE107** |
| 4. Modes of Attendance offered | Full time attendance |
| 5. Semester/Year | 2020-2021 (annual) |
| 6. Number of hours tuition (total) | 120 |
| 7. Date of production/revision of this  specification | February, 2021 |
| 8. Aims of the Course | |
| 1. The course is designed for university students and to give them a detailed knowledge about electrical circuits that might be supplied fron DC sources or AC sources. 2. Some special cases where dependant sources might occure in advanced electrical equipment are also tought to students. 3. The course is designed for 30 weeks. 4 hours a week, three of material various content whereas the forth hour is focused on solving tutorials at various aspects of the course. 4. After finishing the course, students will be able analyise different electrical cirucits with widebroad of applied theorems to circuits inclusing basic component as resistors, inductors and capacitors. | |
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| 9- Learning outcomes, Teaching, Learning and Assessment methods |
| A- Cognitive goals . A1.  A2. A3. A4. A5.  A6 . |
| B. The skills goals special to the course. B1.  B2.  B3. |
| Teaching and Learning Methods |
| 1. Lecturing (on-line). 2. Discussions during lecturing with storm minding questions. 3. Tutorials, homeworks and assignments. |
| Assessment methods |
| 1. Short tests (quizzes). 2. Long tests ( semesters + finals). |
| C. Affective and value goals  C1. C2. C3.  C4. |
| Teaching and Learning Methods |
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| Assessment methods |
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| D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)  D1.  D2.  D3.  D4. |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching Method | Unit/Module or  Topic Title | ILOs | Hours | Week |
| Quiz | Pdf, videos and online lecturing | Introducing the SI units. And resistance- resistivity |  | 4 | 1 |
| = | = | Temperature coefficients of resitance. |  | 4 | 2 |
| = | = | Series and parallel connections. |  | 4 | 3 |
| = | = | Star / delta & delta/star transformation. |  | 4 | 4 |
| = | = | Ohm's law |  | 4 | 5 |
| = | = | Kirchhoff's law |  | 4 | 6 |
| = | = | D.C. networks theorems for dependent & independent source Substitution & reciprocity theorems. |  | 4 | 7 |
| = | = | Thevenin theorem |  | 4 | 8 |
| = | = | Norton theorem |  | 4 | 9 |
| = | = | Superposition theorem |  | 4 | 10 |
| = | = | Maximum power transfer |  | 4 | 11 |
| = | = | Spring Break |  | 4 | 12 |
| = | = | Spring Break |  | 4 | 13 |
| = | = | Self and mutual inductance in D.C. circuits. |  | 4 | 14 |
| = | = | Basic electrostatics – capacitors in D.C. circuits. |  | 4 | 15 |
| = | = | Alternating voltage and current. |  | 4 | 16 |
| = | = | Single phase circuits |  | 4 | 17 |
| = | = | Complex notations & phasor diagram |  | 4 | 18 |
| = | = | Network theorems for dependent &indent. Source |  | 4 | 19 |
| = | = | Thevenin theorem |  | 4 | 20 |
| = | = | Norton theorem |  | 4 | 21 |
| = | = | Superposition theorem |  | 4 | 22 |
| = | = | Power calculations |  | 4 | 23 |
| = | = | Power factor corrections |  | 4 | 24 |
| = | = | Resonance circuits |  | 4 | 25 |
| = | = | Passive filters |  | 4 | 26 |
| = | = | Magnetic circuits |  | 4 | 27 |
| = | = | Hysteresis &eddy current losses. |  | 4 | 28 |
| = | = | Basic electromagnetic –self inductance. |  | 4 | 29 |
| = | = | Mutual inductance. |  | 4 | 30 |

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| 11. Infrastructure | |
| 1. Books Required reading: | The book we used to teach fundamentals of Electrical circuits to first year students in the Electrical Engineering Department is *Fundamentals of Electric Circuits* by Charles K. Alexander & Mathew N.O. Sadiku (third edition). |
| 2. Main references (sources) | 1- Electric Circuits (8th Edition) by James W. Nilson.  2- Introductory Circuit Analysis by Boylestad, 3- Electrical Technology by Hughes.  4- Introductions to Electric Circuits (6th Edition) by R.C. Dorf & J. A. Svoboda |
| A- Recommended books and references (scientific journals, reports…). | * Available websites related to the subject. * Extracurricular activities. |
| B-Electronic references, Internet  sites… |  |

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| 12. The development of the curriculum plan |
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**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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| College of Engineering, Baghdad University | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Mathematics I / GE101** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 Annual | 5. Semester/Year |
| 120 | 6. Number of hours tuition (total) |
| February, 2021 | 7. Date of production/revision of this specification |
| 8.Aims of the Course | |
| Build strong electrical engineers with powerful mathematic tools serving to solve problems in Math, Electronics, Power and all other engineering courses. | |
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| 9· Learning Outcomes, Teaching ,Learning and Assessment Method |
| 1. Knowledge and Understanding   A1. Understanding academic texts and try to solve the problems in the end of each chapter.  A2. Learn how to reflect the theoretical functions and definitions to practical applications.  A3. Finding and understanding information about mathematics problems and theoties. |
| B. Subject-specific skills  B1. Solving some specific problems with different ideas related to the subject courses.  B2. Explore the web pages that concerned on Math.  B3. Manipulating some powerful software like Maple and Microsoft Math in order to solve some integrals and graph delicate polar functions.  B4. Making an oral presentation |
| Teaching and Learning Methods |
| Lecturing and Exercises and Homework. |
| Assessment methods |
| Exams |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through attempting to solve different mathematic problems. |
| Teaching and Learning Methods |
| Lecturing & Class discussions |
| Assessment methods |
| Exams that involve problem-solving skills and critical thinking skills |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Effective communication to understand and imagine the idea behind the problem want to be solved.  D2. Team work |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exam | Lecturing, Discussions & Exercises | Determinant |  | 4 | 1 |
| Exam | Lecturing, Discussions & Exercises | Matrices |  | 4 | 2 |
| Exam | Lecturing, Discussions & Exercises | **Transcendental functions:**  **Inverse Functions**  **Natural logarithm** |  | 4 | 3 |
| Exam | Lecturing, Discussions & Exercises | **General Form: ax & loga x**  **Growth and Decay Functions** |  | 4 | 4 |
| Exam | Lecturing, Discussions & Exercises | **Growth Rates Functions**  **Trigonometric Functions and Its Inverses** |  | 4 | 5 |
| Exam | Lecturing, Discussions & Exercises | **Hyperbolic Functions and its Inverses.** |  | 4 | 6 |
|  |  | New Year Holiday |  |  | 7 |
|  |  | Exam (1) |  | 2 | 8 |
| Exam | Lecturing, Discussions & Exercises | Techniques of Integration |  | 2 | 9 |
| Exam | Lecturing, Discussions & Exercises | Integration Laws |  | 4 | 10 |
| Exam | Lecturing, Discussions & Exercises | Improper fraction technique |  | 4 | 11 |
| Exam | Lecturing, Discussions & Exercises | Trigonometric techniques. |  | 4 | 12 |
| Exam | Lecturing, Discussions & Exercises | Hyperbolic function techniques |  | 4 | 13 |
|  |  | Mid-Year Break |  |  | 14 |
|  |  | Exam (2) |  | 2 | 15 |
| Exam | Lecturing, Discussions & Exercises | Integral with special cases |  | 2 | 16 |
| Exam | Lecturing, Discussions & Exercises | Improper Integral type I and type II |  | 4 | 17 |
| Exam | Lecturing, Discussions & Exercises | Further Application of Integration |  | 4 | 18 |
| Exam | Lecturing, Discussions & Exercises | Conic sections |  | 4 | 19 |
|  |  | Exam (3) |  | 2 | 20 |
| Exam | Lecturing, Discussions & Exercises | Polar functions |  | 2 | 21 |
| Exam | Lecturing, Discussions & Exercises | Polar functions and Cartesian coordinates |  | 4 | 22 |
| Exam | Lecturing, Discussions & Exercises | Graphing Polar functions |  | 4 | 23 |
| Exam | Lecturing, Discussions & Exercises | Area and Length in Polar function |  | 4 | 24 |
| Exam | Lecturing, Discussions & Exercises | Surfaces and quadrature in Space |  | 4 | 25 |
|  |  | Exam (4) |  | 2 | 26 |
|  |  | Vectors in space |  | 2 | 27 |
| Exam | Lecturing, Discussions & Exercises | Dot Product and  Cross product |  | 4 | 28 |
| Exam | Lecturing, Discussions & Exercises | Lines and Planes in Space |  | 4 | 29 |
| Exam | Lecturing, Discussions & Exercises | Vector Valued Functions and Motion in space |  | 4 | 30 |
|  |  | T, N, B vectors |  | 4 | 31 |
|  |  | Final Exam |  | 3 | 32 |

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| 11. Infrastructure | |
| 1. Thomas - Calculus Including 2nd Order Differential Equations (Addison-Wesley, 11th edition, 2005). 2. Stroud - Engineering Mathematics 5th edition. | 1. Books Required reading: |
| Lecture notes | 2. Main references (sources) |
| None. | A- Recommended books and references (scientific journals, reports…). |
| Internet links related to the topics discussed in the book and class. | B-Electronic references, Internet  sites… |

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| 12. The development of the curriculum plan |
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**COURSE SPECIFICATION – Year Two**

**COURSE SPECIFICATION**

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| Baghdad University | 1. Teaching Institution |
| College of Engineering/Department of Electrical Engineering | 2. University Department/Centre |
| **Electrical Machines I / EE203** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 (annual) | 5. Semester/Year |
| 90 | 6. Number of hours tuition (total) |
| 2020-2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| The aim of this course is to introduce the basic theory of dc machine and transformers, learn the construction of dc machine, and enhance the students’ skills for the principles of commutation and armature reaction. Then they learn various types of dc machines including characteristics. | |

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| 9· Learning Outcomes |
| 1. Knowledge and Understanding   A1. Learning the construction of a dc machine  A2. Understanding the armature reaction and commutation.  A3. Understanding the analysis of the transformers.  A4. Explaining the losses in Transformers. |
| B. Subject-specific skills  B1. Analyzing the types of armature winding, Lap and wave windings function  B2.presenting the types of DC Motors and Generators  B3. Illustrate the types of D.C. motors, power equation,  B4. Studying the speed control of dc motors  B5. Demonstrating the Transformer, types, and presenting the equivalent circuit of a transformer  B6. Studying the Transformer efficiency and regulation |
| C. Thinking Skills  C1. Getting a knowledge to analysis the dc machines  C2 be able to work in practical with machines and transformers |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Design and implement a dc machine  D2. Increase ability in discussion and cooperate |
| Teaching and Learning Methods  Lecturing & Class discussions  Assessment methods |
| Exams, quizzes |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week | |
| Exam | Lecturing, Discussions & Exercises | Introduction of Machinery Principles, Construction of a dc machine, yoke, poles, armature, brushes, brush gear, bearings | A+B | 3 | 1 | |
| Exam | Lecturing, Discussions & Exercises | Coil pitch and distributed windings | A+B+C+D | 3 | 2 | |
| Exam | Lecturing, Discussions & Exercises | Introduction to transformer principle, Phasor diagram of the transformer | A+B+C+D | 3 | 3 | |
| Exam | Lecturing, Discussions & Exercises | Types of armature winding, Lap windings | A+B+C+D | 3 | 4 | |
| Exam | Lecturing, Discussions & Exercises | Wave windings, comparison of Lap and wave type winding | A+B+C+D | 3 | 5 | |
| Exam | Lecturing, Discussions & Exercises | Multiplex windings | A+B+C+D | 3 | 6 | |
| Exam, quiz | Lecturing, Discussions & Exercises |  | A+B+C+D | 3 | 7 | |
| Exam | Lecturing, Discussions & Exercises | The E.M.F equation of a d.c machine | A+B+C+D | 3 | 8 | |
| Exam | Lecturing, Discussions & Exercises | Winding topologies, single and double layer winding | A+B+C+D | 3 | 9 | |
| Exam | Lecturing, Discussions & Exercises | Armature reaction | A+B+C+D | 3 | 10 | |
| Exam | Lecturing, Discussions & Exercises | Commutation | A+B+C+D | 3 | 11 | |
| Exam | Lecturing, Discussions & Exercises | DC Machinery Fundamentals | A+B+C+D | 3 | 12 | |
| Exam | Lecturing, Discussions & Exercises |  | A+B+C+D | 3 | 13 | |
| Exam | Lecturing, Discussions & Exercises | The per-unit system of measurements | A+B+C+D | 3 | 14 | |
| Exam | Lecturing, Discussions & Exercises | DC Motors and Generators ,Self-excited dc generators | A+B+C+D | 3 | 15 | |
| Exam | Lecturing, Discussions & Exercises | Shunt generator , Series generator | A+B+C+D | 3 | 16 | |
| Exam | Lecturing, Discussions & Exercises | Compound generator | A+B+C+D | 3 | 17 | |
| Exam | Lecturing, Discussions & Exercises | Speed control of dc series motor, shunt motor, compound motor | A+B+C+D | 3 | 18 | |
| Exam | Lecturing, Discussions & Exercises | Voltage building in self-excited dc generator | A+B+C+D | 3 | 19 | |
| Exam | Lecturing, Discussions & Exercises | D.C. motors, power equation, Torque equation | A+B+C+D | 3 | 20 | |
| Exam | Lecturing, Discussions & Exercises | Types of DC motor | A+B+C+D | 3 | 21 | |
| Exam | Lecturing, Discussions & Exercises | Three phase transformers | A+B+C+D | 3 | 22 | |
| Exam | Lecturing, Discussions & Exercises | Transformer efficiency | A+B+C+D | 3 | 23 | |
| Exam | Lecturing, Discussions & Exercises | Tutorials on dc machines | A+B+C+D | 3 | 24 | |
| Exam | Lecturing, Discussions & Exercises | Three phase Transformer connections | A+B+C+D | 3 | 25 | |
| Exam | Lecturing, Discussions & Exercises | Three phase transformation using two transformers, open delta connection, open wye-open delta connection, Scott connection, three phase transformer | A+B+C+D | 3 | 26 | |
| Exam | Lecturing, Discussions & Exercises | DC series motor, dc compound motor | A+B+C+D | 3 | 27 | |
| Exam | Lecturing, Discussions & Exercises | Losses of transformer | A+B+C+D | 3 | 28 | |
|  | Transformer, types, and construction of transformer | Rounding up | A+B+C+D | 3 | 29 | |
|  |  | Final Exam |  | 3 | 30 | |

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| 11. Infrastructure | |
| Two text books : A. Draper, “Electrical Machines” , 2nd edition, Longman, 1979.  Stephen J. Chapman, “Electric Machinery Fundamentals”, 4th edition,Mc Graw Hill, 2005. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet websites, seminars | 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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| 12. The development of the curriculum plan |
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**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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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Electromagnetic Fields / EE205** | 3. Course title/code |
| BSc in Electrical Engineering | 4. Program (s) to which it contributes |
| Full time | 5. Modes of Attendance offered |
| 2020-2021 | 6. Semester/Year |
| 90 | 7. Number of hours tuition (total) |
| 18-01-2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aim of this course is to reach a student who has the ability to understand and analyze the principles of electromagnetic fields, as well as the ability to solve the problems related to them. In addition to developing his ability to think on his own to reach solutions related to designs of electromagnetic fields. | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1. Understanding the principles of electric fields.  A2. Understanding the principles of magnetic fields.  A3. Using Maxwell’s equations. |
| B. Subject-specific skills  B1.Engineering drawing and imagining the dimensions of the electromagnetic problem.  B2.Solving integral and differential equations. |
| Teaching and Learning Methods |
| 1. Face to face lectures. 2. Online learning. 3. Problem solving. |
| Assessment methods |
| 1. One quiz per each chapter.(Total average 30%). 2. Final exam (70%). |
| C. Thinking Skills  C1.  C2.  C3.  C4. |
| Teaching and Learning Methods |
| Lectures and online learning. |
| 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 |
| One quiz per each chapter + Final exam | Face-to-face lectures + Online learning | Introducing syllabus and introducing Chapter 1 (vector analysis) |  | 3 | 1 |
| = | = | Cylindrical and spherical coordinate systems + Problems |  | = | 2 |
| = | = | Coulomb’s law and electric field intensity |  | = | 3 |
| = | = | Infinite line charge to the end of Ch.2 |  | = | 4 |
| = | = | Ch2 problems |  | = | 5 |
| = | = | Electric flux density |  | = | 6 |
| = | = | Gauss’s law and divergence |  | = | 7 |
| = | = | First Maxwell’s equations and CH3 problems |  | = | 8 |
| = | = | Energy and potential |  | = | 9 |
| = | = | Potential gradient and energy of static fields |  | = | 10 |
| = | = | Dipole principles and CH4 problems |  | = | 11 |
| = | = | Conductors and dielectrics |  | = | 12 |
| = | = | Conductor properties and boundary conditions |  | = | 13 |
| = | = | Theory of images |  | = | 14 |
| = | = | Boundary conditions for dielectrics |  | = | 15 |
|  |  | Capacitances and CH5 problems |  | = | 16 |
| = | = | **Half – year break** |  | = |  |
| = | = | Poisson’s and Laplace’s equations |  | = | 17 |
| = | = | Examples on Possion’s and Laplace’s equations and solving CH6 problems |  | = | 18 |
| = | = | Magnetostatic fields (CH7) |  | = | 19 |
| = | = | Stoke’s theory and magnetic flux density |  | = | 20 |
| = | = | Derivations of magnetic flux density |  | = | 21 |
| = | = | CH7 problems |  | = | 22 |
| = | = | Mangetic forces |  | = | 23 |
| = | = | Nature of magnetic materials |  | = | 24 |
| = | = | Forces and torques in closed circuits |  | = | 25 |
| = | = | Potential energy and forces in magnetic materials |  | = | 26 |
| = | = | CH8 problems |  | = | 27 |
| = | = | Time-varying fields and Faraday’s law (CH9) |  | = | 28 |
| = | = | Point form of Maxwell’s equations |  | = | 29 |
| = | = | Integral form of Maxwell’s equations |  | = | 30 |
|  |  | Displacement current |  |  | 31 |
|  |  | CH9 problems |  |  | 32 |

