قسم الهندسة الكهربائية

College of Engineering

Electrical Engineering Department

2012-2013

First Year

No.	Subject	First Semester			Second Semester			units
		Hours			Hours			
		Theoretical	Tutorial	Practical	Theoretical	Tutorial	Practical	
GE101	Mathematics I	3	1	-	3	1	-	6
EE102	Computer Programming	1	1	2	1	1	2	4
GE103	English	1	1	-	1	1	-	2
GE104	Fundamental of Mechanical Engineering	2	1	-	2	1	-	4
GE105	Engineering Drawing	-	1	2	-	1	2	2
EE106	Electrical Engineering Laboratory	-	-	3	-	-	3	3
EE107	Fundamentals of Electrical Engineering	3	1	-	3	1	-	6
EE108	Solid State Electronics	3	1	-	3	1	-	6
EE109	Digital Techniques	2	-	1	2	-	1	5
GE110	Arabic Language	-	1	-	-	1	-	-
Total		15	7	8	15	7	8	38
		30			30			

GE101 - Mathematics I

Transcendental functions, Techniques of integrations, Further application of integration, Conic sections and polar coordinates, Vectors and the geometry of space , Vector valued functions and motion in space, Determinants, Matrices

EE102 - Computer Programming

Introduction, Variable types, conversion, arithmetic operations, and bitwise operations, I/O statements, Control statements, Loop statements: (for, while, do), Applications: summation, factorial, finding minimum and maximum, series, Arrays (one dimensional, two dimensional, and multidimensional), Pointers, Strings and characters, Subprograms: (function, procedure, variable scope, recursion…etc.), Structures, Macros, Files, Introduction to object oriented programming (OOP): (classes, functions, prototype, overloading), Introduction to Matlab Programming.

Note: Algorithms and flow charts are to be included in each of the above items.

GE103 - English Language

The course empowers students with the language and life skills they need to carry out their career goals. It provides ample opportunities for students to build awareness and practice the language in real-life scenarios. Its integrated skills approach develops the student's self-confidence to survive and succeed in professional and social encounters within an English speaking global community. The course is designed in five units .Each unit is composed of six lessons. The four skills of listening ،speaking, writing and reading are developed throughout each unit within a professional context.

GE- 104 Fundamentals of Mechanical Engineering

Statics ،Forces, Equilibrium, Friction, Moment of inertia, Parallel axes theorem ، 2nd moment of area by integration, Radius of gyration moment of inertia of composite area, Dynamics, Absolute motion, Relative motion, Kinetic, Thermodynamics, Active materials & their specifications, Open & closed system, Flow process.

GE105 - Engineering Drawing

See Mechanical Engineering Department Syllabus

EE106 - Electrical Engineering Laboratory

Experiments covering material on fundamentals of electrical engineering.

EE107 - Fundamentals of Electrical Engineering

Introducing the SI units. Resistance-resistivity, temperature coefficient of resistance, series and parallel connection, star/delta & delta/star transformation, ohms law, Kirchhoff's law. D.C. Network. Theorems for dependent & independent source Substitution and reciprocity theorems). Magnetic circuits, Kirchhoff's laws (Thevenin, Norton, Superposition, maximum power transfer, Millman, Hysteresis & eddy current losses. Basic electromagnetic- self and mutual inductance in D.C. circuits. Basic electrostatics- capacitors in D.C. circuits. Alternating voltage & current, single phase circuits, complex notations and phasor diagram. Network theorems for dependent and independent source. Power calculations and P.F. correction, resonance circuits and passive filters.

EE108 - Solid State Electronics

Electron Ballistics; Atomic Structure and Band Theory; Electrical Conduction in Metals; Semiconductor Physics; P_N Junction: pn junction at open circuit, forward bias, diffusion & recombination current components at forward bias, reverse bias, pn junction band diagram, depletion layer capacitance, diffusion capacitance, tunneling phenomenon, avalanche and zener breakdowns, Diode Applications: the diode as a circuit element, the diode as a non-linear device, static & dynamic resistance of the diode, piece-wise linear equivalent circuits, clipping circuits, clamping circuits, rectifier circuits, voltage regulation and ripple factor, the harmonic components in rectifier circuits, Inductive filters, capacitive filters, L-section filters, π-section filters, multiple L-section filters, d.c. power supplies, regulator circuits using zener diodes, regulator circuit stability, voltage multipliers, function generation; Other Devices: light emitting diodes, solar cells, photo diodes, pin diodes, semiconductor lasers, bipolar transistor (BJT), common base dc c/cs, common base amplifier, common emitter dc c/cs, low frequency small signal model, thyristor basic c/cs, triggering the SCR, SCR turn-off, other device structures.

