جمـهورية العراق

وزارة التعليم العالي و البحث العلمي

جـــــــــــامعة ميســـان

كـــليـــة الهندســـــة

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 third year

Third year

Code	Subject	Hours/Week						units
		First Term			Second Term			
		Th.	Prac	Tut.	Th.	Prac	Tut.	
EEE301	Eng. and Numerical Analysis	3	-	1	3	-	1	6
EEE302	Electrical Machines (II)	2	-	1	2	-	1	4
EEE303	Electrical Power	2	-	1	2	-	1	4
EEE304	Electronics (III)	2	-	1	2	-	1	4
EEE305	Communication (I)	3	-	1	3	-	1	6
EEE306	Microprocessor	2	-	-	2	-	-	4
EEE307	Control (I)	2	-	-	2	-	-	4
EEE308	Elective Subject¤	2	-	1	2	-	1	4
EEE309	Laboratories	-	6		-	6		٦
Total		18	6	6	18	6	6	٤٢

Total hours per week

First term	Second term
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College of Engineering – Department of Electrical Engineering

Class: third Year

Subject: Engineering & Numerical Analysis

Theoretical: 3 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE 301

1- Fourier Transform: (10 hrs)

Properties, convolution theorem, power spectral, density and correlations, signals and linear systems, applications.

2- The Z-Transform: (10 hrs)

Region of convergence, properties of Z-transforms, Z-transform pairs, the inverse of Z-transform, analysis and discrete-time systems, applications.

3- Numerical Analysis: (10 hrs)

Solution of non-linear equations (Iteration, bisection and Newton-Raphson), finite deference, numerical differentiation and integration, numerical solutions of 1st order differential equations.

4- Matrix Analysis: (10hrs)

Review of matrix theory, linear transformation, Eign values and Eign vectors, Laplace transform of matrices, application of electric cct.

5- Statistics: (10 hrs)

Definitions, frequency distribution (relative & cumulative, mean, standard deviation).

6-Probability Theorem: (10 hrs)

Definitions, mutually exclusive and conditional probability, permutations and combinations, probability distribution functions (Binomial, Poisson).

7- Complex Variable Theory: (10 hrs)

Functions of complex variables, complex differentiation, analytic functions and its properties, integration in the complex plane, Cauchy's theorem, Cauchy's integral formula for simply and multiply connected regions, Taylor's and Laurent series, the residue theorem.

8- Solution of Differential Equations using power series: (10 hrs)

Legendre's equation, Legendre's polynomials, Bessel function of the first and second orders, Bessel function properties.

9- Partial Differential Equations: (10 hrs)

Wave equation, Laplace equation, solution of boundary condition problems, general solution, solution by separation of variables.

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College of Engineering – Department of Electrical Engineering

Class: third Year

Subject: Electrical Machines (II)

Theoretical: 2 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE 302

1- Three-Phase Induction Motors: (25 hrs)

Construction and principle of operation, equivalent circuit, torque-speed characteristics, starting and maximum torque, phasor and circle diagrams, starting of 3-phase induction motor, speed control of 3-phase induction motor, braking of 3-phase induction motor, induction generator.

2- Single Phase Induction Motor: (15 hrs)

Types of single-phase induction motors, double-field revolving, torque-speed characteristics, starting of single-phase induction motor, equivalent circuit and applications.

3-Synchronous Machines: (20 hrs)

Alternators, construction, salient and non-salient pole types, linear and non-linear analysis of cylindrical rotor, salient-pole machines (two-reactance and general methods),E.M.F. equation, armature reaction equation, power, parallel operation of synchronous generators, performance of generator connected to infinite-bus, V-curves, synchronous motor, method of starting, phasor diagram and equivalent circuit, hunting of synchronous machine.

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Class: third Year

Subject: Electrical Power

Theoretical: 2 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE 303

1- Sources of Electrical Energy: (8 hrs)

Structure of power system and its elements, major sources of primary energy, power stations, steam, hydro, gas turbines, nuclear, M.H.D generation, renewable energy sources, solar energy, wind generators, other renewable sources, AC and DC single and 3-phase transmission, development of electric power in Iraq.

2- Economical Aspects of Power Systems: (8 hrs)

Economics of generation, load curves, choice of size and number of generator units, effect of system voltage on transmission efficiency of power supply system, choice of transmission voltage, conductor size and Kelvin's law, power factor improvement, most economical power factor, tariffs.

3- Mechanical Design of Transmission Lines: (6 hrs)

Conductor materials, line supports, sag, calculation of sag, effect of wind and ice, insulators, voltage distribution over an insulator string, string efficiency, improving string efficiency.

4- Transmission Line Parameters: (6 hrs)

Line resistance, line inductance, single-phase line with multiconductors, bundling, line inductance of three-phase transmission systems, single-phase and three-phase capacitance.

5-Electrical Characteristics of Overhead Transmission Lines: (10 hrs)

Representation of lines, short, medium, long T.L., the equivalent circuit of a long transmission line, power factor flow through a transmission line, power circle diagram, line regulation, reactive compensation of transmission line.

6- Corona: (6 hrs)

Phenomenon, disruptive critical voltage, visual critical voltage, corona losses, factor and conditions affecting corona losses.

7- Underground Cables: (8 hrs)

Conductor materials, insulating materials, sheathing end armouring materials, types of cables, insulation resistance, stress and capacitance, use of intersheaths, capacitance grading, power factor in cables, capacitance in three core cables, thermal characteristics, comparison between overhead lines and underground cables.

8- Distribution: (8 hrs)

Single phase distributors, distributor fed from both ends, three phase distributors, three phase feeders, ring systems, distribution network arrangements.