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| 11. Infrastructure | |
| 1. Lectrues. 2. The following books 3. Engineering electromagnetics by Hayt. 4. Electromagnetic field theory by Bakshi. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| COMSOL, CST,  [www.wolframalpha.com](http://www.wolframalpha.com)  photomath android app | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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 program specification. |

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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Electrical engineering Department | 2. University Department/Centre |
| **Electronics I / EE206** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 (annual) | 5. Semester/Year |
| 90 | 6. Number of hours tuition (total) |
| Jan. 2021 | 7. Date of production/ revision of this specification |
| 8. Aims of the Course | |
| Build strong electrical engineers able to design electronic amplifier circuits with suitable DC biasing. Solve delicate problems in CMOS and BJT transistors configuration networks. In addition to multistage transistors such as cascade, cascode, current mirrors and Darlington pairs amplifiers. Furthermore, power amplifiers, class A, B, AB and class C are designed and studied. | |

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| 10· Learning Outcomes, Teaching, Learning and Assessment Method |
| 1. Knowledge and Understanding   A1. Understanding academic texts and try to solve the problems in the end of each chapter.  A2. Learn how to reflect the theoretical functions and definitions to practical applications.  A3. Finding and understanding information about electronic problems and theories. |
| B. Subject-specific skills  B1. Solving some specific problems with different ideas related to the subject courses.  B2. Explore the web pages that concerned on Electronic circuits.  B3. Manipulating some powerful software like Multisim in order to solve some delicate problems in electronic circuits.  B4. Making an oral presentation and seminars. |
| Teaching and Learning Methods |
| 1. Lecturing and Exercises and Homework. 2. PDFs, YOUTUBE, GOOGLE MEET, GOOGLE CLASSROOM and GOOGLE FORM. |
| Assessment methods |
| Exams |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through attempting to solve different problems. |
| Teaching and Learning Methods |
| Lecturing & Class discussions |
| Assessment methods |
| Exams that involve problem-solving skills and critical thinking skills |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Effective Electronic Circuits to understand and imagine the idea behind the problem want to be solved.  D2. Team work |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exam | Lecturing, Discussions & Exercises | MOSFET, Device Structure and Physical  Operation |  | 3 | 1 |
| Exam | Lecturing, Discussions & Exercises | Current-Voltage Characteristics, MOSFET Circuits at DC |  | 3 | 2 |
| Exam | Lecturing, Discussions & Exercises | Applying the MOSFET in Amplifier Design, Small-Signal Operation and Models |  | 3 | 3 |
| Exam | Lecturing, Discussions & Exercises | Basic MOSFET Amplifier Configurations. |  | 3 | 4 |
| Exam | Lecturing, Discussions & Exercises | Biasing in MOS Amplifier Circuits |  | 3 | 5 |
| Exam | Lecturing, Discussions & Exercises | Discrete-Circuit MOS Amplifiers, The Body Effect and Other Topics |  | 3 | 6 |
|  |  | New Year Holiday |  |  | 7 |
|  |  | Exam (1) |  | 1 | 8 |
| Exam | Lecturing, Discussions & Exercises | BJT,  Device Structure and Physical Operation, |  | 2 | 9 |
| Exam | Lecturing, Discussions & Exercises | Current–Voltage Characteristics, BJT Circuits at DC |  | 3 | 10 |
| Exam | Lecturing, Discussions & Exercises | Applying the BJT in Amplifier, Design  Small-Signal Operation and  Models |  | 3 | 11 |
| Exam | Lecturing, Discussions & Exercises | Basic BJT Amplifier  Configurations |  | 3 | 12 |
| Exam | Lecturing, Discussions & Exercises | Biasing in BJT Amplifier  Circuits |  | 3 | 13 |
|  |  | Mid-Year Break |  |  | 14 |
|  |  | Exam (2) |  | 1 | 15 |
| Exam | Lecturing, Discussions & Exercises | Discrete-Circuit BJT Amplifiers, Transistor Breakdown and Temperature Effects |  | 2 | 16 |
| Exam | Lecturing, Discussions & Exercises | Building Blocks of  Integrated-Circuit  Amplifiers, Introduction, IC Design Philosophy The Basic Gain Cell |  | 3 | 17 |
| Exam | Lecturing, Discussions & Exercises | The Cascode Amplifier |  | 3 | 18 |
| Exam | Lecturing, Discussions & Exercises | IC Biasing—Current Sources, Current  Mirrors, and Current-Steering Circuits |  | 3 | 19 |
|  |  | Exam (3) |  | 1 | 20 |
| Exam | Lecturing, Discussions & Exercises | Current-Mirror Circuits with Improved  Performance |  | 2 | 21 |
| Exam | Lecturing, Discussions & Exercises | Some Useful Transistor Pairings |  | 3 | 22 |
| Exam | Lecturing, Discussions & Exercises | Output Stages and  Power Amplifiers, Classification of Output Stages, Class A Output Stage |  | 3 | 23 |
| Exam | Lecturing, Discussions & Exercises | Class B Output Stage |  | 3 | 24 |
| Exam | Lecturing, Discussions & Exercises | Class AB Output Stage |  | 3 | 25 |
|  |  | Exam (4) |  | 1 | 26 |
|  |  | Biasing the Class AB Circuit |  | 2 | 27 |
| Exam | Lecturing, Discussions & Exercises | CMOS Class AB Output Stages |  | 3 | 28 |
| Exam | Lecturing, Discussions & Exercises | Power BJTs |  | 3 | 30 |
| Exam | Lecturing, Discussions & Exercises | Variations on the Class AB  Configuration |  | 3 | 31 |
|  |  | IC Power Amplifiers  MOS Power Transistors |  | 3 | 32 |
|  |  | Final Exam |  | 3 | 33 |

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| 11. Infrastructure | |
| 1. [Adel S. Sedra](https://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Adel+S.+Sedra&search-alias=books&field-author=Adel+S.+Sedra&sort=relevancerank) and [Kenneth C. Smith](https://www.amazon.com/s/ref=dp_byline_sr_book_2?ie=UTF8&text=Kenneth+C.+Smith&search-alias=books&field-author=Kenneth+C.+Smith&sort=relevancerank), Microelectronic Circuits (Oxford University Press, 1987) 6th Edition. 2. Behzad Razavi, Fundamentals of Microelectronics, Wiley 2014, Second Edition. 3. Malvino, Albert Paul. Electronic Principles, McGraw-Hill Education, Eighth Edition | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet links related to the topics discussed in the book and class. | 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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| 12. The development of the curriculum plan |
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**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 program specification. |

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| College of Engineering, University of Baghdad | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Microprocessor and Computer Architecture I / EE201** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 (annual) | 5. Semester/Year |
| 60 | 6. Number of hours tuition (total) |
| 2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| This course introduces the programming, architecture and interfacing of the Intel microprocessors for the second year students. A student, after successfully passing this course will be able to:  program and debug in assembly language  understand the basic computer architecture  understand the memory organization and memory interfacing  perform input/output device programming in assembly  understand the hardware and software interrupts and their applications. | |

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| 10. Course Structure | | | | |
| Assessment Method | **Teaching**  **Method** | **Unit/Module or Topic Title** | **Hours** | **Week** |
| Exam | Lecturing, Discussions & Exercises | Computer data representation systems | 2 | 1 |
| Exam | Lecturing, Discussions & Exercises | Addressing modes. Model of microprocessor 8088/8086 | 2 | 2 |
| Exam | Lecturing, Discussions & Exercises | Addressing modes. Model of microprocessor 8088/8086 | 2 | 3 |
| Exam | Lecturing, Discussions & Exercises | Machines and assembly language programming for IBM PC. | 2 | 4 |
| Exam | Lecturing, Discussions & Exercises | Machines and assembly language programming for IBM PC. | 2 | 5 |
| Exam | Lecturing, Discussions & Exercises | Machines and assembly language programming for IBM PC. | 2 | 6 |
|  | Lecturing, Discussions & Exercises | Machines and assembly language programming for IBM PC. | 2 | 7 |
|  | Lecturing, Discussions & Exercises | Machines and assembly language programming for IBM PC. | 2 | 8 |
| Exam | Lecturing, Discussions & Exercises | Machines and assembly language programming for IBM PC. | 2 | 9 |
| Exam | Lecturing, Discussions & Exercises | Machines and assembly language programming for IBM PC. | 2 | 10 |
| Exam | Lecturing, Discussions & Exercises | Computer bus classifications and types, timing diagram, decoding of address. | 2 | 11 |
| Exam | Lecturing, Discussions & Exercises | Computer bus classifications and types, timing diagram, decoding of address. | 2 | 12 |
|  | Lecturing, Discussions & Exercises | Computer bus classifications and types, timing diagram, decoding of address. | 2 | 13 |
|  | Lecturing, Discussions & Exercises | Computer performance measurements | 2 | 14 |
| Exam | Lecturing, Discussions & Exercises | Arithmetic logic unit ALU | 2 | 15 |
| Exam | Lecturing, Discussions & Exercises | CPU Examples | 2 | 16 |
| Exam | Lecturing, Discussions & Exercises | CPU Examples | 2 | 17 |
|  |  | CPU Examples | 2 | 18 |
| Exam | Lecturing, Discussions & Exercises | Memory and Interfacing | 2 | 19 |
| Exam | Lecturing, Discussions & Exercises | Memory and Interfacing | 2 | 20 |
| Exam | Lecturing, Discussions & Exercises | Memory and Interfacing | 2 | 21 |
| Exam | Lecturing, Discussions & Exercises | Interfacing microprocessor, line Drivers, Transceivers, Latches, transducers, relay drivers, ADC, DAC, I/O interfacing | 2 | 22 |
|  |  | Interfacing microprocessor, line Drivers, Transceivers, Latches, transducers, relay drivers, ADC, DAC, I/O interfacing | 2 | 23 |
| Exam | Lecturing, Discussions & Exercises | Interfacing microprocessor, line Drivers, Transceivers, Latches, transducers, relay drivers, ADC, DAC, I/O interfacing | 2 | 24 |
| Exam | Lecturing, Discussions & Exercises | Interfacing microprocessor, line Drivers, Transceivers, Latches, transducers, relay drivers, ADC, DAC, I/O interfacing | 2 | 25 |
| Exam | Lecturing, Discussions & Exercises | Interfacing microprocessor, line Drivers, Transceivers, Latches, transducers, relay drivers, ADC, DAC, I/O interfacing | 2 | 26 |
| Exam | Lecturing, Discussions & Exercises | Instruction design, control unit design and CPU design. | 2 | 27 |
| Exam | Lecturing, Discussions & Exercises | Instruction design, control unit design and CPU design. | 2 | 28 |
| Exam | Lecturing, Discussions & Exercises | Instruction design, control unit design and CPU design. | 2 | 29 |
| Exam | Lecturing, Discussions & Exercises | Instruction design, control unit design and CPU design. | 2 | 30 |

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| 11. Infrastructure | |
| Barry B. Brey  The Intel Microprocessors (8th Edition)  8th Edition  Computer System Architecture  M. Morris Mano | 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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| 12. The development of the curriculum plan |
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**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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| College of Engineering, University of Baghdad | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Electrical circuits / EE207** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 (annual) | 5. Semester/Year |
| 90 | 6. Number of hours tuition (total) |
| Jan. 2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| The aim of this course is to introduce students to the fundamental theory and mathematics for the analysis of poly phase system, frequency response, transfer function of circuits and the stability of the system. Through the material presented in this course, students will learn: | |
| The fundamental principles in electric circuit theory and to be able to extend these principles into a way of thinking for problem solving in mathematics, science, and engineering. | |
| Analyze circuits those include energy storage elements in the time and frequency domains. | |
| How to work effectively both individually and in groups. | |
| Evaluate the personal learning process and understanding of the concepts and skills from class. | |
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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methods |
| 1. Knowledge and Understanding   Upon Completion of this course the students will acquire the following skills:  1. An ability to read and comprehend electrical circuits at an appropriate level  2. An ability both to follow and correctly to analyze the circuits of appropriate degrees of complexity.  3. Understanding of electrical circuits’ equations, and an ability to use it correctly.  4. An appreciation of the important connection between the ideas in the electrical circuits theories and the practical applications |
| B. Subject-specific skills  Upon Completion of this course the students will acquire the following skills:  1. Making an oral presentation  2. Analyzing the circuits of appropriate degrees of complexity.  3. Solve electrical circuits’ equations. |
| Teaching and Learning Methods |
| Lectures, Seminars and Exercises |
| Assessment methods |
| 1. Weekly Quiz 30% weight.  2. Final written Exam. 70% weight. |

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| C. Thinking Skills  Arguing for and defending a position in a clear and structured way using academic sources, through analyzing and solving |
| Teaching and Learning Methods |
| Lecturing & Class discussions |
| Assessment methods |
| Exams that involve problem-solving skills and critical thinking skills |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  1. Analyzing and solving the electrical circuits’ problems.  2. Team work |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Mutual Inductance, A review of Self Inductance | A+B+C+D | 3 | 1 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | The Concept of Mutual Inductance | A+B+C+D | 3 | 2 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Polarity of Mutually Induced Voltages (The Dot Convention) | A+B+C+D | 3 | 3 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | How to Use the Dot Marking when Writing Circuit Equation | A+B+C+D | 3 | 4 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Inductance of Inductively-Coupled Coils Connected in Series | A+B+C+D | 3 | 5 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Poly Phase System, Phase Sequence  Star or Way (Y) Connection | A+B+C+D | 3 | 6 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Delta (∆) or Mesh Connection,  Line Currents and Phase Currents | A+B+C+D | 3 | 7 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Power (Active, Reactive and Apparent Power) | A+B+C+D | 3 | 8 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Balanced Three-Phase System | A+B+C+D | 3 | 9 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Unbalanced Three-Phase System | A+B+C+D | 3 | 10 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Transient Response ( 1st. Order), Transient in RL Circuit | A+B+C+D | 3 | 11 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Transient in RC Circuit | A+B+C+D | 3 | 12 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Transient Response ( 2nd. Order), Transient in Series RLC Circuit | A+B+C+D | 3 | 13 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Over Damped | A+B+C+D | 3 | 14 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Critically Damped | A+B+C+D | 3 | 15 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Under Damped | A+B+C+D | 3 | 16 |
|  |  | **Half – year break** |  |  |  |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Laplace Transform in Circuit Analysis | A+B+C+D | 3 | 17 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Circuit Elements in the S-Domain | A+B+C+D | 3 | 18 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | The Network Function and Laplace Transform | A+B+C+D | 3 | 19 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Applications of Operational Amplifier | A+B+C+D | 3 | 20 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Inverting Amplifier, Non Inverting Amplifier and Differentiator Amplifier | A+B+C+D | 3 | 21 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Summing and Differential Amplifier, Voltage Follower Amplifier | A+B+C+D | 3 | 22 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | and Relaxation Operational Amplifier | A+B+C+D | 3 | 23 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Cascaded Operational Amplifier Circuits | A+B+C+D | 3 | 24 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Active Filters, LPF Design, HPF Design | A+B+C+D | 3 | 25 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | BPF Design and BRF Design | A+B+C+D | 3 | 26 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Two Port Networks, Terminal Equations | A+B+C+D | 3 | 27 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Two Port Parameters, Z- Parameters | A+B+C+D | 3 | 28 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | Y- Parameters | A+B+C+D | 3 | 29 |
| Weekly Quiz and written final Exam | Online Lecturing, Discussions & Exercises | The Relationships between Parameters | A+B+C+D | 3 | 30 |