EE109 - Digital Techniques

Introduction to digital techniques; System of numbers; numbers base conversions, Binary representation of signed numbers; Binary arithematics; Binary Codes; BCD arithematics; Logic gates; Universal building blocks; Boolean algebra: canonical and standard forms, Karnough map and Quine Mcclusky; Arithmetic circuits; Comparator circuits and code converter; Multiplexer and demultiplexer; Encoder and decoder; Sequential logic circuit: types of Flip-Flops, counters and shift registers.

قسم الهندسة الكهربائية

College of Engineering

Electrical Engineering Department

2012-2013

Second Year

No.	Subject	First Semester			Second Semester			Units
		Hours			Hours			
		Theoretical	Tutorial	Practical	Theoretical	Tutorial	Practical	
EE201	Microprocessor and Computer Architecture	1	1	2	1	1	2	4
GE202	Human Rights	1	-	-	1	-	-	2
EE203	Electrical Machines I	2	1	-	2	1	-	4
EE204	Numerical Analysis and Statistics	2	-	-	2	-	-	4
EE205	Theory of Electrical Field	2	1	-	2	1	-	4
EE206	Electronics I	2	1	-	2	1	-	4
EE207	Electrical Circuits	3	1	-	3	1	-	6
EE208	Electrical Engineering Laboratory	-	-	6	-	-	6	6
GE209	Mathematics II	3	1	-	3	1	-	6
Total		16	6	8	16	6	8	40
		30			30			

قسم الهندسة الكهربائية

EE201 - Microprocessor and Computer Architecture

Introduction to the Microprocessor and Computer: (A Historical Background, Numbering Systems, Computer Data Formats). The Microprocessor and its Architecture: (Internal Microprocessor Architecture, Real and protected memory addressing, Memory Paging, flat mode memory mode1). Addressing Modes: (Data Addressing modes, Program memory addressing modes, Stack memory addressing modes). Assembly Programming for 8088/8086 microprocessor Family: (Data transfer instructions, Arithmetic & Logic instructions, Program Control instructions, Procedures, using assembly language with c/c++ programming language). 8088/8086 Microprocessors Hardware specifications :(the pin assignment, clock generator, bus buffering and latching, bus timing). Memory Interface :(memory devices, Address Decoding, 8088, 80188 (8-bit) memory interface, (8086, 80186, 80286, and 80386SX) (16-bit) memory interface, (80386DX, and 80486) (32-bit) memory interface, Pentium through core2 (64- bit) memory interface, dynamic RAM interface). Basic Input/ Output Interface :(Introduction to I/O interface, I/O port address decoding, the programmed peripheral interface, 8254 programmable interval timer, 16550 programmable communication interface, Analog-to-Digital (ADC) and Digital-to-Analog (DAC) converts interface).

EE 203 - Electrical Machines I

Types of transformers, principle of operation, transformer losses, ideal transformer, real transformer, transformer voltage regulation, transformer efficiency, open circuit and short circuit test, per unit calculation, three phase transformers, parallel operation of transformers, autotransformers, current and voltage transformers. General d.c. machine principle, d.c. machine construction, windings, calculation of M.M.F., armature reaction, commutation, d.c. generators, parallel operation of d.c. generators, d.c. machines losses and efficiency, principle of operation of motors, speed calculation, torque calculation, starting of d.c. motors, types of motors, speed control, testing of d.c. machines.

EE204 – Numerical Analysis and Statistics

Review of matrices, Solutions of equations of one variable, Numerical interpolation, Least squares data fitting, Numerical integration and differentiation, Solution of sets of linear equations, System of non-linear equations, Finite difference & their applications, The numerical solution of differential equations, Multistep methods to solve differential equations. Basic probability concepts, Random variables and probability distributions, Expectations and moments, Functions of random variables, Some important discrete distributions, Some important continuous distributions. Observed data and graphical representation, Parameter estimation, Model verification.

