جمـهورية العراق

وزارة التعليم العالي و البحث العلمي

جـــــــــــامعة ميســـان

كـــليـــــة الهندســـــــة

قـســـم الكـــهرباء

Ministry of Higher Education and Scientific Research

Mayssan University

College of Engineering

Department of Electrical engineering

المناهج الدراسية ومفرداتها Curriculum& the unites لقسم الهندسة الكهربائية for electrical engineeringdepartment

وصف المنهج Course Description

2018-2017

Course Syllabi

يتكون المنهج في قسم الهندسة الكهربائية من أربع وثلاثين مادة سنوية موزعة على أربعة أعوام وتكون ما مجموعه ١٦٤ وحدة وكما هو موضح من خلال الجداول التالية:-

Current Electrical Engineering Courses for second year

second year

Code	Subject	Hours/Week						Units
		First Term			Second Term			
		Th.	Prac.	Tut.	Th.	Prac.	Tut.	
EEE201	Fundamentals of democracy	2	-	-	2	-	-	4
EEE202	Mathematics (II)	3	-	1	3	-	1	6
EEE203	Computer Programming	2	2	-	2	2	-	6
EEE204	Electronics (II)	2	-	1	2	-	1	4
EEE205	Electrical Circuits	2	-	1	2	-	1	4
EEE206	Electrical Machines (I)	2	-	1	2	-	1	4
EEE207	Electromagnetic Fields	2	-	1	2	-	1	4
EEE208	Laboratories	-	6	-	-	6	-	٦
Total		15	8	5	15	8	5	٣٨

Total hours per week

First term	Second term
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Class: Second year

Subject: Mathematics (II)

Theoretical: 3 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE202

1- Vector analysis: (44 hrs)

(i) Vector; scalars and vectors, component of a vector, rules of vector arithmetic, norm of a vector, normalizing of vectors, dot product, cross product, product of three or more vectors, equations of lines in space, planes in 3-space.

(ii) Vector-valued functions: limits and continuity, derivatives, forms of a curve equation in space, parametric representation, unit tangent and normal vectors, curvature, radius of curvature, motion along a curve, velocity, acceleration and speed, normal and tangential components of acceleration.

(iii) Partial differentiation:Function of two or more variables, limits and continuity, partial derivatives, partial derivatives of functions of two variables, partial derivatives of functions with more than two variables, the chain rule, the chain rule for derivatives, the chain rule for partial derivatives, directional derivatives and gradients, directional derivatives, the gradient, tangent plans and normal vectors, maxima and minima of functions of two variables, Lagrange multipliers.

(iv) Multiple integrals:Double integral, areas and volumes, double integral in polar coordinates, parametric surfaces, surface area, surface integrals, evaluation of volume and triple integral.

2- Differential Equations: (20 hrs)

(i) First Order: variable separable, exact, linear, Bernoulli.

(ii) second and Higher Order: Linear equation with constant coefficients, linear homogeneous equations with constant coefficients, non-homogenous equations, solving of non-homogenous equations, variation of parameters, higher order linear equations with constant coefficients, D-operator, Cauchy equation.

3- Fourier series: (8 hrs)

Periodic functions, Fourier series, Euler formula, even and odd functions, complex form of Fourier series.

4- Sequences and series: (18 hrs)

(i) Sequences: Convergence, test of monotone.

(ii) Series: n-th partial sum, geometric series, test of convergence, alternating series, power series.

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Class: Second Year

Subject: Computer Programming

Theoretical: 2 hr/wk

Tutorial: - hr/wk

Practical: 2 hr/wk

EEE203

1- C Language: (50 hrs)

A brief history, importance of C, simple program of C, identification, declaration, dada types, expressions, operators, arithmetic, logical, assignment, relation of operator bitwise, ternary, I/O operation, print statement, scan statement, getch statement, put statement, basic program control statement, nesting loop, While statement nesting (Do while) loop nesting loop, (if) statement, (if…else) nesting, switch statement break, continue statement, arrays, I-D arrays initialization, declaration storing, multidimensional arrays initialization, declaration application of 2D-arrays, character arrays, arrays and pointers, creating pointer, declaration pointer, initialization pointer and variable types, application on pointers file processing, types of files (sequential and random files).

2- Programming by Matlab: (10 hrs)

Variables, numbers, operations, functions, examples and applications, matrix operations in Matlab, plots in Matlab.

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Class: Second Year

Subject: Electronics (II)

Theoretical: 2 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE204

EEE 204

1- Bipolar Junction Transistors (BJT's) (12 hrs)

Basic transistor operation, volt-amper equations for the BJT, regions of operation, graphical analysis of BJT, regions of operation, stability and compensation graphical analysis of BJT as an amplifier, small-signal models, analysis of CE, CC and CB configurations, BJT as a switch, current sources using BJTs.

2- Field Effect Transistors: (16 hrs)

(i) Junction field-effect transistor (JFET): Physical operation and static characteristics.

(ii) Metal-Oxide semiconductors FET (MOSFET): Depletion-type MOSFET, enhancement-type MOSFET.