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| 12. Infrastructure | |
| **The text book:**  - “Fundamentals of Electric circuits”, by Charles K. Alexander and Muthew N. O. Sadiku.  **The references:**  - “Electric circuits”, by James W. Nilsson.  - “Introductory Circuit Analysis”, by Boylestad.  - “Electrical Technology”, by Hughes.  - “Engineering Circuit Analysis”, by William H. Hayt, Jr and Jack E. Kemmerly.  In addition to internet links related to the topics discussed in the book and class.  **Course materials:**  Mutual Inductance, Poly Phase System, Transient Response ( 1st. Order), Transient Response ( 2nd. Order), Laplace Transform in Circuit Analysis, Application of Laplace Transform, Operational Amplifiers, Op Amp Circuit Analysis, Active Filters Design, Two Port Networks, The Relationships between Parameters. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet links related to the topics discussed in the book and class and websites | Special requirements (include for example workshops, periodicals, IT software, websites) |
| - | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Electrical Engineering Department | 2. University Department/Centre |
| **English Language (2) / EE210** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 (Annual) | 5. Semester/Year |
| 30 | 6. Number of hours tuition (total) |
| 23-1-2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| The aim of this course is to empower students with the language and life skills | |
| they need to carry out their career goals. To this end it provides ample | |
| opportunities for students to build awareness and practice language in real-life | |
| scenarios. The integrated skills approach of the course develops the student's | |
| self-confidence to survive and succeed in professional and social encounters | |
| within an English-speaking global community. | |
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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methods |
| 1. Knowledge and Understanding   A1. Understanding texts using effective learning strategies for reading and vocabulary building  A2. Developing conversational English skills necessary for becoming a contributing participant in small group activities, large group discussions, and oral presentations  A3. Finding and understand information about vocabulary, pronunciation, usage, and grammar in reference texts, online resources, and English language dictionaries  A4. Demonstrating an appropriate level of control of grammatical accuracy and lexical appropriacy in academic communication |
| B. Subject-specific skills  B1. Recognizing parts of speech and types of sentences according to structure and function  B2. Producing simple, compound, complex and compound-complex sentences  B3. Producing declarative, interrogative, imperative and exclamatory sentences  B4. Writing paragraphs with topic sentences and supporting details  B5. Writing cohesive coherent essays  B6. Making an oral presentation |
| Teaching and Learning Methods |
| Lecturing and Exercises |
| Assessment methods |
| Exams |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through critical reading and listening  C2 Arguing for and defending a position in a clear and structured way using academic sources, through writing and speaking |
| Teaching and Learning Methods |
| Lecturing & Class discussions |
| Assessment methods |
| Exams |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.Effective communication in written and spoken English  D2. Team work |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exams | Lecturing & doing exercises | Introduction |  | 1 | 1 |
| = | = | **Unit One:** Getting to Know you (p.6) **1. Grammar:** Tenses, Questions and Question words **2. Vocabulary:**  Using a bilingual dictionary Parts of Speech Words with more than one meaning **3. Everyday English:** Social Expressions 1 **4.Reading:** 'People, the great communicators'  **5.Speaking:** Information gap Discussion  Roleplay  **6.Listening:** Neighbours **7.Writing:** Informal letters |  | 1 | 2 |
| = | = | **Unit One:** Getting to Know you (p.6) **1. Grammar:** Tenses, Questions and Question words **2. Vocabulary:**  Using a bilingual dictionary Parts of Speech Words with more than one meaning **3. Everyday English:** Social Expressions 1 **4.Reading:** 'People, the great communicators'  **5.Speaking:** Information gap Discussion  Roleplay  **6.Listening:** Neighbours **7.Writing:** Informal letters |  | 1 | 3 |
| = | = | **Unit Two:** The way we live (p.14) **1. Grammar:** Present tenses **2. Vocabulary:**  Describing countries Collocation **3. Everyday English:** Making conversation  **4.Reading:** 'Living in the USA'  **5.Speaking:** Information gap Exchanging information about immigrants to the USA  **6.Listening:** 'You drive me mad' **7.Writing:** Linking words |  | 1 | 4 |
| = | = | **Unit Two:** The way we live (p.14) **1. Grammar:** Present tenses **2. Vocabulary:**  Describing countries Collocation **3. Everyday English:** Making conversation  **4.Reading:** 'Living in the USA'  **5.Speaking:** Information gap Exchanging information about immigrants to the USA  **6.Listening:** 'You drive me mad' **7.Writing:** Linking words |  | 1 | 5 |
| = | = | **Unit Three:** It all went wrong (p.22) **1. Grammar:** Past tenses **2. Vocabulary:**  Irregular verbs Making connections Suffixes to make different parts of speech Making negatives **3. Everyday English:** Time expressions **4.Reading:** 'The burglars' friend' 'The thief, his mother and $2 billion' 'Teenager goes on spending spree' Sherlock Holmes- The Three Students  **5.Speaking:**  Telling stories  **6.Listening:** An extract from The Three Students  **7.Writing:** Linking words |  | 1 | 6 |
| = | = | **Unit Three:** It all went wrong (p.22) **1. Grammar:** Past tenses **2. Vocabulary:**  Irregular verbs Making connections Suffixes to make different parts of speech Making negatives **3. Everyday English:** Time expressions **4.Reading:** 'The burglars' friend' 'The thief, his mother and $2 billion' 'Teenager goes on spending spree' Sherlock Holmes- The Three Students  **5.Speaking:**  Telling stories  **6.Listening:** An extract from The Three Students  **7.Writing:** Linking words |  | 1 | 7 |
| = | = | **Unit Four:** Let's go shopping!(p.30)  **1. Grammar:** Quantity Articles **2. Vocabulary:**  Buying things **3. Everyday English:** Prices and shopping  **4.Reading:** Markets around the world **5.Speaking:**  Survey Discussion **6.Listening:** 'My uncle's a shopkeeper' Buying things **7.Writing:** Filling in forms |  | 1 | 8 |
| = | = | **Unit Four:** Let's go shopping!(p.30)  **1. Grammar:** Quantity Articles **2. Vocabulary:**  Buying things **3. Everyday English:** Prices and shopping  **4.Reading:** Markets around the world **5.Speaking:**  Survey Discussion  **6.Listening:** 'My uncle's a shopkeeper' Buying things **7.Writing:** Filling in forms |  | 1 | 9 |
| = | = | Exam (1) |  | 1 | 10 |
| = | = | **Unit Five:** What do you want to do? (p.38) **1. Grammar:** Verb patterns 1 Future intentions **2. Vocabulary:**  Hot verbs **3. Everyday English:** How do you feel?  **4.Reading:** 'Hollywood kids' **5.Speaking:** What are your plans and ambitions? Being a teenager **6.Listening:** A song **7.Writing:** Writing a postcard |  | 1 | 11 |
| = | = | **Unit Five:** What do you want to do? (p.38) **1. Grammar:** Verb patterns 1 Future intentions **2. Vocabulary:**  Hot verbs **3. Everyday English:** How do you feel?  **4.Reading:** 'Hollywood kids' **5.Speaking:** What are your plans and ambitions? Being a teenager **6.Listening:** A song **7.Writing:** Writing a postcard |  | 1 | 12 |
| = | = | **Unit Six:** Tell me! What's it like? (p.46) **1. Grammar:** What's it like? Comparative and superlative adjectives **2. Vocabulary:**  Talking about cities Money Synonyms and antonyms **3. Everyday English:** Directions  **4.Reading:** 'A tale of two millionaires'  **5.Speaking:** Information gap Discussion **6.Listening:** Living in another country **7.Writing:** Relative clauses 1 Describing a place |  | 1 | 13 |
| = | = | **Unit Six:** Tell me! What's it like? (p.46) **1. Grammar:** What's it like? Comparative and superlative adjectives **2. Vocabulary:**  Talking about cities Money Synonyms and antonyms **3. Everyday English:** Directions  **4.Reading:** 'A tale of two millionaires'  **5.Speaking:** Information gap Discussion **6.Listening:** Living in another country **7.Writing:** Relative clauses 1 Describing a place |  | 1 | 14 |
| = | = | **Unit Seven:** Fame (p.54) **1. Grammar:** Present perfect and past simple for and since Tense revision **2. Vocabulary:**  Past participles Bands of music Adverbs Word pairs **3. Everyday English:** short answers  **4.Reading:** Celebrity interview  **5.Speaking:** Mingle Roleplay Project **6.Listening:** An interview with the band style **7.Writing:** Relative clauses 2 Writing a biography |  | 1 | 15 |
| = | = | Mid-Year Break |  |  | 16 |
|  |  | Mid-Year Break |  |  | 17 |
| = | = | **Unit Eight:** Do's and don'ts (p. 62) **1. Grammar:** have (got) to should must **2. Vocabulary:**  Jobs Travelling abroad Words that go together Compound nouns  **3. Everyday English:** At the doctor's **4.Reading:** Problem page  **5.Speaking:** Jobs Discussion Asking questions about places Roleplay Group work **6.Listening:** Holidays in JanuaryAt the doctor's **7.Writing:** Writing letters/ Formal letters |  | 1 | 18 |
| = | = | **Unit Eight:** Do's and don'ts (p. 62) **1. Grammar:** have (got) to should must **2. Vocabulary:**  Jobs Travelling abroad Words that go together Compound nouns  **3. Everyday English:** At the doctor's **4.Reading:** Problem page  **5.Speaking:** Jobs Discussion Asking questions about places Roleplay Group work **6.Listening:** Holidays in JanuaryAt the doctor's **7.Writing:** Writing letters/ Formal letters |  | 1 | 19 |
|  |  | Exam(2) |  | 1 | 20 |
| = | = | **Unit Nine:** Going places (p. 70) **1. Grammar:** Time and conditional clauses What if…? **2. Vocabulary:**  Hot verbs Hotels **3. Everyday English:** In a hotel **4.Reading:** The world's first megalopolis  **5.Speaking:** What will you do? Discussion What are the biggest cities in the world? **6.Listening:** Life in 2050 **7.Writing:** Linking words |  | 1 | 21 |
| = | = | **Unit Nine:** Going places (p. 70) **1. Grammar:** Time and conditional clauses What if…? **2. Vocabulary:**  Hot verbs Hotels **3. Everyday English:** In a hotel **4.Reading:** The world's first megalopolis  **5.Speaking:** What will you do? Discussion What are the biggest cities in the world? **6.Listening:** Life in 2050 **7.Writing:** Linking words |  | 1 | 22 |
| = | = | **Unit Ten:** Scared to death (p. 78) **1. Grammar:** Verb patterns 2 Infinitives **2. Vocabulary:**  Shops Describing feelings and situations **3. Everyday English:** Exclamations **4.Reading:** 'Don't look down' 'Into the wild'  **5.Speaking:** "When I was young' Describing feelings Roleplay **6.Listening:** When I was young The sinking of the Titanic **7.Writing:** Writing letters/ Formal and informal letters |  | 1 | 23 |
| = | = | **Unit Ten:** Scared to death (p. 78) **1. Grammar:** Verb patterns 2 Infinitives **2. Vocabulary:**  Shops Describing feelings and situations **3. Everyday English:** Exclamations **4.Reading:** 'Don't look down' 'Into the wild'  **5.Speaking:** "When I was young' Describing feelings Roleplay **6.Listening:** When I was young The sinking of the Titanic **7.Writing:** Writing letters/ Formal and informal letters |  | 1 | 24 |
| = | = | **Unit Eleven:** Things that changed the world (p. 86) **1. Grammar:** Passives **2. Vocabulary:**  Verbs and past participles Verbs and nouns that go together **3. Everyday English:** Notices  **4.Reading:** A discovery and an invention that changed the world  **5.Speaking:** Exchanging and discussing information about DNA and Google **6.Listening:** The world's most common habit  **7.Writing:** Writing a review of a book or film |  | 1 | 25 |
| = | = | **Unit Eleven:** Things that changed the world (p. 86) **1. Grammar:** Passives **2. Vocabulary:**  Verbs and past participles Verbs and nouns that go together **3. Everyday English:** Notices  **4.Reading:** A discovery and an invention that changed the world  **5.Speaking:** Exchanging and discussing information about DNA and Google **6.Listening:** The world's most common habit  **7.Writing:** Writing a review of a book or film |  | 1 | 26 |
| = | = | **Unit Twelve:** Dreams and Reality (p. 94) **1. Grammar:** Second conditional might **2. Vocabulary:**  phrasal verbs **3. Everyday English:** Social expressions 2 **4.Reading:** Supervolcano  **5.Speaking:** Giving advice Discussion  **6.Listening:** Two students talk about their future plans **7.Writing:** AdverbsWriting a story |  | 1 | 27 |
| = | = | **Unit Twelve:** Dreams and Reality (p. 94) **1. Grammar:** Second conditional might **2. Vocabulary:**  phrasal verbs **3. Everyday English:** Social expressions 2 **4.Reading:** Supervolcano  **5.Speaking:** Giving advice Discussion  **6.Listening:** Two students talk about their future plans **7.Writing:** AdverbsWriting a story |  | 1 | 28 |
| = | = | **Unit Thirteen:** Earning a living (p. 102) **1. Grammar:** Present Perfect Continuous  Present Perfect Simple versus Continuous **Vocabulary:**  Jobs Word formation Adverbs **3. Everyday English:** Telephoning  **4.Reading:** A funny way to earn a living  **5.Speaking:** Information gap Discussion Roleplay  **6.Listening:** Giving news **7.Writing:**Writing letters |  | 1 | 29 |
| = | = | **Unit Thirteen:** Earning a living (p. 102) **1. Grammar:** Present Perfect Continuous  Present Perfect Simple versus Continuous **Vocabulary:**  Jobs Word formation Adverbs **3. Everyday English:** Telephoning  **4.Reading:** A funny way to earn a living  **5.Speaking:** Information gap Discussion Roleplay  **6.Listening:** Giving news **7.Writing:**Writing letters |  | 1 | 30 |
| = | = | **Unit Fourteen:** Family ties (p. 110) **1. Grammar:** Past perfect for clarification Reported speech **Vocabulary:**  Hot verbs **3. Everyday English:** Saying goodbye **4.Reading:** Twins reunite after forty years A short story-'The tale of two silent brothers'  **5.Speaking:** Telling stories Arguments in families What happened next in the story? Families that live abroad **6.Listening:** An interview with Beth Taylor  Families that live abroad **7.Writing:**Writing a story |  | 1 | 31 |
|  |  | **Unit Fourteen:** Family ties (p. 110) **1. Grammar:** Past perfect for clarification Reported speech **Vocabulary:**  Hot verbs **3. Everyday English:** Saying goodbye **4.Reading:** Twins reunite after forty years A short story-'The tale of two silent brothers'  **5.Speaking:** Telling stories Arguments in families What happened next in the story? Families that live abroad **6.Listening:** An interview with Beth Taylor  Families that live abroad **7.Writing:**Writing a story |  |  | 32 |

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| 11. Infrastructure | |
| 1. Textbook:  New Headway Plus[Student's Book and Workbook with key for Pre-Intermediate Level] by John and Liz Soars, Oxford: Oxford University Press 2010  2. Internet links related to the topics discussed in the book and class | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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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| College of Engineering, University Of Baghdad | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Numerical Analysis and Statistics / EE204** | 3. Course title/code & Description |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 (Annual) | 5. Semester/Year |
| 60 H | 6. Number of hours tuition (total) |
| 2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| The aim of this course is to introduce the methods of Numerical analysis and Probabilities. | |

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| 9· Learning Outcomes, Teaching, Learning and assessment methods |
| 1. Review of matrices. 2. Knowledge and understanding with skills:   B1- **Solution of Non-linear Equations:**  B2- **Solving sets of linear equations**  B3- Numerical interpolation.  B4- Least squares data fitting.  B5- Numerical integration and differentiation.  B6- Solution of sets of linear equations.  B7- Finite difference and their applications.  B8- Numerical solution of differential equations.  B9- Multistep methods to solve differential equations.   1. Knowledge and understanding with skills   C1- Basic probability concepts.  C2- Conditional probability and dependence  C3- Random variables and probability distributions.  C4- Expectations and moments.  C5- Functions of random variables.  C6- Some important discrete distributions.  C7- Some important continuous distributions. |
| Teaching and Learning Methods |
| Lecturing and Class discussions. |
| Assessment Methods |
| Exams, quizzes, Homework. |

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| 10. Course Structure | | | | | |
|  | Assessment Method | Teaching Method | Unit/Module or topic Title | Hours | Week |
|  | Exam | Lecturing Discussions and Exercises | **Solution of Non-linear Equations**  Method of Halving the Interval (Bisection method) | 2 | 1 |
|  | Exam | Lecturing Discussions and Exercises | **Solution of Non-linear Equations**  Method of linear Interpolation(Method of false position) | 2 | 2 |
|  | Exam | Lecturing Discussions and Exercises | **Solution of Non-linear Equations**  Newton’s Method | 2 | 3 |
|  | Exam | Lecturing Discussions and Exercises | **Solution of Non-linear Equations**  Synthesis Division | 2 | 4 |
|  | Exam | Lecturing Discussions and Exercises | Gauss and Gauss-Jordan methods | 2 | 5 |
|  | Exam | Lecturing Discussions and Exercises | **Solving sets of linear equations**  LU Decomposition | 2 | 6 |
|  | Exam | Lecturing Discussions and Exercises | **Solving sets of linear equations**  Gauss-Seidel Method | 2 | 7 |
|  | Exam | Lecturing Discussions and Exercises | **System of Non-Linear Equations**  Newton-Raphson’s Method | 2 | 8 |
|  | Exam | Lecturing Discussions and Exercises | **Numerical interpolation** | 2 | 9 |
|  | Exam | Lecturing Discussions and Exercises | **Least squares date fitting** | 2 | 10 |
|  | Exam | Lecturing Discussions and Exercises | **Numerical integration** | 2 | 11 |
|  | Exam | Lecturing Discussions and Exercises | **Numerical Differentiation**  Finite difference and their applications, Interpolation using newton –gregory forward polynomial | 2 | 12 |
|  | Exam | Lecturing Discussions and Exercises | Error of Interpolation using newton –gregory backward polynomial | 2 | 13 |
|  | Exam | Lecturing Discussions and Exercises | Numerical solution of differential equations | 2 | 14 |
|  | Exam | Lecturing Discussions and Exercises | Multistep methods to solve differential equations | 2 | 15 |
|  | Exam | Lecturing Discussions and Exercises | Basic probability concepts | 2 | 16 |
|  | Exam | Lecturing Discussions and Exercises | Basic probability concepts | 2 | 17 |
|  | Exam | Lecturing Discussions and Exercises | Conditional probability and dependence | 2 | 18 |
|  | Exam | Lecturing Discussions and Exercises | Conditional probability and dependence | 2 | 19 |
|  | Exam | Lecturing Discussions and Exercises | Random variables and probability distributions | 2 | 20 |
|  | Exam | Lecturing Discussions and Exercises | Random variables and probability distributions | 2 | 21 |
|  | Exam | Lecturing Discussions and Exercises | Expectations and moments | 2 | 22 |
|  | Exam | Lecturing Discussions and Exercises | Expectations and moments | 2 | 23 |
|  | Exam | Lecturing Discussions and Exercises | Functions of random variables | 2 | 24 |
|  | Exam | Lecturing Discussions and Exercises | Functions of random variables | 2 | 25 |
|  | Exam | Lecturing Discussions and Exercises | Some important discrete distributions | 2 | 26 |
|  | Exam | Lecturing Discussions and Exercises | Some important discrete distributions | 2 | 27 |
|  | Exam | Lecturing Discussions and Exercises | Some important discrete distributions | 2 | 28 |
|  | Exam | Lecturing Discussions and Exercises | Some important continuous distributions | 2 | 29 |
|  | Exam | Lecturing Discussions and Exercises | Some important continuous distributions | 2 | 30 |