EE205 - Theory of Electrical Field

Vector analysis; vector algebra, vector components and Coordinate systems; Coulombs law and electric field intensity; Electric flux density, Gausses law and divergence; Energy and potential; Conductors, dielectric and capacitance; Electrostatic fields; Electromagnetic field; Maxwell's equation.

EE206 - Electronics I

BJT operation; Biasing techniques for stabilizing Q-point, in BJTs; BJT equivalent circuits: h–Parameter model, π- model and Ebers-Moll model; FET operation; Biasing techniques for stabilizing Q-point, in FETS; FET equivalent circuits; Constant current source and level shifter Single and multi stage amplifiers; Power amplifier: class A, class B and class C amplifier; Tuned amplifier; SCR & UJT; Logic gates design; IC fabrication.

EE207 - Electrical Circuits

Two Port Networks, (Z, Y. H and ABCD) parameters and the relation between them, inter connected 2-port network; Operational Amplifier, Transfer characteristic of operational amplifier, its applications and cascaded op. amp. Circuits; Active Filters, Low pass filter (LPF) design, frequency response for amplitude LPF, High pass filter (HPF) design, frequency response for amplitude HPF, Band pass filter (BPF) design, frequency response for amplitude BPF, Band reject filter circuit and its frequency response for amplitude Band reject filter; Bode Plot, K gain factor, Integral and Derivative factors, First order factor, Second order factor and Frequency response; Routh's Stability Criterion, Locus Diagram. Mutual Inductance, Three Phase Circuits (balanced and unbalanced), Transient Analysis of First and Second Order Circuits for dc and ac, Laplace Transform and its Applications in Circuits Analysis.

GE09 - Mathematics II

Briefed syllabus: Multiple integrals, Infinite sequences and series, Fourier series, Partial derivatives, First order Ordinary Differential Equations (ODEs), Second order Ordinary Differential Equations (ODEs), Higher Order Linear Ordinary Differential Equations (ODEs), Systems of Ordinary Differential Equations (ODEs), Laplace Transforms (one sided).

قسم الهندسة الكهربائية

College of Engineering

Electrical Engineering Department

2012-2013

Third Year

No.	Subject	First Semester			Second Semester			units
		Hours			Hours			
		Theoretical	Discussion	Practical	Theoretical	Discussion	Practical	
EE301	Antenna & wave Propagation	3	1	-	3	1	-	6
EE302	Electronics II	3	1	-	3	1	-	6
EE303	Signals and Systems	2	1	-	2	1	-	4
EE304	Electrical Power I	2	1	-	2	1	-	4
EE305	Electrical Machines II	2	1	-	2	1	-	4
EE306	Communications I	3	1	-	3	1	-	6
EE307	Electrical Engineering Laboratory	-	-	6	-	-	6	6
EE308	Advanced Microprocessors	2	1	-	2	1	-	4
Total		17	7	6	18	7	6	40
		30			30			

EE301 - Antenna & Wave Propagation

Fundamentals of electromagnetic waves and Maxwell's equations and introduction to antenna; Isotropic point radiator and antenna parameters: Gain, efficiency, input impedance, and radiated power; Hertezian Dipole; Loop antenna; Finite length dipole: λ/4, λ/2, λ ,2λ, Nλ wavelength dipole; Array of point source; Array factor and pattern Multiplication; Hallen's equation; Methods of Moments and solution of Hallen's equation; Helical antenna; smith chart and impedance matching; Microstripe patch antenna; Microwave antennas; Reflector type antenna and radar equation; Electromagnetic waves Fundamentals and wave equation; Propagation in a lossless medium; Wave propagation in a conducting medium; Reflection by a perfect conductor; Reflection by a perfect dielectric; Radio wave propagation and polarization; Ionospheric propagation; Tropospheric scatter propagation; Ground wave propagations; Space wave and surface wave; Propagation over a plane earth; Propagation loss and power Budget calculations; Receiver input power & Receiver noise; Transmission lines; Propagation filters; Wave guides; Rectangular wave guide: TE, TEM, and TM modes.

EE302 - Electronics II

Basic IC amplifier stages at low frequencies: bias techniques for ICs, Differential amplifier using BJTs, JFETs and MOSFETs with passive and active loads, output stages; Operational amplifier characteristic using bipolar and BiMOS circuits; Frequency response of amplifiers; Feedback amplifier, Op-amp applications: linear and nonlinear applications; Linear oscillators; Wave shaping and waveform generators: comparators, regenerative comparators, square wave and triangular wave generators; Multivibrators: Transistor based and IC based Multivibrators; Analog Multipliers; Phase Locked Loop (PLL).