(iii) DC analysis of FET, the FET as an amplifier, graphical (load line) analysis, small-signal FET models, analysis of CS, CD and CG configurations, using FETs as switch, voltage variable resistor, and constant current source.

3-Multistage Amplifiers: (12 hrs)

Analysis of multistage amplifiers (voltage gain, current gain, ect.…), types of multistage amplifiers (cascade, … ect..)

4- Tuned Amplifiers: (10 hrs)

Transformer-coupled amplifiers, single-tuned amplifiers, tapped and double-tuned amplifiers.

5- Introduction to Four-Layer Devices: (10 hrs)

Description and operation of silicon controlled rectifier, diac, thyristor, GTO, and triac.

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Class: Second Year

Subject: Electrical Circuits

Theoretical: 2 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE205

1- The Transient Circuits: (12 hrs)

RC, RL, RLC circuit in series and parallel and their complete response in time and S-domain.

2- Polyphase Circuits: (12 hrs)

Single-phase three wire system, circle diagram, 3-phase balance and unbalance systems with star and delta connections, power in 3-phase circuits.

3- Coupling: (12 hrs)

Magnetic coupling, coefficient of coupling, equivalent circuits linear and ideal transformers.

4- Two-Port Networks: (12 hrs)

Two-port networks, y-z-h-g and ABCD parameters, image and iterative operations, attenuation and phase functions, loss of networks.

5- Filters: (12 hrs)

Constant k-filters, low pass and high pass, modern filter design, Butterworth and Chebyshev filters, network transformations and all pass filters, active filters.

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Class: Second Year

Subject: Electrical Machines (I)

Theoretical: 2 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE206

1- DC Machines: (22 hrs)

General principle of rotating electrical machines, and calculation of induced emf, energy, power, and torque in DC machines, constriction of DC machines, and function of commentator, type of armature windings calculation of mmf per pole, type of excitation connections, armature reaction, commutation, type and characteristics of DC generators, parallel operation of DC generators, losses and efficiency of DC machines.

2- Motors: (22 hrs)

Principle of operation of DC motors, calculation of speed, calculation of torque, starting of DC motors, characteristics of DC motors and their type, speed control of DC motors & electric breaking, testing of a DC machines.

3- Transformer: (16 hrs)

Transformer type and construction, transformer action, Faraday's and Lenze's law's, transformer general equation, voltage ratio, current ratio, power rating equations, volt per turn form general equation volt per turn in terms of power rating., losses in transformer, equations of these losses relating to transformer variables as a function to frequency and voltage (eddy current loss and hysteresis loss), tapping of transformer, regulation calculation using voltage values, equivalent circuit of the transformer, leakage reactance, equivalent resistances, reactance's, and impedances, phasor diagrams, short circuit test and open circuit test, regulation calculation using short and open circuit tests, power rating related to window and core area of transformer, efficiency calculation using short and open circuit tests, maximum efficiency, all day efficiency, short circuit times as related current rating, transformer polarity, parallel operation of transformers, three phase transformers, connection of three phase transformers, importance of connecting transformer neutral to the earth, phasor groups, zig-zag transformer, voltage grading of transformer, harmonics in transformer, auto transformers and their types, calculation of power rating of auto transformers

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Class: Second Year

Subject: Electromagnetic Fields

Theoretical: 2 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE207

1- Vector Algebra: (4 hrs)

The Cartesian coordinate system, vector components and unit vector field, dot product, cross product, circular cylindrical coordinates system, spherical coordinate system.

2- Coulombs Law and Electric Field Intensity: (6 hrs)

Coulombs law, electric field intensity-field of n-point charges, field due to a continuous volume charge distribution, field of line charge, field of sheet of charge, stream line and sketches of fields, electric flux density.

3- Gauss's Law and Divergence: (8 hrs)

Electric flux density, Gauss's law-application of Gauss's law, differential volume element-divergence, Maxwell's first equation.

4- Vector operator and Divergence Theorem: (6 hrs)

Energy and potential energy expended in moving a point charge, the line integral – definition of potential difference and potential, the potential field of point charge, the potential field of system charge, conservative property, potential gradient, the dipole.

5- Energy Density in Electrostatic Field: (6 hrs)

Conductors, dielectrics and capacitance, current and current density, continuity of current metallic conductors, conductor properties and boundary condition, method of image semiconductors, nature of dielectric material.

6- Capacitance: (7 hrs)

Poisson's & Laplace equations, examples of the solution of Laplace equation (1D), examples of the solution of Poisson's equation (1D).

7- The Steady Magnetic Field: (7 hrs)

Boit – Savart law, amperes circulatal law Curl Stockes theorem, magnetic flux and magnetic flux density.

8- The Scalar and Vector Magnetic Potential: (6 hrs)

Derivation of steady – magnetic field laws, magnetic forces.

9- Materials and Inductance: (5 hrs)

Force on moving charge, force on differential current element, force between differential current elements, force and torque on a closed circuit.

10- The Nature of Magnetic Materials : (5 hrs)

Magnetization and permeability, magnetic boundary conditions, the magnetic boundary condition, the magnetic circuit, potential energy and force on magnetic materials, inductance and mutual inductance.