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| 11. Infrastructure | |
| 1. Curtis F. Gerald / Patrick O. Wheatley “ Applied Numerical Analysis “3rd Edition 1984 2. Richard L. Burden J. Douglas Faires “Study Guide for Numerical Analysis” 6th Edition 1996. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet web sites, Numerical Analysis | Special requirements (include for example workshops, periodicals, IT software, websites) |
| None | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

**COURSE SPECIFICATION**

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| In This Course Mathematics II Students study advance mathematics that make him be able to make and implementation a blook diagram and representing in mathematical model with functions has servile variables for any Engineering Problem specially for Electrical Engineering. |

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| Collage of Engineering / University of Baghdad | 1. Teaching Institution |
| Electrical Engineering Department | 2. University Department/Centre |
| **Mathematics II / EE201** | 3. Course title/code |
| B.Sc. in Electrical Engineering | 4. Program (s) to which it contributes |
| Full time attendance | 5. Modes of Attendance offered |
| 2020-2021 (annual) | 6. Semester/Year |
| 120 | 7. Number of hours tuition (total) |
| Feb, 2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aim of this course (annual) material is to study advance mathematics. The student starts the course by understanding functions has servile variables. Then students will be able to explore advance mathematics, and to solve problems including deferential equations. After finishing this material with successful progression, students will be able to take other courses based on this course like Engineering Mathematics Analysis. | |

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| 10· Learning Outcomes, Teaching, Learning and Assessment Methods |
| 1. Knowledge and Understanding   A1. Understand what the basic and advanced laws of all in Course Structure.  A2. Make the students be familiar with the theoretical calculation of all in Course Structure.  A3. Make the students able to assess and predict as all in Course Structure. |
| B. Subject-specific skills  B1.**Solid knowledge of basic mathematics rules, exponents and solving simultaneous system of linear equations using Cramer’s rule an so on.**  B2. **Solid knowledge of the all in**  Course Structure **.** |
| Teaching and Learning Methods |
| 1. Lecture notes. 2. Internet based home works. 3. Others like -------Microsoft Mathematics V5 . |
| Assessment methods |
| 1. Short tests (yes 9). 2. Long test (no). |
| C. Thinking Skills  C1. Problem solving.  C2. Homework leading to problem solving. |
| Teaching and Learning Methods |
| We use the blackboard and wide screen to introduce the students to this course, we also let the students to participate in the problem-solving process in the class and by giving them HomeWorks, and mind storm sudden class questions. All this will done with Internet. |
| Assessment methods |
| Quizzes and final examinations |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.**The most important skill students can acquire during the first term of this material is to full Mathematics Calculus via some home works that are arranged in a manner from easy up to hard level. Also, class room mind storm questions prepare students to sudden questions that may be asked face when a graduate starts searching for a job, face-to-face contact is very important skill students must acquire.** |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
|  | e-learning  and interactive Lectures | 1-Functions of Several Variables  2-Limits and Continuity in Higher Dimensions  3-Partial Derivatives 4-The Chain Rule |  | 4 | **1** |
|  | e-learning  and interactive Lectures | 5-Directional Derivatives and Gradient Vectors  6-Tangent Planes and Differentials  7-Extreme Values and Saddle Points  8-Lagrange Multipliers |  | 4 | **2** |
| \*First Quiz | e-learning and interactive Lectures | 9-Taylor’s Formula for Two Variables  10-Partial Derivatives with Constrained Variables  \*First Quiz  11- Double and Iterated Integrals over Rectangles  12-Double Integrals |  | 4 | **3** |
|  | e-learning and interactive Lectures | 13-Area by Double Integration  14-Parametrizations of Plane Curves  15-Calculus with Parametric Curves |  | 4 | **4** |
|  | e-learning and interactive Lectures | 16-Polar Coordinates  17-Graphing Polar Coordinate Equations  18- Areas and Lengths in Polar Coordinates  19- Conic Sections |  | 4 | **5** |
| \*Second Quiz | e-learning and interactive Lectures | 20- Conics in Polar Coordinates  \*Second Quiz  21- Double Integrals in Polar Form  22-Triple Integrals in Rectangular Coordinates  23-Moments and Centers of Mass |  | 4 | **6** |
| \*Third Quiz | e-learning and interactive Lectures | 24-Triple Integrals in Cylindrical and Spherical Coordinates 25- Substitutions in Multiple Integrals  \*Third Quiz |  | 4 | **7** |
|  | e-learning and interactive Lectures | 26-Three-Dimensional Coordinate Systems 27-Vectors 28-The Dot Product 29-The Cross Product  30-Lines and Planes in Space  31-Cylinders and Quadric Surfaces |  | 4 | **8** |
|  | e-learning and interactive Lectures | Vector-Valued Functions and Motion in Space 32- Curves in Space and Their Tangents  33- Integrals of Vector Functions; Projectile Motion  34- Arc Length in Space |  | 4 | **9** |
| \*4th Quiz | e-learning and interactive Lectures | 35- Curvature and Normal Vectors of a Curve  36- Tangential and Normal Components of Acceleration  37- Velocity and Acceleration in Polar Coordinates  \*4th Quiz |  | 4 | **10** |
|  | e-learning and interactive Lectures | 38-Sequences  39-Infinite Series  40-The Integral Test |  | 4 | **11** |
|  | e-learning and interactive Lectures | 41-Comparison Tests  42-Absolute Convergence; The Ratio and Root Tests |  | 4 | **12** |
|  | e-learning and interactive Lectures | 43- Alternating Series and Conditional Convergence 44-Power Series |  | 4 | **13** |
|  | e-learning and interactive Lectures | 45- Taylor and Maclaurin Series  46-Convergence of Taylor Series |  | 4 | **14** |
| \*5th Quiz | e-learning and interactive Lectures | 47-The Binomial Series and Applications of Taylor Series and Fourier Series  \*5th Quiz |  | 4 | **15** |
|  |  | First-Order ODEs  48-Basic Concepts. Modeling  49- Geometric Meaning of y\ =ƒ(x, y). Direction Fields, Euler’s Method |  | 4 | **16** |
|  |  | 50- Separable ODEs. Modeling  51- Exact ODEs, Integrating Factors |  | 4 | **17** |
| \*6th Quiz |  | 52- Linear ODEs. Bernoulli Equation. Population Dynamics 27  53- Orthogonal Trajectories. Optional 36  54- Existence and Uniqueness of Solutions for Initial Value Problems  \*6th Quiz |  | 4 | **18** |
|  |  | 55-Homogeneous Linear ODEs of Second Order  56-Homogeneous Linear ODEs with Constant Coefficients |  | 4 | **19** |
|  |  | 57- Differential Operators. Optional 58- Modeling of Free Oscillations of a Mass–Spring System |  | 4 | **20** |
|  |  | 59- Euler–Cauchy Equations 60- Existence and Uniqueness of Solutions. Wronskian |  | 4 | **21** |
|  |  | 61- Nonhomogeneous ODEs  62- Modeling: Forced Oscillations. Resonance |  | 4 | **22** |
| \*7th Quiz |  | 63- Modeling: Electric Circuits 64-Solution by Variation of Parameters  \*7th Quiz |  | 4 | **23** |
|  |  | Series Solutions of ODEs. Special Functions 65- Power Series Method  66- Legendre’s Equation. Legendre Polynomials Pn(x) |  | 4 | **24** |
| \*8th Quiz |  | 67- Extended Power Series Method: Frobenius Method 68- Bessel’s Equation. Bessel Functions J(x)  69- Bessel Functions of the Y(x). General Solution  \*8th Quiz |  | 4 | **25** |
|  |  | Laplace Transforms  70- Laplace Transform. Linearity. First Shifting Theorem (s-Shifting)  71- Transforms of Derivatives and Integrals. ODEs |  | 4 | **26** |
|  |  | 72- Unit Step Function (Heaviside Function). Second Shifting Theorem (t-Shifting) |  | 4 | **27** |
|  |  | 73- Short Impulses. Dirac’s Delta Function. Partial Fractions  74- Convolution. Integral Equations |  | 4 | **28** |
|  |  | 75- Differentiation and Integration of Transforms. ODEs with Variable Coefficients 76- Systems of ODEs |  | 4 | **29** |
| \*9th Quiz |  | 77- Laplace Transform: General Formulas 78- Table of Laplace Transforms  \*9th Quiz |  | 4 | **30** |

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| 11. Infrastructure | |
| 1. George B. Thomas Jr., Maurice D. Weir, Joel R. Hass-Thomas' Calculus\_ Early Transcendentals (13th Edition)-Pearson 2. Advanced Engineering Mathematics By Erwin Kreyszig 10th edition | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Microsoft Mathematics V5. | Special requirements (include for example workshops, periodicals, IT software, websites) |
| No | Community-based facilities  (include for example, guest  Lectures, internship, field studies) |

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| 12. The development of the curriculum plan |
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**COURSE SPECIFICATION – Year Three**

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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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| Collage of Engineering, University of Baghdad | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Electrical Machines II / EE305** | 3. Course title/code |
| Full time attendance | 4. Modes of Attendance offered |
| 2020-2021 (annual) | 5. Semester/Year |
| 90 | 6. Number of hours tuition (total) |
| 19th January, 2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| The aim of this annual material is to help undergraduate students to understand more about various types of AC Electrical Machines. The student starts the course by understanding how electrical power is generated and what types of machines can do that. Also, AC machines motoring mode of operation will be investigated in the first term. Then students will learn about Asynchronous AC machines focusing on the motoring mode of operation. They will be able to explore these machines analytically and practically, and solve problems including various point of their operating conditions. After finishing this material with successful progression, students will be able to take other courses based on this course like, power electronics and AC motors speed control. | |

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| 9· Learning Outcomes, Teaching, Learning and Assessment Methods |
| 1. Cognitive goals   A1. Understand what the basics and advanced laws of AC electrical machines.  A2. Make the students be familiar with the theoretical calculation of machines performance parameters.  A3. Make the students able to assess and predict machine operational characteristics. |
| B. The skills goals special to the course  B1.**Solid knowledge of basic mathematics rules, DC machines and Transformers.**  B2. **Solid knowledge of the Electrical Circuit Fundamentals and analysis techniques .** |
| Teaching and Learning Methods |
| 1. Lecture notes (Pdf). 2. Google meet lecturing including mind storm questioning. 3. Internet based home works via google classroom like assignments, quizzes and problems solving. 4. Others like you tube videos about electrical machine manufacturing and operation . |
| Assessment methods |
| 1. Short tests and quizzes (30%). 2. Final long test (70%). |
| C. Affective and value goals  C1. AC machines problem solving.  C2. Homework leading to problem solving of specified subjects. |
| Teaching and Learning Methods |
| 1. Interactive on line lecturing including short quizzes. 2. Hand out lecture notes (pdf format). 3. Assignments. 4. Seminars and class discussions. |
| Assessment methods |
| E-Quizzes, E-assignments and final examination(s). |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. **The most important skill students can acquire during the first term of this material is to understand the AC machine construction, principles of operation in both generating and motoring modes and testing of synchronous machines. This is very important for future employability with the Ministry of Electricity.**  D2. **Easy to hard levels home works besides class mind storm questions to prepare students to sudden questions that may be asked face to face when a graduates start seeking a job. Face to face contact is a very important skill that students must acquire.** |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| 1st term assignment | E- Pdf Lecture +  (Google - meeting) | Review on basic principles in electric machinery |  | 3 | **1** |
| Mind storm | = | AC machinery principles: Generation of alternating emf; 3-phase AC voltages |  | 3 | **2** |
| Mind storm | = | Rotating magnetic field waves in AC machines; reversal of magnetic field rotation |  | 3 | **3** |
| Mind storm | = | Construction of AC synchronous and Asynchronous machines |  | 3 | **4** |
| Mind storm | = | Winding distribution in Ac machines |  | 3 | **5** |
| Quiz | Google form | Tutorial |  | 3 | **6** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Synchronous generator equivalent circuit and phasor diagram |  | 3 | **7** |
| Quiz | Google form | Synchronous generator: Power and torque, Measuring model parameters |  | 3 | **8** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Synchronous generators operating alone |  | 3 | **9** |
| Quiz | Google form | Parallel operation of synchronous generators |  | 3 | **10** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Parallel operation of synchronous generators |  | 3 | **11** |
| Quiz | Google form | Effect of salient poles |  | 3 | **12** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Synchronous motor: principle of operation and equivalent circuit |  | 3 | **13** |
| Mind storm | = | Steady state synchronous motor =operation |  | 3 | **14** |
| Mind storm | = | Synchronous motor: Torque –speed characteristics, effect of load changes, effect of field current changes |  | 3 | **15** |
| **Midyear break** | | | | | |
| Quiz | Google form | The synchronous capacitor, starting of synchronous motor |  | 3 | **16** |
| 2nd term assignment | E- Pdf Lecture +  (Google - meeting) | Three phase induction motor: Construction and basic concepts |  | 3 | **17** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Equivalent circuit of three phase induction motor |  | 3 | **18** |
| Quiz | Google form | Power and torque of three phase induction motor |  | 3 | **19** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Torque speed characteristics of three phase induction motor & starting of three phase induction motor |  | 3 | **20** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Speed control of three phase induction motor |  | 3 | **21** |
| Quiz | Google form | Determination circuit model parameters of three phase induction motor |  | 3 | **22** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | The three phase induction generator: principle of operation |  | 3 | **23** |
| Quiz | Google form | Single phase induction motor: revolving field theory and cross field theory |  | 3 | **24** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Starting of single phase induction motor |  | 3 | **25** |
| Mind storm | = | Speed control of single phase induction motor |  | 3 | **26** |
| Mind storm | = | The circuit model of single phase induction motor |  | 3 | **27** |
| Quiz | Google form | Other types of motors: reluctance motor |  | 3 | **28** |
| Mind storm | E- Pdf Lecture +  (Google - meeting) | Hysteresis motor |  | 3 | **29** |
| Mind storm | = | Stepper motor |  | 3 | **30** |

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| 11. Infrastructure | |
| 1. Electrical Machines by S. K. Sahdev, Cambridge University Press, 2018. 2. Electric Machinery and Transformers by B. S. Guru and H. R. Hiziroglu, 3ed Ed., Oxford University Press, 2001. | 1. Books Required reading: |
| Lecture notes (pdf files), power point presentations (recorded videos) | 2. Main references (sources) |
| Prefer to arrange a visit to a factory or maintenance workshops of electrical machinery, as well as a visit to one of the electrical power generation plants | A- Recommended books and references (scientific journals, reports…). |
| YouTube recorded videos | B-Electronic references, Internet  sites… |

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| 12. The development of the curriculum plan |
| Well organized lecture notes collected from more than 7 reference books in electrical machine analysis and design. Also, some machine graphical tools are used to make some topics of this course be more readable with in depth visualization to machine structure. |

**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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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Electrical engineering Department | 2. University Department/Centre |
| **Electronics-II / EE302** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| Third Year | 5. Semester/Year |
| 90 | 6. Number of hours tuition (total) |
| Jan. 2021 | 7. Date of production/revision of this specification |
| 9. Aims of the Course | |
| * **To teach the analysis and design of analog integrated circuits:** | |
| * Basic amplifier stages at low and high frequencies | |
| * Basic stages of operational amplifier: differentisl amplifier, multistage amplifiers, level shifter, and output stage design | |
| * Bias techniques in ICs | |
| * Feedback amplifier | |
| * Teach the applications of the electronic devices: wave generation, wave shaping circuit,analog multipliers, PLL, and the usage of operational amplifiers in different applications. | |