E303- Signal and Systems

Briefed syllabus: Signals and systems, Linear time-invariant systems, Fourier analysis for continuous-time signals and systems, Filtering, Sampling, The Bilateral Laplace transform, Z-transform, State space analysis

EE304 – Electrical Power I

General background; elements of power system; Radial, Parallel, Ring and interconnected systems; transmission line constants, performance of transmission line (short, medium and long), general 2 port constants (ABCD constants); power circle diagram; Corona; overhead transmission line insulators; sag and stress calculation; conductors types and performance of underground cables; economic operation of power system.

EE305 - Electrical Machines II

Three phase induction motors-3-phase a/c winding-the rotating electromagnetic field-the equivalent circuit-performance, other modes of operation-starting, Single phase induction motors-main and auxiliary windings-the doubt revolving field theory-the equivalent circuit-performance calculations, Three phase synchronous machines-basic theory of operation — voltage & torque equations for cylindrical rotor machines -voltage & torque equations for salient pole machines. Methods of starting synchronous motors.

EE306 - Communication I

Signals; Amplitude Modulation: (Normal AM, DSB-SC, SSB-SC, VSB and QAM) modulator and demodulator, AM Heterodyne receiver; Frequency Modulation: NBFM, WBFM, FM detection methods (PLL, zero crossing and frequency discriminator) , FM Heterodyne receiver; Frequency Division Multiplexing (FDM); Noise: Thermal noise, noise in AM and noise in FM; Discrete modulation; Digital modulation; Baseband modulation: PCM, Noise in PCM and probability of error in PCM; DM and ADM; Time Division Multiplexing (TDM); Band pass digital communication: OOF, ASK, (PSK,BPSK,QPSK, 8PSK,16PSK), FSK, NCPFSK and CPFSK and (QAM, 8QAM, 16 QAM…… 256 QAM); B.W in digital systems; Introduction to OFDM;

EE308 - Advanced Microprocessors

Review: (Assembly, memory interface, input/output interface). Interrupts: (Basic interrupts processing, hardware interrupts, expanding the interrupt structure, 8259A programmable interrupt controller, interrupt examples). BIOS system interrupts and BIOS function calls. Direct Memory Access (DMA) and DMA- controlled I/O: (Basic DMA operation, the 8237 DMA controller, shared-bus operation, disk memory systems, video displays). Bus Interface: (the ISA bus, the peripheral component interconnect (PCI) bus, the parallel printer interface (LPT), the serial (COM) ports, the universal serial bus (USB), accelerated graphics port (AGP)). Survey of microprocessors: (the 80188/80186, 80286, 80386 and 80486 microprocessors, the Pentium and Pentium Pro microprocessors, the Pentium II, Pentium III, Pentium 4 and core2 microprocessors). Special purpose and new microprocessors (Mobile Processor, monitoring processor, and DSP processor).

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College of Engineering

Electrical Engineering Department

2012-2013

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		Hours			Hours			
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GE103	English	1	1	-	1	1	-	2
GE104	Fundamental of Mechanical Engineering	2	1	-	2	1	-	4
GE105	Engineering Drawing	-	1	2	-	1	2	2
EE106	Electrical Engineering Laboratory	-	-	3	-	-	3	3
EE107	Fundamentals of Electrical Engineering	3	1	-	3	1	-	6
EE108	Solid State Electronics	3	1	-	3	1	-	6
EE109	Digital Techniques	2	-	1	2	-	1	5
GE110	Arabic Language	-	1	-	-	1	-	-
Total		15	7	8	15	7	8	38
		30			30			

GE101 - Mathematics I

Transcendental functions, Techniques of integrations, Further application of integration, Conic sections and polar coordinates, Vectors and the geometry of space , Vector valued functions and motion in space, Determinants, Matrices

EE102 - Computer Programming

Introduction, Variable types, conversion, arithmetic operations, and bitwise operations, I/O statements, Control statements, Loop statements: (for, while, do), Applications: summation, factorial, finding minimum and maximum, series, Arrays (one dimensional, two dimensional, and multidimensional), Pointers, Strings and characters, Subprograms: (function, procedure, variable scope, recursion…etc.), Structures, Macros, Files, Introduction to object oriented programming (OOP): (classes, functions, prototype, overloading), Introduction to Matlab Programming.