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College of Engineering – Department of Electrical Engineering

Class: third Year

Subject: Electronics (III)

Theoretical: 2 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE 304

1-Operational Amplifiers: (6 hrs)

Characteristics and structure, inverting and non-inverting amplifiers, comparators, precision diode, rectifier, sample and hold circuits, peak detectors, Schmitt trigger, limiter, wave shaping, input offset voltage, input bias current and input offset current, slew rate, frequency response, full power response.

2- Active Filters: (6 hrs)

Filters concept, types, direct realization approach, simulated inductance methods, variable frequency, scaling methods, state variable filter, cascading realization approach, single operation amplifier structures, voltage controlled voltage source circuits, multiple loop feedback circuits.

3- Feedback Amplifier: (6 hrs)

Feedback concepts, types, effects and topologies, feedback analysis, voltage-series, voltage-shunt, current –series, and current-shunt, F.B. stability and response of feedback amplifiers.

4- Oscillators: (6 hrs)

Oscillator concepts, RC oscillator, LC oscillator, crystal oscillator.

5- Power Amplifiers: (6 hrs)

Class A, class B, class AB and push-pull amplifiers.

6- Analogue Multiplexers: (6 hrs)

Analogue multiplier operation, characteristics and applications.

7- Analogue Multipliers: (6 hrs)

Logarithmic multiplier, quainter-square multiplier, triangle-averaging multiplier, time division multiplier, current rationing multiplier.

8- Voltage and Current Regulators: (6 hrs)

Zener diode stabilizers, line regulation, voltage regulators, series regulators, shunt regulators, switching regulators, current regulators, typical current, grounded load C.R.

9- Analogue to Digital and Digital to Analogue Converters: (6 hrs)

Sampling rate and bandwidth requirements, quantizing and digitizing analogue information's, digitally controlled switches.

10- Multivibrators: (6 hrs)

Monostablemultivibrators, Astablemultivibrators, Bistablemultivibrators.

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College of Engineering – Department of Electrical Engineering

Class: third Year

Subject: Communication (I)

Theoretical: 2 hr/wk

Tutorial: 1 hr/wk

Practical: - hr/wk

EEE 305

1- Communication System Elements (Signal Analysis): (15 hrs)

Signal classification of periodic and non-periodic signals (Fourier series and Fourier transforms), classification of systems, power spectral density and correlations.

2-Noise: (10 hrs)

Types, power calculation, thermal white Gaussian noise (AWGN), band-limited noise (base band and band pass) noise through linear systems.

3-Linear Modulation: (16 hrs)

AM/DSB-SC, AM/DSB-LC, AM/SSB-SC, AM/VSB, frequency division multiplexing (FDM), commercial receivers (TRF and super-heterodyne), and noise in AM systems.

4- Angle Modulation: (14 hrs)

NBFM, NBPM, WBPM, noise in angle modulation systems.

5- Transmission Lines: (15 hrs)

Equivalent circuit, characteristic impedance, phase velocity, reflection coefficient, standing waves, quarter-wave transformer, Smith chart calculations and stub matching.

6- Digital Communication: (20 hrs)

Nyquist sampling theorem, pulse modulation PAM, PWM, PPM, time division multiplexing (TDM), noise in pulse modulation, pulse code modulation PCM/TDM, data modulation (DM), quantization noise in PCM and DM, signaling format (unipolar, bipolar, and split-phase Manchester), sinusoidal digital modulation ASK,PSK, FSK, and M-array, noise in ASK, PSK,FSK, (error probability using coherent matched filter and noncoherent detection).

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College of Engineering – Department of Electrical Engineering

Class: third Year

Subject: Microprocessor

Theoretical: 2 hr/wk

Tutorial: -hr/wk

Practical: - hr/wk

EEE 306

1- An Introduction to Computer Architecture: (8 hrs)

Introduction, CPU, memory

2- CPU and Memory Architecture: (15 hrs)

Architecture of CPU, frequency, memory architecture, access time, 2D addressing, memory types, secondary and main memory.

3- I/O Units: (12 hrs)

Ports, interrupt, DMA, keyboard, mouse, monitors.

4- Microcomputers: (8 hrs)

8085 Architecture, 8085 Is, 8085 microprocessor and I/O interfacing.

5- Interfacing: (10hrs)

Introduction, general I/O interfacing, examples.

6- Computer and Control: (7hrs)

General ideas, examples

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Class: third Year

Subject: Control (I)

Theoretical: 2 hr/wk

Tutorial: -hr/wk

Practical: - hr/wk

EEE 307

1- Basic Definitions: (6 hrs)

Systems, plant, linear systems, static system and dynamic systems, open loop and closed loop (feedback) systems.

2- Modeling of Control System: (6 hrs)

Mathematical modeling of electrical system, mechanical systems, block diagrams.

3- Time Domain Analysis: (8 hrs)

Time response of 1st order systems, time response of 2nd order systems, step response analysis and performance specifications.

4- Classical Design in S-Plane: (8 hrs)

Stability of dynamic systems, the Routh-Hurwitz stability criterion, root locus analysis.

5- Classical Design in Frequency Domain: (8 hrs)

Frequency domain analysis, the bode diagram, stability in the frequency domain, Nyquist stability criterion, closed loop frequency response.

6- Compensation: (8 hrs)

Lead compensation, lag compensation, lead-lag compensation.

7- PID Control and Introduction to Robust Control. (8 hrs)

Tuning rules for PID controllers, modifications of PID control schemes, two-degrees of freedom control, design considerations for robust control.

8- State Space: (8 hrs)

Definitions, the standard forms of state models (state variable form and diagonal form), Eign values, transfer functions and transfer matrix for state models, solution of state space equations, controllability and observabillity, state feedback design.