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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methods |
| 1. Knowledge and Understanding   A1. Design details, principle of operation, performance, and analysis of analog integrated circuits.  A2. Applications of analog integrated circuits |
| B. Subject-specific skills |
| Teaching and Learning Methods |
| 1.Face to Face Lectures.  2. Group Exercises. |
| Assessment methods |
| A module assessment will have two components:  1.weekly Quizzes 30% weight.  2. Final written Exam. 70% weight. |
| C. Thinking Skills  C1. |
| Teaching and Learning Methods |
| 1.Face to Face Lectures.  2. Group Exercises. |
| Assessment methods |
| A module assessment will have two components:  1.weekly Quizzes 30% weight.  2. Final written Exam. 70% weight. |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Quizes, Assignments, and Seminars | Lectures | Basic IC amplifier stages at low frequencies |  | 3 | 1 |
| = | = | Biasing techniques for ICs |  | 3 | 2 |
| = | = | BJT differential amplifier: structure and transfer characteristics |  | 3 | 3 |
| = | = | BJT differential amplifier: small signal analysis |  | 3 | 4 |
| = | = | FET differential amplifier: structure and transfer characteristics |  | 3 | 5 |
| = | = | FET differential amplifier: small signal analysis |  | 3 | 6 |
| = | = | Differential amplifier with active loads |  | 3 | 7 |
| = | = | Tutorial |  | 3 | 8 |
| = | = | Feedback amplifiers: Classifications of amplifiers & feedback amplifier characteristics |  | 3 | 9 |
| = | = | Feedback amplifiers: Outlines of analysis of feedback amplifiers |  | 3 | 10 |
| = | = | Feedback amplifiers: Tutorial |  | 3 | 11 |
| = | = | Output stage: Class A & Class B |  | 3 | 12 |
| = | = | Output stage: Class AB & Tutorial |  | 3 | 13 |
| = | = | BJT and BiCMOS operational amplifier design |  | 3 | 14 |
| = | = | Tutorial: 741 analysis |  | 3 | 15 |
| = | = | Op-amp applications: linear applications |  | 3 | 16 |
| = | = | Op-amp applications: nonlinear applications |  | 3 | 17 |
| = | = | - Equivalent circuit of electronic devices at high frequencies  - Frequency response parts of a typical amplifier |  | 3 | 18 |
| = | = | High frequency response of amplifiers |  | 3 | 19 |
| = | = | Low frequency response of amplifiers |  | 3 | 20 |
| = | = | Tutorial |  | 3 | 21 |
| = | = | Linear oscillator: Basic principles and phase-shift oscillators |  | 3 | 22 |
| = | = | Wien-Bridge Oscillator |  | 3 | 23 |
| = | = | LC oscillators: Colpitts and Hartley oscillators |  | 3 | 24 |
| = | = | Tuned oscillator and Tutorial |  | 3 | 25 |
| = | = | Multivibrators: transistor based bistable MV |  | 3 | 26 |
| = | = | Multivibrators:monostable and astable MV |  | 3 | 27 |
| = | = | IC based Multivibrators |  | 3 | 28 |
| = | = | Analog multipliers |  | 3 | 29 |
| = | = | Phase Locked Loop (PLL) |  | 3 | 30 |

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| 12. Infrastructure | |
| A. Module Handout  B. The following texts:   1. Analysis and Design of Analog Integrated Circuits” By: Paul R. Gray 2. “Microelectronics: Circuit Analysis and Design” By: Donald A. Neamen 3. “Electronic Devices and Circuits” by Millman & Halkias 4. “Microelectronic Circuits” By: A. S. Sedra & K. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Multisim | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Electrical engineering Department | 2. University Department/Centre |
| **Engineering Analysis / EE303** | 3. Course title/code |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 | 5. Semester/Year |
| 90 | 6. Number of hours tuition (total) |
| 21-1-2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| The purpose of this course, is to provide the concepts and theory of signals and systems needed in almost all electrical engineering fields and in many other engineering and science disciplines as well. | |

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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methods | | | | | |
| 1. Knowledge and Understanding   A1. Understanding the continuous and digital electrical systems and identifying their most important characteristics.  A2- Dealing with the signal and systems in the time and frequency domains.  A3- Signals and systems analysis using Fourier Series.  A4- Signal and system analysis using the Laplace Transform.  A5- Analyzing signals and systems using the Z-Transform. | | | | | |
| B. Subject-specific skills  B1. Mathematical ability to analyze engineering systems in all time and frequency domains.  B2 - Analyzing the various electrical systems and dealing with them in fields of frequency. | | | | | |
| Teaching and Learning Methods | | | | | |
| 1. Attended lectures  2. Panel discussions  3. Solve examples in groups  4. Weekly homework | | | | | |
| Assessment methods | | | | | |
| 1. Weekly or monthly examinations representing 30% of the assessment score  2. A final written exam that lasts 3 hours, which represents 70% of the assessment score | | | | | |
| C. Thinking Skills  C1.  C2.  C3. | | | | | |
| Teaching and Learning Methods | | | | | |
| Assessment methods | | | | | |
| The daily oral and written examinations in addition to the final written examination | | | | | |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.  D2. | | | | | |
| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| A daily written exam for 15 minutes, in addition to the final written exam for a period of 3 hours | Attended Lectures | Definition of the signals and the systems with its classifications and an explanation of some of their characteristics |  | 3 | 1 |
| = | = | Explanation of some known and required (continuous) signals to deal with electrical systems, with solving illustrative examples |  | 3 | 2 |
| = | = | Analyzing digital signals with an explanation of their characteristics |  | 3 | 3 |
| = | = | Explanation of linear time invariant LTI systems |  | 3 | 4 |
| = | = | Response of a Discrete-Time LTI System and Convolution Sum |  | 3 | 5 |
| = | = | Systems described by differential equations |  | 3 | 6 |
| = | = | Characteristics of discrete time systems LTI |  | 3 | 7 |
| = | = | Systems described by the difference equations |  | 3 | 8 |
| = | = | Explanation of the Laplace Transform |  | 3 | 9 |
| = | = | Laplace transforms of some common signals |  | 3 | 10 |
| = | = | Characteristics of the Laplace Transform |  | 3 | 11 |
| = | = | Inverse Laplace Transform |  | 3 | 12 |
| = | = | Transfer function analysis using Laplace transform |  | 3 | 13 |
| = | = | Unilateral Laplace Transform |  | 3 | 14 |
| = | = | Solve differential equations using the Laplace Transform |  | 3 | 15 |
| = | = | Solved various Examples |  | 3 | 16 |
|  |  | **Half – year break** |  | 3 |  |
| = | = | Explanation of Z transform |  | 3 | 17 |
| = | = | z- Transform of some common sequences |  | 3 | 18 |
| = | = | Characteristics of z- Transform |  | 3 | 19 |
| = | = | Explanation of the inverse Z-Transform |  | 3 | 20 |
| = | = | System functionality for discrete time systems LTI |  | 3 | 21 |
| = | = | Unilateral Z-Transform |  | 3 | 22 |
| = | = | Solve differential equations using the z transform |  | 3 | 23 |
| = | = | Solve various questions |  | 3 | 24 |
| = | = | Fourier analysis of continuous time signals |  | 3 | 25 |
| = | = | Representation of the Fourier series of periodic signals |  | 3 | 26 |
| = | = | Representation properties using Fourier series |  | 3 | 27 |
| = | = | Explanation of the Fourier transform |  | 3 | 28 |
| = | = | Properties of the continuous Fourier transform |  | 3 | 29 |
| = | = | Frequency response for continuous time LTI systems |  | 3 | 30 |
| = | = | Solving differential equations using the Fourier transform |  | 3 | 31 |
|  |  | Filtering and Bandwidth |  | 3 | 32 |

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| 11. Infrastructure | |
| 1. Daily Lectures 2. The following Books: 3. Hsu, Hwei P. Schaum's outlines of theory and problems of signals and systems. McGraw-Hill, 1995. 4. Willsky, Alan S., and Ian T. Young. Signals and systems. Prentice-Hall International, 1997. 5. Oppenheim, Alan V. Discrete-time signal processing. Pearson Education India, 1999. 6. Haykin, Simon, and Barry Van Veen. Signals and systems. John Wiley & Sons, 2007. 7. Lathi, Bhagwandas Pannalal. Signals and systems. Berkeley-Cambridge Press, 1987. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| The topic needs to be solved extensive questions so it is preferable to do periodic lectures only to solve tutorials | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development to the curriculum plan |
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**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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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Electrical engineering Department | 2. University Department/Center |
| **English Language (3) / EE309** | 3. Course title/code |
| BSc in Electrical Engineering | 4. Program (s) to which it contributes |
| Full time | 4. Modes of Attendance offered |
| 2020-2021 (Annual) | 5. Semester/Year |
| 30 | 6. Number of hours tuition (total) |
| 23-1-2021 | 7. Date of production/revision of this specification |
| 8. Aims of the Course | |
| |  | | --- | | The aim of this course is to empower students with the language and life skills they need to | | carry out their career goals. To this end it provides ample opportunities for students to build | | awareness and practice language in real-life scenarios. The integrated skills approach of the course | | develops the student's self-confidence to survive and succeed in professional and social encounters | | within an English-speaking global community. | | |

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| 9· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1. Understanding texts using effective learning strategies for reading and vocabulary building  A2. Developing conversational English skills necessary for becoming a contributing participant in small group activities, large group discussions, and oral presentations  A3. Finding and understand information about vocabulary, pronunciation, usage, and grammar in reference texts, online resources, and English language dictionaries  A4. Demonstrating an appropriate level of control of grammatical accuracy and lexical appropriacy in academic communication. |
| B. Subject-specific skills  B1. Recognizing parts of speech and types of sentences according to structure and function  B2. Producing simple, compound, complex and compound-complex sentences  B3. Producing declarative, interrogative, imperative and exclamatory sentences  B4. Writing paragraphs with topic sentences and supporting details  B5. Writing cohesive coherent essays; Making an oral presentation |
| Teaching and Learning Methods |
| Lecturing and Exercises |
| Assessment methods |
| Exams |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through critical reading and listening  C2 Arguing for and defending a position in a clear and structured way using academic sources, through writing and speaking. |
| Teaching and Learning Methods |
| Lecturing & Class discussions. |
| Assessment methods |
| Exams |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Effective communication in written and spoken English  D2. Team work |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exams | Lectures & Exercises | Introduction |  | 1 | 1 |
| = | = | Unit One: It's a wonderful world (pp.6-11) |  | 1 | 2 |
| = | = | Unit One: It's a wonderful world (pp. 12 -13) and Writing (p.103) |  | 1 | 3 |
| = | = | Unit Two: Get Happy (pp.14-17) |  | 1 | 4 |
| = | = | Unit Two: Get Happy (pp.18-21) and Writing (p.104) |  | 1 | 5 |
| = | = | Unit Three: Telling Tales (pp.22-25) |  | 1 | 6 |
| = | = | Unit Three: Telling Tales (pp.26-29) and Writing (p.106) |  | 1 | 7 |
| = | = | Unit Four: Doing the right thing (pp.30-33) |  | 1 | 8 |
| = | = | Unit Four: Doing the right thing (pp.34-37) and Writing (p.108) |  | 1 | 9 |
| = | = | Exam (1) |  | 1 | 10 |
| = | = | Unit Five: On the move (pp.38-43) |  | 1 | 11 |
| = | = | Unit Five: On the move (pp 44 -45) and Writing (p.109) |  | 1 | 12 |
| = | = | Unit Six: I just love it! (pp.46-50) |  | 1 | 13 |
| = | = | Unit Six: I just love it! (pp.51-53) and Writing (p.110) |  | 1 | 14 |
| = | = | ESP |  | 1 | 15 |
| = | = | Mid-Year Break |  |  | 16 |
|  |  | Mid-Year Break |  |  | 17 |
| = | = | Unit Seven: The world of work (pp.54-58) |  | 1 | 18 |
| = | = | Unit Seven: The world of work (pp.59-61) and Writing (p.112) |  | 1 | 19 |
| = | = | Exam (2) |  | 1 | 20 |
| = | = | Unit Eight : Just imagine! (pp. 62-67) |  | 1 | 21 |
| = | = | Unit Eight : Just imagine! (pp. 68-69) and Writing (p.114) |  | 1 | 22 |
| = | = | Unit Nine: Getting on together (pp. 70-73) |  | 1 | 23 |
| = | = | Unit Nine: Getting on together (pp. 74-77) and Writing (p.116) |  | 1 | 24 |
| = | = | Unit Ten: Obsessions (pp.78-83) |  | 1 | 25 |
| = | = | Unit Ten: Obsessions (pp.84-85) and Writing (p.117) |  | 1 | 26 |
| = | = | ESP |  | 1 | 27 |
| = | = | Unit Eleven: Tell me about it! (pp.86-89) |  | 1 | 28 |
| = | = | Unit Eleven: Tell me about it! (pp.90-93) and Writing (p.118) |  | 1 | 29 |
| = | = | ESP |  | 1 | 30 |
| = | = | Unit Twelve: Life's great events! (pp.94-97) |  | 1 | 31 |
| = | = | Unit Twelve: Life's great events! (pp.98-101) and Writing (p.119) |  | 1 | 32 |

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| 11. Infrastructure | |
| 1. Textbook:  New Headway Plus[Student's Book and Workbook with key for Intermediate Level] by John and Liz Soars, Oxford: Oxford University Press 2006  2. Internet links related to the topics discussed in the book and class | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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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| University of Baghdad-College of Engineering | 1. Teaching Institution |
| Electrical engineering Department | 2. University Department/Centre |
| **Computer Architecture/EE307** | 3. Course title/code |
| BSc in Electrical Engineering | 4. Program (s) to which it contributes |
| On-line- full time | 5. Modes of Attendance offered |
| 2020-2021 | 6. Semester/Year |
| 60 | 7. Number of hours tuition (total) |
| 20/1/2021 | 8. Date of production/revision of this specification |
| **9. Aims of the Course** | |
| Provides the basic knowledge necessary to understand the hardware operation of digital computers & covers the three subjects associated with computer hardware. Deals with computer architecture as well as computer organization and design. | |

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| **10· Learning Outcomes, Teaching ,Learning and Assessment Methode** |
| 1. **Knowledge and Understanding**   **A1.** Understanding academic texts, using effective learning strategies .  **A2.**Developing computer hardware skills necessary for becoming a contributing for designing and solving the scientific problem and research.  **A3.** Finding and understand information about academic study, designing capabilities, usage, and capability for analysisiing the scientific problems.  **A4.** Demonstrating an appropriate level of control of analysis of many problems in academic and industrial fields. |
| **B. Subject-specific skills**  **B1.** Firstly cover material needed for the basic understanding of computer organization, design, & programming of simple digital computer.  **B2.** Give detailed steps that a designer must go through in order to design an elementary basic computer.  **B3**. Dealing with the organization & architecture of the central processing unit.  **B4.** Presenting the organization & architecture of input-output & memory.  **B5.** Introducing the concept of multiprocessing.  **B6.** Vector Processing: Principles of vector processing, vector operation, Matrix multiplication, Memory interleaving, Supercomputers.  **B7.**I/O Organization: Introduction to Peripherals & their interfacing. Strobe based and handshake-based communication, DMA based data transfer, I/O processor.  **B8.** Parallel Processing: Characteristics of Multiple Processors, Interconnection structure and arbitration, Inter process communication and synchronization  **B9.** Multi-core Computers: Hardware and software performance, Multi-core organization.  **B10.** Explain the advance in microprocessors |
| **Teaching and Learning Methods** |
| * Lecturing and Exercises * On-line meeting |
| **Assessment methods** |
| * Exams * Tutorial * Homeworks |
| **C. Thinking Skills**  **C1.** Asking the student to give solution for any problem through the lecture  **C2.** Give many questions and scientific problems using academic sources. |
| **Teaching and Learning Methods** |
| Lecturing & on-line Classroom meeting with discussions, activities. |
| **Assessment methods** |
| Exams that involve problem-solving skills and critical thinking skills, practically and theoretically. |
| **D. General and Transferable Skills (other skills relevant to employability and personal development)**  **D1.** The sharing among the students to solve the weekly homework. |

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| **10. Course Structure** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| Exam | Lecturing & on line meeting tests. | Register Transfer & Computer Organization: Data movement around registers. Data movement from/to memory, | A+B+C+D | 2 | 1 |
| Exam | Lecturing & on line meeting tests. | arithmetic and logic micro operations. Concept of bus and timing in register transfer. | A+B+C+D | 2 | 2 |
| Exam | Lecturing & on line meeting tests. | Basic Computer Organization:  Computer | A+B+C+D | 2 | 3 |
| Exam | Lecturing & on line meeting tests. | Instructions, Timing and Control, Execution of Instructions, | A+B+C+D | 2 | 4 |
| Exam | Lecturing & on line meeting tests. | Design of Basic Computer. | A+B+C+D | 2 | 5 |
| **Exam (1)** | | | | | 6 |
| Exam | Lecturing & on line meeting tests. | Micro programmed Control Unit:  Basic organization of micro programmed control unit, Microinstruction formats, Address sequencer. | A+B+C+D | 2 | 7 |
| Exam | Lecturing & on line meeting tests. | CPU Organization:  Addressing Modes, Instruction Format.. | A+B+C+D | 2 | 8 |
| Exam | Lecturing & on line meeting tests. | CPU organization with large registers, stacks and handling of interrupts & subroutines | A+B+C+D | 2 | 9 |
| **Exam (2)** | | | | | 10 |
| Exam | Lecturing & on line meeting tests. | Pipelining:  Parallel Processing Principle of pipelining, Instruction and arithmetic pipelines, Hazards of pipelining., | A+B+C+D | 2 | 11 |
| Exam | Lecturing & on line meeting tests. | Vector Processing:  Principles of vector processing, vector operation, Matrix multiplication, | A+B+C+D | 2 | 12 |
| Exam | Lecturing & on line meeting tests. | Memory interleaving, Supercomputers. | A+B+C+D | 2 | 13 |
| Exam | Lecturing & on line meeting tests. | I/O Organization: | A+B+C+D | 2 | 14 |
| Exam | Lecturing & on line meeting tests. | Introduction to Peripherals & their interfacing. | A+B+C+D | 2 | 15 |
| Exam | Lecturing & on line meeting tests. | Strobe based and handshake-based communication, | A+B+C+D | 2 | 16 |
|  |  | **Half – year break** |  |  |  |
| Exam | Lecturing & on line meeting tests. | DMA based data transfer, I/O processor. | A+B+C+D | 2 | 17 |
| Exam | Lecturing & on line meeting tests. | Memory Organization:  Concept of RAM/ROM, basic cell of RAM | A+B+C+D | 2 | 18 |
| Exam | Lecturing & on line meeting tests. | Associative memory, Cache memory organization, Virtual memory organization | A+B+C+D | 2 | 19 |
| **Exam (3)** | | | | | 20 |
| Exam | Lecturing & on line meeting tests. | Parallel Processing Characteristics of Multiple Processors, | A+B+C+D | 2 | 21 |
| Exam | Lecturing & on line meeting tests. | Interconnection structure and arbitration | A+B+C+D | 2 | 22 |
| Exam | Lecturing & on line meeting tests. | Inter process communication and synchronization. | A+B+C+D | 2 | 23 |
| Exam | Lecturing & on line meeting tests. | Multi-core Computers:  Hardware and software performance, | A+B+C+D | 2 | 24 |
| Exam | Lecturing & on line meeting tests. | Multi-core organization. | A+B+C+D | 2 | 25 |
| Exam | Lecturing & on line meeting tests. | Survey of microprocessors: (the 80188/80186, 80286, 80386 and 80486 | A+B+C+D | 2 | 26 |
| **Exam (4)** | | | | | 27 |
| Exam | Lecturing & on line meeting tests. | microprocessors, the Pentium and Pentium Pro microprocessors | A+B+C+D | 2 | 28 |
| Exam | Lecturing & on line meeting tests. | the Pentium II, Pentium III, Pentium 4, core2 microprocessors). | A+B+C+D | 2 | 29 |
| **Final Exam** | | | | | 30 |