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GE105 - Engineering Drawing

See Mechanical Engineering Department Syllabus

EE106 - Electrical Engineering Laboratory

Experiments covering material on fundamentals of electrical engineering.

EE107 - Fundamentals of Electrical Engineering

Introducing the SI units. Resistance-resistivity, temperature coefficient of resistance, series and parallel connection, star/delta & delta/star transformation, ohms law, Kirchhoff's law. D.C. Network. Theorems for dependent & independent source Substitution and reciprocity theorems). Magnetic circuits, Kirchhoff's laws (Thevenin, Norton, Superposition, maximum power transfer, Millman, Hysteresis & eddy current losses. Basic electromagnetic- self and mutual inductance in D.C. circuits. Basic electrostatics- capacitors in D.C. circuits. Alternating voltage & current, single phase circuits, complex notations and phasor diagram. Network theorems for dependent and independent source. Power calculations and P.F. correction, resonance circuits and passive filters.

EE108 - Solid State Electronics

Electron Ballistics; Atomic Structure and Band Theory; Electrical Conduction in Metals; Semiconductor Physics; P_N Junction: pn junction at open circuit, forward bias, diffusion & recombination current components at forward bias, reverse bias, pn junction band diagram, depletion layer capacitance, diffusion capacitance, tunneling phenomenon, avalanche and zener breakdowns, Diode Applications: the diode as a circuit element, the diode as a non-linear device, static & dynamic resistance of the diode, piece-wise linear equivalent circuits, clipping circuits, clamping circuits, rectifier circuits, voltage regulation and ripple factor, the harmonic components in rectifier circuits, Inductive filters, capacitive filters, L-section filters, π-section filters, multiple L-section filters, d.c. power supplies, regulator circuits using zener diodes, regulator circuit stability, voltage multipliers, function generation; Other Devices: light emitting diodes, solar cells, photo diodes, pin diodes, semiconductor lasers, bipolar transistor (BJT), common base dc c/cs, common base amplifier, common emitter dc c/cs, low frequency small signal model, thyristor basic c/cs, triggering the SCR, SCR turn-off, other device structures.

EE109 - Digital Techniques

Introduction to digital techniques; System of numbers; numbers base conversions, Binary representation of signed numbers; Binary arithematics; Binary Codes; BCD arithematics; Logic gates; Universal building blocks; Boolean algebra: canonical and standard forms, Karnough map and Quine Mcclusky; Arithmetic circuits; Comparator circuits and code converter; Multiplexer and demultiplexer; Encoder and decoder; Sequential logic circuit: types of Flip-Flops, counters and shift registers.

قسم الهندسة الكهربائية

College of Engineering

Electrical Engineering Department

2012-2013

Second Year

No.	Subject	First Semester			Second Semester			Units
		Hours			Hours			
		Theoretical	Tutorial	Practical	Theoretical	Tutorial	Practical	
EE201	Microprocessor and Computer Architecture	1	1	2	1	1	2	4
GE202	Human Rights	1	-	-	1	-	-	2
EE203	Electrical Machines I	2	1	-	2	1	-	4
EE204	Numerical Analysis and Statistics	2	-	-	2	-	-	4
EE205	Theory of Electrical Field	2	1	-	2	1	-	4
EE206	Electronics I	2	1	-	2	1	-	4
EE207	Electrical Circuits	3	1	-	3	1	-	6
EE208	Electrical Engineering Laboratory	-	-	6	-	-	6	6
GE209	Mathematics II	3	1	-	3	1	-	6
Total		16	6	8	16	6	8	40
		30			30			