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| **12. Infrastructure** | |
| 1. Morrise Mano, “computer System architecture”, 3rd Edition, Prentice Hall.  2. Mostara Abd-El-Barr, Hesham El-Rewini, “Fundamentals of Computer Organization and Architecture”, John Wiley, 2005.  3. David A. Patterson, John L. Hennessy, “Computer Organization and Design”, Arm Edition, Elsevier, 2010.  4. .Barry B. Brey, “The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, and Pentium Pro processor Architecture, Programming, and Interfacing”, 6th Edition, Prentice-Hall Inc., 2003. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet links related to the topics discussed in the book, and class. | Special requirements (include for example workshops, periodicals, IT software, websites) |
| None | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

**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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| Collage of Engineering / University of Baghdad | 1. Teaching Institution |
| Electrical Engineering Department | 2. University Department/Centre |
| **Electrical Power I** | 3. Course title/code |
| B.Sc. in Electrical Engineering | 4. Program(s) to which it contributes |
| Full time attendance | 5. Modes of Attendance offered |
|  | 6. Semester/Year |
| 90 | 7. Number of hours tuition (total) |
| 20/1/2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aim of this annual material is to produce graduate with advanced knowledge and understanding of the principles of Electrical power systems. The student starts the course by understanding conventional topics like the elements of power systems: Radial, Parallel, Ring and interconnected systems and so forth all electrical power parts working and issues principles will be covered within this subject. Students those who understand most subject parts will be able to explore the economic operation of power system and to solve problems including all the above subjects. After finishing this material with successful progression, students will be able to take other courses based on this course like load flow studies, economic load dispatch, state estimation in power system . | |

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| 10· Learning Outcomes, Teaching, Learning and Assessment Methods |
| 1. Knowledge and Understanding   A1.Understand what the basic and advanced of generation of electrical energy, elements of power system.  A2. Make the students be familiar with the theoretical calculation of the electrical design of the overhead transmission line, corona, sag and stress calculation .  A3. Make the students able to assess and predict performance of electrical power systems. |
| B. Subject-specific skills  B1√Solid knowledge of basic mathematics rules, exponents and solving simultaneous system of linear equations using matrices rule.  B2. Solid knowledge of the electrical circuit fundamentals. |
| Teaching and Learning Methods |
| 1. Lecture notes. 2. Internet based HomeWorks. 3. Others like assignments and quiz assignments. |
| Assessment methods |
| 1. Short tests (30%). 2. Long test (70%). |
| C. Thinking Skills  C1. Problem solving in electrical power system.  C2. Homework leading to problem solving of electrical power plants, generation, transmission, distribution systems. |
| Teaching and Learning Methods |
| We use the blackboard and wide screen to introduce the students to this course, we also let the students to participate in the problem-solving process in the class and by giving them HomeWorks, and mind storm sudden class questions, Now we also use Google classroom application for electronic education, G form and G meet . |
| Assessment methods |
| Quizzes and midterm examinations |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.√The most important skill students can acquire during the first term of this material is to understand the elements of electrical power system via some home works that are arranged in a manner from easy up to hard level. Also, class room mind storm questions prepare students to sudden questions that may be asked when a graduate starts searching for a job. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
|  | Lecture | General background |  | 3 | **1** |
|  | Lecture | Elements of power system |  | 3 | **2** |
|  | Lecture | Radial, Parallel and Ring interconnected system |  | 3 | **3** |
|  | Lecture | Transmission line constants |  | 3 | **4** |
| Test (short test) | Lecture | Transmission line constants, reactance's |  | 3 | **5** |
|  | Lecture | Transmission line constants, capacitance |  | 3 | **6** |
|  | Lecture | Tutorial |  | 3 | **7** |
|  | Lecture | Performance of short TL |  | 3 | **8** |
|  | Lecture | Performance of medium TL |  | 3 | **9** |
| Test (long test) | Lecture | Performance of long TL |  | 3 | **10** |
|  | Lecture | Tutorial |  | 3 | **11** |
|  | Lecture | ABCD constant: general 2 port |  | 3 | **12** |
| Test (short test) | Lecture | ABCD constant: general 2 port |  | 3 | **13** |
|  | Lecture | Overhead TL insulator  Low voltage |  | 3 | **14** |
|  | Lecture | Overhead TL insulator  Medium voltage |  | 3 | **15** |
|  | Lecture | Overhead TL insulator  High Voltage |  | 3 | **16** |
|  | Lecture | Corona |  | 3 | **17** |
|  | Lecture | Overhead TL sag and stress calculations 1 |  | 3 | **18** |
|  | Lecture | Overhead TL sag and stress calculations 2 |  | 3 | **19** |
|  | Lecture | Tutorial |  | 3 | **20** |
|  | Lecture | Power circle diagram |  | 3 | **21** |
|  | Lecture | Tutorial |  | 3 | **22** |
|  | Lecture | Conductors types |  | 3 | **23** |
|  | Lecture | Tutorial |  | 3 | **24** |
|  | Lecture | Performance of underground cables |  | 3 | **25** |
|  | Lecture | Performance of underground cables |  | 3 | **26** |
|  | Lecture | Tutorial |  | 3 | **27** |
|  | Lecture | Economic operation of power system |  | 3 | **28** |
|  | Lecture | Economic operation of power system |  | 3 | **29** |
|  | Lecture | Tutorial |  | 3 | **30** |

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| 11. Infrastructure | |
| 1. Principles of power system by V.K. Mehta Rohit Mehta. 2. Electrical power systems by C L WADHWA 3. Electrical power by Abd AL sahib Hassan | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship, field studies) |

12. The development of the curriculum plan

**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 / EE301** | 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) |
| 2020 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| 1- The student learns the fundamental solutions of time-varying Maxwell's equations, and applies them to design antennas.  2- 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 and - Research assignments |
| Assessment methods |
| - Weekly sheet exercises at class room  - Quizzes  - Case study for more demonstration.  - Midterm, and final exams |
| 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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| 10. 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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| 11. 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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| 12 The development of the curriculum plan |
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**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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| Collage of Engineering / University of Baghdad | 1. Teaching Institution |
| Electrical Engineering Department | 2. University Department/Centre |
| **CONTROL ENGINEERING I / EE308** | 3. Course title/code |
| B.Sc. in Electrical Engineering | 4. Program (s) to which it contributes |
| Full time attendance | 5. Modes of Attendance offered |
| Year 2020/2021 | 6. Semester/Year |
| 60 hours | 7. Number of hours tuition (total) |
| 1/2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aim of this course (annual) material is to be able to attach control engineering performances. The student starts the course by understanding the basic concepts of classical control engineering. Then students will be able to explore the control system characteristics, and to solve problems including evaluating and also modifying and calibrating the behavior of different control systems in various applications. After finishing this material with successful progression, students will be able to take other courses based on this course like Control Engineering-II. | |

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| 9· Learning Outcomes, Teaching, Learning and Assessment Methods |
| 1. Knowledge and Understanding   A1. Understand what the basic and advanced laws of Classic Control Engineering.  A2. Make the students be familiar with the theoretical calculation of control system behaviors.  A3. Make the students able to assess and predict control system stability, modification to control system responses in different applications. |
| B. Subject-specific skills  B1. **Solid knowledge of basic mathematics rules, exponents and solving simultaneous system of linear time invariant equations using many procedures and criteria.**  B2. **Solid knowledge of the design, evaluate, modify and implementations of different engineering systems.** |
| Teaching and Learning Methods: |
| 1. Lecture notes. 2. Internet based home works. 3. Others like text books. 4. Explanation videos (through YouTube channels). |
| Assessment methods |
| 1. Short tests (quizzes). 2. Long test (monthly exams). |
| C. Thinking Skills  C1. Problem solving.  C2. Homework leading to problem solving. |
| Teaching and Learning Methods |
| Previously, we were using the whiteboard to do lecturing. Nowadays, with Covid-19 worldwide issues, we use the online facilities (google classrooms and google meet) to introduce the students to this course, we also let the students to participate in the problem-solving process in the class and by giving them HomeWorks, and mind storm sudden online - class questions. |
| Assessment methods |
| Quizzes and midterm examinations |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. **The most important skill students can acquire during the first term of this material is to practice the subjects via some home works that are arranged in a manner from easy up to hard level. Also, class room mind storm questions prepare students to sudden questions that may be asked face when a graduate starts searching for a job, face-to-face contact is very important skill students must acquire.** |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Direct Questions |  | Introduction to Control Engineering |  | 2 | **1** |
| Direct Questions |  | Mathematical Model |  | 2 | **2** |
| Direct Questions |  | Describing the control system by differential equations |  | 2 | **3** |
| Direct Questions |  | Transfer Function |  | 2 | **4** |
| Quiz |  | Block Diagram Representation and block diagram reduction |  | 2 | **5** |
| Direct Questions |  | Signal Flow Graph and Mason’s gain formula |  | 2 | **6** |
| Direct Questions |  | Studied cases and examples |  | 2 | **7** |
| Direct Questions |  | Servo motors: Armature controlled and field controlled |  | 2 | **8** |
| Exam |  | Overall Exam |  | 2 | **9** |
| Direct Questions |  | Time Response of control systems |  | 2 | **10** |
| Direct Questions |  | Time Response of first-order control systems |  | 2 | **11** |
| Direct Questions |  | Time Response of second-order control systems |  | 2 | **12** |
| Quiz |  | Impulse Response of control systems |  | 2 | **13** |
| Direct Questions |  | Time Response specifications for second order system in standard form |  | 2 | **14** |
| Direct Questions |  | Steady-State Error |  | 2 | **15** |
| Exam |  | Overall Exam |  | 2 | **16** |
|  |  | MID YEAR HOLIDAY |  |  | **17** |
| Direct Questions |  | Control system stability |  | 2 | **18** |
| Direct Questions |  | Routh’s Stability Criterion |  | 2 | **19** |
| Direct Questions |  | Special Cases in Routh’s Stability Criterion and their indications |  | 2 | **20** |
| Exam |  | Applications |  | 2 | **21** |
| Discussion |  | Root-Locus Technique |  | 2 | **22** |
| Discussion |  | Procedure to draw the approximated root-locus |  | 2 | **23** |
| Exam |  | Root-Locus Indications on control systems |  | 2 | **24** |
| Direct Questions |  | Frequency Response of Control Systems |  | 2 | **25** |
| Direct Questions |  | Frequency response methods |  | 2 | **26** |
| Direct Questions |  | Bode plot |  | 2 | **27** |
| Direct Questions |  | Applied example |  | 2 | **28** |
| Direct Questions |  | Gain margin and phase margin |  | 2 | **29** |
| Quiz |  | Discussion and exam |  | 2 | **30** |
| Final Exam |  | Final Exam |  | 2 | **31** |

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| 12. Infrastructure | |
| 1. Given lectures. 2. Text Books. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| Collage of Engineering / University of Baghdad | 1. Teaching Institution |
| Electrical Engineering Department | 2. University Department/Centre |
| **Communication I / EE306** | 3. Course title/code |
| B.Sc. in Electrical Engineering | 4. Program (s) to which it contributes |
| Full time attendance | 5. Modes of Attendance offered |
| 2020-2021 (annual) | 6. Semester/Year |
| 90 H | 7. Number of hours tuition (total) |
| February, 2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aim of this course (annual) material is to make students understand the main objectives of communication system, main parts and differences in operation. The student starts the course by understanding the AM and FM modulations techniques, then proceed with understanding to the systems that can be used in such techniques. After finishing this material with successful progression, students will be able to take other courses based on this course like Comm. II. | |

**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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| 10· Learning Outcomes, Teaching, Learning and Assessment Methods |
| 1. Knowledge and Understanding   A1. Understand what the basic and advanced laws of AM and FM.  A2. Make the students be familiar with the theoretical calculation of -------.  A3. Make the students able to assess and predict ----------. |
| B. Subject-specific skills  B1.**√Solid knowledge of basic mathematics rules, exponents and solving simultaneous system of linear equations using Cramer’s rule.**  B2. **Solid knowledge of the ------------ .** |
| Teaching and Learning Methods |
| 1. Lecture notes. 2. Internet based home works. 3. Others like experimental work. |
| Assessment methods |
| 1. Short tests (30%). 2. Long test (70%). |
| C. Thinking Skills  C1. Problem solving.  C2. Homework leading to problem solving. |
| Teaching and Learning Methods |
| We use the blackboard and wide screen to introduce the students to this course, we also let the students to participate in the problem-solving process in the class and by giving them HomeWorks, and mind storm sudden class questions. |
| Assessment methods |
| Quizzes and midterm examinations |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. **√The most important skill students can acquire during the first term of this material is to ------------------- via some home works that are arranged in a manner from easy up to hard level. Also, class room mind storm questions prepare students to sudden questions that may be asked face when a graduate starts searching for a job, face-to-face contact is very important skill students must acquire.** |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
|  | Lecture | Signals and spectrums |  | 3 | **1** |
|  | Lecture | Reasons for modulation and types of modulations |  | 3 | **2** |
|  | Lecture | Normal AM modulation |  | 3 | **3** |
|  | Lecture | DSB-SC |  | 3 | **4** |
| Test (short test) | Lecture | SSB-SC |  | 3 | **5** |
|  | Lecture | VSB |  | 3 | **6** |
|  | Lecture | QAM and heterodyne  AM receiver |  | 3 | **7** |
|  | Lecture | FM and PM |  | 3 | **8** |
|  | Lecture | NBFM |  | 3 | **9** |
| Test (long test) | Lecture | WBFM |  | 3 | **10** |
|  | Lecture | Generation of FM signals (wide and narrow). |  | 3 | **11** |
|  | Lecture | Detection of FM signals |  | 3 | **12** |
| Test (short test) | Lecture | Detection of FM signals |  | 3 | **13** |
|  | Lecture | FDM and  Heterodyne FM receiver |  | 3 | **14** |
|  | Lecture | Noise  (AWGN) |  | 3 | **15** |
|  | Lecture | PSD of noise |  | 3 | **16** |
|  | Lecture | Effective noise temperature and noise figure |  | 3 | **17** |
|  | Lecture | Noise in normal AM, DSB,  **SSB, and in FM** |  | 3 | **18** |
|  | Lecture | Discrete type of modulation |  | 3 | **19** |
|  | Lecture | Digital types of modulation and line Codes |  | 3 | **20** |
|  | Lecture | Baseband digital systems PCM and DPCM |  | 3 | **21** |
|  | Lecture | DM and ADM |  | 3 | **22** |
|  | Lecture | Bandpass digital systems ASK |  | 3 | **23** |
|  | Lecture | FAK, CPFSK, MSK |  | 3 | **24** |
|  | Lecture | PSK, BPSK, QPSK, OQPSK, 8PSK |  | 3 | **25** |
|  | Lecture | Types of digital QAM |  | 3 | **26** |
|  | Lecture | Noise and probability of error in digital systems |  | 3 | **27** |
|  | Lecture | Error detection codes |  | 3 | **28** |
|  | Lecture | CRC |  | 3 | **29** |
|  | Lecture | TDM systems |  | 3 | **30** |

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| 11. Infrastructure | |
| 1. Communication systems by Carlson fifth edition. 2. Introduction to communication systems by Stremler 3rd edition. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**COURSE SPECIFICATION – Year Four**

**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 program specification. |

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| College of Engineering, University of Baghdad | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Digital Systems Design / EE403** | 3. Course title/code |
| B. Sc. in Electrical Engineering | 4. Program(s) to which it contributes |
| Full time | 5. Modes of Attendance offered |
| 2020-2021 (Annual) | 6. Semester/Year |
| 90 | 7. Number of hours tuition (total) |
| 19/1/2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aim of the course is to teach those methods of designing logical circuits which have evolved as useful and practical techniques. | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| 1. Knowledge and Understanding   A1. Understanding the principles and making design of ADC & DAC circuits.  A2. Designing sequence generators with applications.  A3. Making analysis & design for synchronous and asynchronous state machines  A4. Understanding implementation of semiconductor memory circuits and PLDs  A5. Understanding principles and characteristics of different logic families. |
| B. Subject-specific skills  B1. Developing design methods for digital systems.  B2. Deciding which type of logic families is proper for specific digital systems design.  B3. Making oral scientific presentations. |
| Teaching and Learning Methods |
| Lecturing and giving examples. |
| Assessment methods |
| Exams |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through critical reading and listening  C2. Arguing for and defending a scientific position in a clear and structured way using academic sources, through writing and speaking |
| Teaching and Learning Methods |
| Lecturing, class discussions and home works. |
| Assessment methods |
| Exams that involve problem-solving skills and critical thinking skills |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Team work.  D2. Effective communication with specialists in digital systems design field. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours per Week | Week |
| Exam | Lecturing, Discussions & Home Works | ADC & DAC Circuits | A+B+C+D | 3 | 1 - 4 |
| Exam | Lecturing, Discussions & Home Works | Sequence Generators | A+B+C+D | 3 | 5 - 6 |
| Exam | Lecturing, Discussions & Home Works | Analysis & Design of Synchronous State Machines | A+B+C+D | 3 | 7 - 11 |
| Exam | Lecturing, Discussions & Home Works | Analysis & Design of Asynchronous State Machines | A+B+C+D | 3 | 12 - 16 |
|  |  | Mid - Year Break |  |  | 17 - 18 |
| Exam | Lecturing, Discussions & Home Works | Semiconductor Memory Circuits | A+B+C+D | 3 | 19 - 22 |
| Exam | Lecturing, Discussions & Home Works | Programmable Logic Devices | A+B+C+D | 3 | 23 - 26 |
| Exam | Lecturing, Discussions & Home Works | Logic Families | A+B+C+D | 3 | 27 - 31 |
|  |  | Final Exam |  | 3 | 32 |

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| 11. Infrastructure | |
| The text book used to teach this course is:  M. Morris Mano, “ Digital Design”, 3rd edition, Prentice - Hall, Inc., 2002.  As well as the following recommended references:   * M. Morris Mano and C. R. Kime, “Logic and Computer design fundamentals”. * V. G. Oklobdzija, “Digital Design and Fabrication”. * P. Horowitz and W. Hill, “The Art of Electronics”. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet links related to the topics of the course. | 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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| 12. The development of the curriculum plan |
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**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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| College of Engineering, University of Baghdad | 1. Teaching Institution |
| Electrical engineering Department | 2. University Department/Centre |
| **Communications II / EE404** | 3. Course title/code |
| BSc in Electrical Engineering | 4. Programme(s) to which it contributes |
| Full time | 5. Modes of Attendance offered |
| 2020-2021 (Annual) | 6. Semester/Year |
| 60 | 7. Number of hours tuition (total) |
| Feb. 2018 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aim of the course is to produce graduates with advanced knowledge and understanding of  Digital communication systems principles;operation;performances, problem solving and ability to think rigorously and independently to meet higher level expectations of communication systems, academics, research | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| A-Knowledge and Understanding  A1. Understanding academic texts  A2. learns how to reflect the theoretical digital communication systems design to be practical systems  A3. Finding and understanding information about digital communication systems and the advantages and disadvantages of it. |
| B. Subject-specific skills  B1. Reading some useful papers related to digital communication systems  B2. Explore the web pages that concerned on digital communication systems  B3. Reading an arbitrary device manual to explore the digital communication systems from practical point of view. |
| Teaching and Learning Methods |
| 1. Google classroom  2. Lecturing & Class discussions.  3. Group Exercises. |
| Assessment methods |
| A module assessment will have two components:  1. Quizzes 30% weight.  2. Final written Exam. 70% weight. |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through attempting constructing the digital communication systems. |
| 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 |
| Quizes and written final Exam | Lecturing, online class, Discussions & Exercises | Introduction to Information Theory |  | 2 | 1 |
| = | = | Source of information |  | 2 | 2 |
| = | = | Entropy |  | 2 | 3 |
| = | = | Source Coding Theorem |  | 2 | 4 |
| = | = | Mathematical model of information source |  | 2 | 5 |
| = | = | Huffman and Fano codes |  | 2 | 6 |
| = | = | Shannon code |  | 2 | 7 |
| = | = | Code Efficiency |  | 2 | 8 |
| = | = | Net Data transmitted |  | 2 | 9 |
| = | = | Channel capacity |  | 2 | 10 |
| = | = | Channel coding |  | 2 | 11 |
| = | = | Linear Block Code |  | 2 | 12 |
| = | = | Binary Cyclic Code |  | 2 | 13 |
| = | = | Convolutional Code |  | 2 | 14 |
| = | = | Viterbi Algorithm |  | 2 | 15 |
| = | = | **Half – year break** |  |  |  |
|  |  | Probability of Error for Signal Detection in Additive White  Gaussian Noise |  | 2 | 16 |
| = | = | Probability of Error for Binary Modulation |  | 2 | 17 |
| = | = | Probability of Error for M-ary PAM |  | 2 | 18 |
| = | = | Probability of Error for Phase-Coherent PSK Modulation |  | 2 | 19 |
| = | = | Probability of Error for QAM |  | 2 | 20 |
| = | = | Comparison of Modulation Methods |  | 2 | 21 |
| = | = | Spread Spectrum Systems |  | 2 | 22 |
| = | = | Direct sequence spread spectrum |  | 2 | 23 |
| = | = | General Principles of CDMA |  | 2 | 24 |
| = | = | CDMA Transmission Channel Models |  | 2 | 25 |
| = | = | OFDM System |  | 2 | 26 |
| = | = | Mathematical description of an OFDM signal |  | 2 | 27 |
| = | = | OFDM parameters |  | 2 | 28 |
| = | = | OFDM architecture |  | 2 | 29 |
| = | = | MB-OFDM signal |  | 2 | 30 |

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| 12. Infrastructure | |
| 1. “COMMUNICATION SYSTEMS ENGINEERING” by John G. Proakis and Masoud Salehi, 2nd edition 2002 2. Schaum’s Outlines of analog and digital communications, by Hwei Hsu, Mc Graw Hill, 2003. 3. “ Digital and analog communication systems by K. Sam, 1979 | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Prefer to arrange a visit to a communications center or communications companies. | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**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 program specification. |

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| University of Baghdad | 1. Teaching Institution |
| College of Engineering/Department of Electrical Engineering | 2. University Department/Centre |
| **Electric Power II / EE405** | 3. Course title/code |
| Electrical Engineering | 4. Programme(s) to which it contributes |
| Internal | 5. Modes of Attendance offered |
| Fourth Year Class | 6. Semester/Year |
| 120 | 7. Number of hours tuition (total) |
| 2015 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The student will learn the main components of the power system as well as the per unit system, also the main faults and the analysis of the power system after subjecting to the fault, the student will also learn the power system stability and its classifications, finally the load flow analysis will be learned . | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| 1. **Knowledge and Understanding**   1. Full understanding for the global power systems and Iraqi power system.  2. Enhancing the student's skills through presenting real cases.  3. Cooperation with experiences and engineers in industry and in electricity sector in order to transport their knowledge to our students.  4. Involving the students in seminars and workshops to increase his skills through preparing a short seminar.  5. Preparing for small visits to some power stations and electricity control centers. |
| **B. Subject-specific skills**  1. full understanding for some power systems and Iraqi power system.  2. learning the students how to read the power station and power network manuals and flowcharts.  3. some knowledge in mathematics and numerical analysis. |
| **Teaching and Learning Methods** |
| Lecturing, slide presentation and Exercises |
| **Assessment methods** |
| Monthly exams and quizzes, participation in class and others. |
| **C. Thinking Skills**  1. Questions through the class.  2. Quizzes and exams.  3. Critical thinking skills  4. Team works. |

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| 11. Course Structure | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| Direct questions | Lecturing, Discussions & Exercises | Evolution of Electric Power Systems |  | 4 | 1 |
| Direct questions | Lecturing, Discussions & Exercises | Components of Electric Power Systems |  | 4 | 2 |
| Direct questions& Exam | Lecturing, Discussions & Exercises | Power System Representation |  | 4 | 3 |
| Direct questions | Lecturing, Discussions & Exercises | Per-Unit (p.u.) Representation |  | 4 | 4 |
| Direct questions& Exam | Lecturing, Discussions & Exercises | Changing the Base of Per-Unit Quantities |  | 4 | 5 |
| **Main Exam (1)** | | | | | 6 |
| Direct questions | Lecturing, Discussions & Exercises | Synchronous Generator Construction & Modeling |  | 4 | 7 |
| Direct questions& Exam | Lecturing, Discussions & Exercises | Parallel Operation of AC Generators |  | 4 | 8 |
| Direct questions | Lecturing, Discussions & Exercises | Power System Protection Equipments & Devices |  | 4 | 9 |
| Direct questions& Exam | Lecturing, Discussions & Exercises | Application of Protection on Iraqi Electrical Network |  | 4 | 10 |
| Direct questions | Lecturing, Discussions & Exercises | Fault Analysis, Symmetrical Components |  | 4 | 11 |
| Direct questions& Exam | Lecturing, Discussions & Exercises | Sequence Impedances for Fault Analysis |  | 4 | 12 |
| **Mid-Year Break** | | | | | 13 |
| **Main Exam (2)** | | | | | 14 |
| Direct questions | Lecturing, Discussions & Exercises | Reactors and balanced faults |  | 4 | 15 |
| Direct questions | Lecturing, Discussions & Exercises | Unbalanced Network Faults |  | 4 | 16 |
| Direct questions | Lecturing, Discussions & Exercises | Worked examples |  | 4 | 17 |
| **Main Exam (3)** | | | | | 18 |
| Direct questions | Lecturing, Discussions & Exercises | Power System Stability |  | 4 | 19 |
| Direct questions | Lecturing, Discussions & Exercises | The Swing Equation |  | 4 | 20 |
| Direct questions& Exam | Lecturing, Discussions & Exercises | Power Angle Relationship |  | 4 | 21 |
| Direct questions | Lecturing, Discussions & Exercises | Equal area relationship |  | 4 | 22 |
| **Main Exam (4)** | | | | | 23 |
| Direct questions | Lecturing, Discussions & Exercises | Power Flow Study, Formulation of the [Y] Matrix |  | 4 | 24 |
| Direct questions | Lecturing, Discussions & Exercises | Gauss Iteration Method and Gauss-Seidal Method |  | 4 | 25 |
| Direct questions& Exam | Lecturing, Discussions & Exercises | Newton-Raphson method |  | 4 | 26 |
| Direct questions | Lecturing, Discussions & Exercises | Worked examples |  | 4 | 27 |
| **Final Exam** | | | | | 28 |

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| 12. Infrastructure | |
| 1. **Electric Power System**, B.M.Weedy, 1977 by John Wiley. 2. **Power System Analysis**, John J. Grainger & William D. Stevenson, 1994 by McGraw-Hill. 3. **Generation of Electrical Energy**, B.R.Gupta , 1988. 4. **Power System Analysis and Design**, J.Duncan Glover & Mulukutla S. Sarma, 2002 by Brooks/Cole. 5. **Power System Stability and Control**, P.Kundur, 1994. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet links related to the topics discussed in the book and class, and some video | Special requirements (include for example workshops, periodicals, IT software, websites) |
| None | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

**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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| College of Engineering, University of Baghdad | 1. Teaching Institution |
| Department of Electrical engineering | 2. University Department/Centre |
| **Power Electronics and Special Machines** | 3. Course title/code |
| B.Sc. in Electrical Engineering | 4. Program (s) to which it contributes |
| Full time | 5. Modes of Attendance offered |
| 2020-2021 (Annual) | 6. Semester/Year |
| 90 | 7. Number of hours tuition (total) |
| Nov 2020 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| The aim of the course is to produce graduates with advanced knowledge and understanding of  power semiconductor devices; construction;operation principles and their applications. Also, the operation principles of special machines and there performances are presented. | |
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1. Constructional details, principle of operation, Performance, power converters.  A2. Constructional details, principle of operation of Special Machines. |
| B. Subject-specific skills  B1.  B2.  B3. |
| Teaching and Learning Methods |
| 1.Face to Face Lectures.  2. Seminars  3. Group Exercises. |
| Assessment methods |
| A module assessment will have two components:  1.weekly Quizes 30% weight.  2. Final written Exam. 70% weight. |
| C. Thinking Skills  C1.  C2.  C3.  C4. |
| Teaching and Learning Methods |
| Short quizzes + termly exams |
| 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 |
| Weekly Quizzes and written final Exam | Face to face lecture | Introduction to the following:   * RL and RC circuits * Fourier series |  | 3 | 1 |
| = | = | Power Semiconductor Devices; construction and operation principles |  | 3 | 2 |
| = | = | Power Semiconductor Devices losses and heat sink design |  | 3 | 3 |
| = | = | Harmonic analysis in power electronic converters; power factor definitions and THD |  | 3 | 4 |
| = | = | Single phase rectifier circuits; operation, design and performances |  | 3 | 5 |
| = | = | Worked examples on single phase rectifiers |  | 3 | 6 |
| = | = | Three-phase rectifier circuits; operation, design and performances |  | 3 | 7 |
| = | = | Worked examples on three phase rectifiers |  | 3 | 8 |
| = | = | Overlap in single phase rectifier circuits; definitions and the its effect |  | 3 | 9 |
| = | = | Overlap in three-phase rectifier circuits; definitions and the its effect |  | 3 | 10 |
| = | = | Inversion and delay angle control |  | 3 | 11 |
| = | = | Inverters; single phase: square wave and quasi square wave |  | 3 | 12 |
| = | = | Inverters; three phase: voltage and frequency control techniques |  | 3 | 13 |
| = | = | Sinusoidal pulse width modulations (SPWM) and sampling techniques |  | 3 | 14 |
| = | = | SPWM and single phase inverter |  | 3 | 15 |
| = | = | SPWM and three- phase inverter |  | 3 | 16 |
|  |  | **Half – year break** |  |  |  |
| = | = | DC-DC converters: constructions and operation principles |  | 3 | 17 |
| = | = | DC-DC converters; design and performances evaluation |  | 3 | 18 |
| = | = | Control strategies in DC-DC converters |  | 3 | 19 |
| = | = | Introduction to speed control of DC machines |  | 3 | 20 |
| = | = | Universal AC series motors; construction and operation principles |  | 3 | 21 |
| = | = | Stepper and Servo motors; construction and operation principles |  | 3 | 22 |
| = | = | Stepper, servo motors, and shaded-Pole-Motors construction and operation principles |  | 3 | 23 |
| = | = | Permanent Magnet Machines; construction, operation and application |  | 3 | 24 |
| = | = | DFIG; construction, operation and application |  | 3 | 25 |
| = | = | Switched reluctance machines; operation and application |  | 3 | 26 |
| = | = | Hysteresis motor |  | 3 | 27 |
| = | = | Stepper motor |  | 3 | 28 |
| = | = | Torque and speed control of machines; permanent magnet reluctance machines |  | 3 | 29 |
| = | = | Worked examples on different types of machine control |  | 3 | 30 |

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| 12. Infrastructure | |
| 1. Module Handout 2. The following texts and articles:      * Bose, B. K.. Power Electronics and Variable Frequency Drives-Technology and Applications, IEEE Press, New York,   Erickson, R. W. and Maksimovic, D. Fundamentals of Power Electronics, Second Edition, Kluwer Academic Publishers,   * Krein, P. T. Elements of Power Electronics. McGraw Hill,.   Lander, C. W. Power Electronics. McGraw Hill,  Mohan N., UndelandT. M., Robbins W. P., Power Electronics: Converters, Applications and Design., John Wiley and Sons, New York,.  Pressman, A. I., Switching Power Supply Design. McGraw Hill New York, 1998.  Rashid, M. H. Power Electronics: Circuits, Devices, and Applications., Prentice-Hall Inc., New Jersey, | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 12. The development of the curriculum plan |
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**COURSE SPECIFICATION**

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| The signal for processing is mathematically modeled as a function or a sequence of numbers that represent the state or behavior of a physical system. The examples of the signals range from speech, audio, image and video in multimedia systems, electrocardiograms in medical systems (ECG/EKG), to electronic radar waveforms in military. Digital Signal processing is concerned with the representation, transformation, and manipulation of signals and the information they contain. For example, we may wish to remove the noise in speech to make it clear, or to enhance an image to make it more natural. Signal processing is one of the fundamental theories and techniques to construct modern information systems. During the last half century, lots of theories and methods have been proposed and widely studied in digital signal processing. |

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| College of Engineering, University of Baghdad | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Digital Signal Processing / EE409** | 3. Course title/code |
| B.Sc. in Electrical Engineering | 4. Program (s) to which it contributes |
| Full time | 5. Modes of Attendance offered |
| 2020-2021 (Annual) | 6. Semester/Year |
| 60 | 7. Number of hours tuition (total) |
| January, 2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| Study and review the concepts of processing of digital signals theories, the most important tools and systems implementation. In addition to teaching students how to apply the transforms methods on different frequency signals and filter design using modern techniques. | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| |  | | --- | | 1. Knowledge and Understanding   A1. Understanding academic texts and ty to solve the problems in the end of each chapter.  A2. learns how to reflect the theoretical digital signal processing design to be practical systems  A3. Finding and understanding information about digital signal processing and the advantages and disadvantages of it. | |
| B. Subject-specific skills  B1. Reading some useful papers related to digital signal processing  B2. Explore the web pages that concerned on digital signal processing  B3. Reading an arbitrary device manual to explore the digital signal processing from practical point of view.  B4. Making an oral presentation |
| Teaching and Learning Methods |
| Lecturing and Exercises |
| Assessment methods |
| Exams |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through attempting construct the digital signal processing algorithm. |
| Teaching and Learning Methods |
| Lecturing & Class discussions |
| Assessment methods |
| Exams that involve problem-solving skills and critical thinking skills |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.Effective communication in the design an applicable Digital signal processing  D2. Team work |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exam | Lecturing, Discussions & Exercises | Classification of signals, systems |  | 2 | 1 |
| Exam | Lecturing, Discussions & Exercises | sampling |  | 2 | 2 |
| Exam | Lecturing, Discussions & Exercises | Discrete time systems |  | 2 | 3 |
| Exam | Lecturing, Discussions & Exercises | Convolution |  | 2 | 4 |
| Exam | Lecturing, Discussions & Exercises | Difference equations |  | 2 | 5 |
| Exam | Lecturing, Discussions & Exercises | Time-Domain analysis |  | 2 | 6 |
| Exam | Lecturing, Discussions & Exercises | Discrete Fourier series (DFS) |  | 2 | 7 |
| Exam | Lecturing, Discussions & Exercises | Frequency Domain analysis and Discrete-Time Fourier transform(DTFT) |  | 2 | 8 |
| Exam | Lecturing, Discussions & Exercises | Discrete Fourier transform (DFT) |  | 2 | 9 |
| Exam | Lecturing, Discussions & Exercises | Properties of DFT |  | 2 | 10 |
| Exam | Lecturing, Discussions & Exercises | Fast Fourier transform FFT |  | 2 | 11 |
| Exam | Lecturing, Discussions & Exercises | Decimation in time FFT |  | 2 | 12 |
| Exam | Lecturing, Discussions & Exercises | Decimation in frequency FFT |  | 2 | 13 |
| Exam | Lecturing, Discussions & Exercises | Z-Transform |  | 2 | 14 |
| Exam | Lecturing, Discussions & Exercises | Definition of Z-transform |  | 2 | 15 |
| Exam | Lecturing, Discussions & Exercises | Properties of Z- transform and The one-sided Z-transform |  | 2 | 16 |
| Exam | Lecturing, Discussions & Exercises | **Half – year break** |  | 2 | 17 |
| Exam |  | Implementation of Discrete-time Systems |  | 2 | 18 |
| Exam | Lecturing, Discussions & Exercises | Digital networks |  | 2 | 19 |
| Exam | Lecturing, Discussions & Exercises | Structure of FIR systems |  | 2 | 20 |
| Exam | Lecturing, Discussions & Exercises | Structure of IIR systems |  | 2 | 21 |
| Exam | Lecturing, Discussions & Exercises | Lattice structure |  | 2 | 22 |
| Exam |  | Introduction to Digital Filter design |  | 2 | 23 |
| Exam | Lecturing, Discussions & Exercises | Filter specifications |  | 2 | 24 |
| Exam | Lecturing, Discussions & Exercises | FIR filter design |  | 2 | 25 |
| Exam | Lecturing, Discussions & Exercises | IIR filter design |  | 2 | 26 |
| Exam | Lecturing, Discussions & Exercises | Bilinear transformation |  | 2 | 27 |
| Exam | Lecturing, Discussions & Exercises | Butterworth and Chebyshev filters |  | 2 | 28 |
| Exam | Lecturing, Discussions & Exercises | Butterworth and Chebyshev filters |  | 2 | 29 |
| Exam | Lecturing, Discussions & Exercises | Butterworth and Chebyshev filters |  | 2 | 30 |

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| 11. Infrastructure | |
| **Discrete-time signal processing, 2nd ed, by Oppenheim, Prentice Hall , 2009.**  **Schaum’s Outlines of digital Signal processing, by Monson Hayes, Mc Graw Hill, 1999.**  **Digital Signal Processing: Principles, algorithms, and applications, by Proakis, Prentice Hall 2007.** | Required reading:  · core texts  · course materials  · other |
| Internet links related to the topics discussed in the book and class, learn the simulators that have ability to construct digital signal processing algorithms | 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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| 12. The development of the curriculum plan |
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**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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| College of Engineering, University of Baghdad | 1. Teaching Institution |
| Electrical Engineering Department | 2. University Department/Centre |
| **English Language (4) / EE410** | 3. Course title/code |
| B.Sc. in Electrical Engineering | 4. Programme(s) to which it contributes |
| Full time | 5. Modes of Attendance offered |
| 2020-2021 (Annual) | 6. Semester/Year |
| 30 | 7. Number of hours tuition (total) |
| 24-1-2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course  The course is intended to accomplish its goal in one full academic year through developing | |
| students’ language skills to: | |
| 1. Understand long complex speech. | |
| 2. Speak fluently without searching for language, communicate effectively in social and professional | |
| situations, and express ideas and opinions and relate them to those of other speakers. | |
| 3. Understand long and complex factual and literary texts | |
| 4. Write well-structured text to express points of view. | |
| 5. Exhibit good grammatical control. | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1. Understanding standard spoken language on both familiar and unfamiliar topics normally encountered in personal, social, academic or vocational life  A2. Usingthe language fluently, accurately and effectively on a wide range of general, academic, vocational or leisure topics |
| B. Subject-specific skills  B1. Reading with a high degree of independence,  B2. Writing clear, detailed texts on a variety of subjects  B3. Exhibiting good grammatical control |
| Teaching and Learning Methods |
| 1. Lectures and group discussions  2. Incorporating basic grammatical structures  3. Incorporating exercises for interpreting verbal or written texts |
| Assessment methods |
| Exams and Quizzes |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through critical reading and listening  C2 Arguing for and defending a position in a clear and structured way using academic sources, through writing and speaking |
| Teaching and Learning Methods |
| Lecturing & Class discussions |
| Assessment methods |
| Exams and Quizzes |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.Effective communication in written and spoken English  D2. Team work |

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| 10. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exams and quizzes | 1. Lectures and group discussions  2. Incorporating basic grammatical structures  3. Incorporating exercises for interpreting verbal or written texts | Introduction | A,B,C & D | 1 | 1 |
| = | = | Unit 1 (No Place like home): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.6-15) and 7. Writing (p.110) | = | 1 | 2 |
| = | = | Unit 1 (No Place like home): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.6-15) and 7. Writing (p.110) | = | 1 | 3 |
| = | = | Unit 2(Been there, done that!): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.16-25) and 7. Writing (p.112) | = | 1 | 4 |
| = | = | Unit 2(Been there, done that!): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.16-25) and 7. Writing (p.112) | = | 1 | 5 |
| = | = | Unit 3 ( What a story!): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.26-33) and 7. Writing (p.113) | = | 1 | 6 |
| = | = | Unit 3 ( What a story!): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.26-33) and 7. Writing (p.113) | = | 1 | 7 |
|  |  | Unit 4 ( Nothing but the truth): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.34-43) and 7. Writing (p.114) | = | 1 | 8 |
| = | = | Unit 4 ( Nothing but the truth): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.34-43) and 7. Writing (p.114) | = | 1 | 9 |
| = | = | Exam (1) | = | 1 | 10 |
| = | = | Unit 5 ( An eye to the future): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.44-53) and 7. Writing (p.115) | = | 1 | 11 |
| = | = | Unit 5 ( An eye to the future): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.44-53) and 7. Writing (p.115) | = | 1 | 12 |
| = | = | Unit 6 ( Making it big): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.54-61) and 7. Writing (p.116) | = | 1 | 13 |
| = | = | Unit 6 ( Making it big): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.54-61) and 7. Writing (p.116) | = | 1 | 14 |
| = | = | ESP |  | 1 | 15 |
|  |  | Mid-Year Break |  |  | 16 |
|  |  | Mid-Year Break |  |  | 17 |
| = | = | Unit 7 ( Getting on together): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.62-69) and 7. Writing (p.118) | = | 1 | 18 |
| = | = | Unit 7 ( Getting on together): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.62-69) and 7. Writing (p.118) | = | 1 | 19 |
| = | = | Exam (2) |  | 1 | 20 |
| = | = | Unit 8 (Going to extremes): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.70-77) and 7. Writing (p.119) | = | 1 | 21 |
| = | = | Unit 8 (Going to extremes): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.70-77) and 7. Writing (p.119) | = | 1 | 22 |
| = | = | Unit 9 ( Things ain’t what they used to be!): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.78-85) and 7. Writing (p.120) | = | 1 | 23 |
| = | = | Unit 9 ( Things ain’t what they used to be!): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.78-85) and 7. Writing (p.120) | = | 1 | 24 |
| = | = | Unit 10 ( Risking life and limb): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.86-93) and 7. Writing (p.121) | = | 1 | 25 |
| = | = | Unit 10 ( Risking life and limb): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.86-93) and 7. Writing (p.121) | = | 1 | 26 |
| = | = | Unit 11 (In your dreams): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.94-101) and 7. Writing (p.122) | = | 1 | 27 |
| = | = | Unit 11 (In your dreams): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.94-101) and 7. Writing (p.122) | = | 1 | 28 |
| = | = | Unit 12 (It’s never too late): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.102-109) and 7. Writing (p.123) | = | 1 | 29 |
| = | = | Unit 12 (It’s never too late): 1. Language focus, 2. Vocabulary, 3. Reading, 4. Listening, 5. Speaking, 6. Everyday English(pp.102-109) and 7. Writing (p.123) | = | 1 | 30 |
| = | = | ESP | = | 1 | 31 |
|  |  | ESP | = | 1 | 32 |

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| 12. Infrastructure | |
| 1. Textbook:  New Headway Plus Upper-intermediate by Liz and John Soars (Oxford: Oxford University Press) 2009  2. Internet links related to the topics discussed in the book and class | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

**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 programmed specification. |

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| College of Engineering, University of Baghdad | 1. Teaching Institution |
| Department of Electrical Engineering | 2. University Department/Centre |
| **Computer Network / EE407** | 3. Course title/code |
| B. Sc. in Electrical Engineering | 4. Program(s) to which it contributes |
| Full time | 5. Modes of Attendance offered |
| 2020-2021 (Annual) | 6. Semester/Year |
| 120 | 7. Number of hours tuition (total) |
| January, 2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| Study the basic principles of computer networks | |
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| 1. Knowledge and Understanding   A1. Understanding the principles of computer networks.  A2. Learn how to design and implement different networks with different protocols.  A3. Measure the performance of networks |
| B. Subject-specific skills  B1. Solving some specific problems with different ideas related to the subject courses.  B2. Explore the web pages that concerned on networks.  B3. Manipulating some powerful software like packet tracer to design the networks. |
| Teaching and Learning Methods |
| Lecturing and Exercises and Homework. |
| Assessment methods |
| Exams |
| C. Thinking Skills  C1. Being able to form personal opinions about issues through attempting to solve different problems in the networks. |
| Teaching and Learning Methods |
| Lecturing & Class discussions |
| Assessment methods |
| Exams that involve problem-solving skills and critical thinking skills |
| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Effective communication to understand and imagine the idea behind the problem want to be solved.  D2. Team work |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exam | Lecturing, Discussions & Lab | Introduction to Computer Network |  | 4 | 1 |
| Exam | Lecturing, Discussions & Lab | OSI model, TCP/IP model |  | 4 | 2 |
| Exam | Lecturing, Discussions & Lab | Performance: Bandwidth, Throughput, Latency, |  | 4 | 3 |
| Exam | Lecturing, Discussions & Lab | Switching: Circuit Switching, Packet Switching. |  | 4 | 4 |
| Exam | Lecturing, Discussions & Lab | Transmission Media |  | 4 | 5 |
| Exam | Lecturing, Discussions & Lab | Data Link Layer |  | 4 | 6 |
|  |  | New Year Holiday |  |  | 7 |
|  |  | Exam (1) |  | 4 | 8 |
| Exam | Lecturing, Discussions & Lab | High Level Data Control Protocol |  | 4 | 8 |
| Exam | Lecturing, Discussions & Lab | Multiple Access Protocols |  | 4 | 9 |
| Exam | Lecturing, Discussions & Lab | Media Access Control: Ethernet, 802 Working Group, Encoding |  | 4 | 10 |
| Exam | Lecturing, Discussions & Lab | Logical Link Layer |  | 4 | 11 |
| Exam | Lecturing, Discussions & Lab | Switching Devices: Hubs, Repeater, MAUS, |  | 4 | 12 |
|  |  | Mid-Year Break |  |  | 13 |
|  |  | Exam (2) |  | 4 | 14 |
| Exam | Lecturing, Discussions & Lab | Network Layer IPv4, IPv6 |  | 4 | 15 |
| Exam | Lecturing, Discussions & Lab | Subnettiong |  | 4 | 16 |
| Exam | Lecturing, Discussions & Lab | Routers |  | 4 | 17 |
| Exam | Lecturing, Discussions & Lab | Address Resolution Protocol |  | 4 | 18 |
|  |  | Exam (3) |  | 4 | 19 |
| Exam | Lecturing, Discussions & Lab | Routing Algorithms |  | 4 | 20 |
| Exam | Lecturing, Discussions & Lab | Shortest Path, Link State, Distance Vector |  | 4 | 21 |
| Exam | Lecturing, Discussions & Lab | Hierarchical, Routing for Mobile Hosts |  | 4 | 22 |
| Exam | Lecturing, Discussions & Lab | Routing in the Internet: RIP, OSPF |  | 4 | 23 |
| Exam | Lecturing, Discussions & Lab | Transport Layer UDP TCP |  | 4 | 24 |
|  |  | Exam (4) |  | 4 | 25 |
|  |  | TCP Congestion Control |  | 4 | 26 |
| Exam | Lecturing, Discussions & Lab | The Application Layer |  | 4 | 27 |
| Exam | Lecturing, Discussions & Lab | Wireless and Mobile Networks |  | 4 | 28 |
| Exam | Lecturing, Discussions & Lab | Scheduling: FIFO, Priority, Round Robin |  | 4 | 29 |
|  | Lecturing, Discussions & Lab | and WFQ |  | 4 | 30 |
|  |  | Final Exam |  |  | 31 |

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| 11. Infrastructure | |
| * Data Communication and Networking Behrouz 2013 * Computer Networking A Top – Down Approach Kurose, Ross 2008   Computer Network Taenboum2004. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Software : Packet Tracer | 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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| 12. The development of the curriculum plan |
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**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 |
| **Control Engineering II / EE401** | 3. Course title/code |
| Electrical Engineering | 4. Programme(s) to which it contributes |
| Internal | 5. Modes of Attendance offered |
| Fourth Year Class | 6. Semester/Year |
| 90 | 7. Number of hours tuition (total) |
| 2021 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| Study and review the concepts of control engineering and modern control theories. In addition to teaching students how to derive the model for a given system, achieve the analysis and accomplish the design based modern techniques. | |

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| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **Hours** | **Week** |
| Exam | Lecturing, Discussions & Exercises | Introduction for frequency domain stability analysis | 3 | 1 |
| Exam | Lecturing, Discussions & Exercises | Nyquist plot | 3 | 2 |
| Exam | Lecturing, Discussions & Exercises | Nyquist stability criterion | 3 | 3 |
| Exam | Lecturing, Discussions & Exercises | Tutorial | 3 | 4 |
| Exam | Lecturing, Discussions & Exercises | Introduction to compensation design | 3 | 5 |
| Exam | Lecturing, Discussions & Exercises | Phase-Lead and Phase-Lag controllers design | 3 | 6 |
| Exam | Lecturing, Discussions & Exercises | Lead-Lag controller design | 3 | 7 |
| Exam | Lecturing, Discussions & Exercises | PID controller design | 3 | 8 |
| Exam | Lecturing, Discussions & Exercises | Tutorial | 3 | 9 |
| Exam | Lecturing, Discussions & Exercises | Introduction to nonlinear systems and types of nonlinearities. | 3 | 10 |
| Exam | Lecturing, Discussions & Exercises | Describing function analysis for nonlinear control systems | 3 | 11 |
| Exam | Lecturing, Discussions & Exercises | Concept of state, state variables, state vector and state space | 3 | 12 |
| Exam | Lecturing, Discussions & Exercises | State-space representation of continuous time systems | 3 | 13 |
| Exam | Lecturing, Discussions & Exercises | Obtaining the transfer function from state variable model | 3 | 14 |
| Exam | Lecturing, Discussions & Exercises | Tutorial | 3 | 15 |
| **Half – year break** | | | | | |
| Exam | Lecturing, Discussions & Exercises | Obtaining the state variable model from the transfer function | 3 | 16 |
|  |  | Controllable and observable canonical forms | 3 | 17 |
| Exam | Lecturing, Discussions & Exercises | Diagonalization and Jordan canonical form | 3 | 18 |
| Exam | Lecturing, Discussions & Exercises | Solution of linear time invariant state equation | 3 | 19 |
| Exam | Lecturing, Discussions & Exercises | Computation of state transition matrix by Laplace, state transition matrix and Cayley Hamilton theorem | 3 | 20 |
| Exam | Lecturing, Discussions & Exercises | Tutorial | 3 | 21 |
| Exam | Lecturing, Discussions & Exercises | Response of homogeneous and non-homogeneous systems | 3 | 22 |
| Exam | Lecturing, Discussions & Exercises | Tests for controllability and observability for continuous time systems | 3 | 23 |
| Exam | Lecturing, Discussions & Exercises | Time varying case, minimum energy control, time invariant case | 3 | 24 |
| Exam | Lecturing, Discussions & Exercises | Principle of Duality | 3 | 25 |
| Exam | Lecturing, Discussions & Exercises | Tutorial | 3 | 26 |
| Exam | Lecturing, Discussions & Exercises | Pole-placement design | 3 | 27 |
| Exam | Lecturing, Discussions & Exercises | State observer design | 3 | 28 |
| Exam | Lecturing, Discussions & Exercises | Equivalent frequency-domain compensator | 3 | 29 |
| Exam | Lecturing, Discussions & Exercises | Tutorial | 3 | 30 |

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| 12. Infrastructure | |
| **Modern Control Engineering, 5th ed, by Ogata,**  **Pearson , 2009.**  **Modern Control Systems, by Dorf and Bishop, 12th ed., Pearson, 2010.**  **Control Systems Engineering, by Nise, 7th ed., Wiley, 2014.** | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet links related to the topics discussed in the book and class, learn the simulators that have ability to model, analyze and design of the control systems. | 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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| 12. The development of the curriculum plan |
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