قسم الهندسة الكهربائية

EE201 - Microprocessor and Computer Architecture

Introduction to the Microprocessor and Computer: (A Historical Background, Numbering Systems, Computer Data Formats). The Microprocessor and its Architecture: (Internal Microprocessor Architecture, Real and protected memory addressing, Memory Paging, flat mode memory mode1). Addressing Modes: (Data Addressing modes, Program memory addressing modes, Stack memory addressing modes). Assembly Programming for 8088/8086 microprocessor Family: (Data transfer instructions, Arithmetic & Logic instructions, Program Control instructions, Procedures, using assembly language with c/c++ programming language). 8088/8086 Microprocessors Hardware specifications :(the pin assignment, clock generator, bus buffering and latching, bus timing). Memory Interface :(memory devices, Address Decoding, 8088, 80188 (8-bit) memory interface, (8086, 80186, 80286, and 80386SX) (16-bit) memory interface, (80386DX, and 80486) (32-bit) memory interface, Pentium through core2 (64- bit) memory interface, dynamic RAM interface). Basic Input/ Output Interface :(Introduction to I/O interface, I/O port address decoding, the programmed peripheral interface, 8254 programmable interval timer, 16550 programmable communication interface, Analog-to-Digital (ADC) and Digital-to-Analog (DAC) converts interface).

EE 203 - Electrical Machines I

Types of transformers, principle of operation, transformer losses, ideal transformer, real transformer, transformer voltage regulation, transformer efficiency, open circuit and short circuit test, per unit calculation, three phase transformers, parallel operation of transformers, autotransformers, current and voltage transformers. General d.c. machine principle, d.c. machine construction, windings, calculation of M.M.F., armature reaction, commutation, d.c. generators, parallel operation of d.c. generators, d.c. machines losses and efficiency, principle of operation of motors, speed calculation, torque calculation, starting of d.c. motors, types of motors, speed control, testing of d.c. machines.

EE204 – Numerical Analysis and Statistics

Review of matrices, Solutions of equations of one variable, Numerical interpolation, Least squares data fitting, Numerical integration and differentiation, Solution of sets of linear equations, System of non-linear equations, Finite difference & their applications, The numerical solution of differential equations, Multistep methods to solve differential equations. Basic probability concepts, Random variables and probability distributions, Expectations and moments, Functions of random variables, Some important discrete distributions, Some important continuous distributions. Observed data and graphical representation, Parameter estimation, Model verification.

EE205 - Theory of Electrical Field

Vector analysis; vector algebra, vector components and Coordinate systems; Coulombs law and electric field intensity; Electric flux density, Gausses law and divergence; Energy and potential; Conductors, dielectric and capacitance; Electrostatic fields; Electromagnetic field; Maxwell's equation.

EE206 - Electronics I

BJT operation; Biasing techniques for stabilizing Q-point, in BJTs; BJT equivalent circuits: h–Parameter model, π- model and Ebers-Moll model; FET operation; Biasing techniques for stabilizing Q-point, in FETS; FET equivalent circuits; Constant current source and level shifter Single and multi stage amplifiers; Power amplifier: class A, class B and class C amplifier; Tuned amplifier; SCR & UJT; Logic gates design; IC fabrication.

EE207 - Electrical Circuits

Two Port Networks, (Z, Y. H and ABCD) parameters and the relation between them, inter connected 2-port network; Operational Amplifier, Transfer characteristic of operational amplifier, its applications and cascaded op. amp. Circuits; Active Filters, Low pass filter (LPF) design, frequency response for amplitude LPF, High pass filter (HPF) design, frequency response for amplitude HPF, Band pass filter (BPF) design, frequency response for amplitude BPF, Band reject filter circuit and its frequency response for amplitude Band reject filter; Bode Plot, K gain factor, Integral and Derivative factors, First order factor, Second order factor and Frequency response; Routh's Stability Criterion, Locus Diagram. Mutual Inductance, Three Phase Circuits (balanced and unbalanced), Transient Analysis of First and Second Order Circuits for dc and ac, Laplace Transform and its Applications in Circuits Analysis.

GE09 - Mathematics II

Briefed syllabus: Multiple integrals, Infinite sequences and series, Fourier series, Partial derivatives, First order Ordinary Differential Equations (ODEs), Second order Ordinary Differential Equations (ODEs), Higher Order Linear Ordinary Differential Equations (ODEs), Systems of Ordinary Differential Equations (ODEs), Laplace Transforms (one sided).

قسم الهندسة الكهربائية

College of Engineering

Electrical Engineering Department

2012-2013

Third Year

No.	Subject	First Semester			Second Semester			units
		Hours			Hours			
		Theoretical	Discussion	Practical	Theoretical	Discussion	Practical	
EE301	Antenna & wave Propagation	3	1	-	3	1	-	6
EE302	Electronics II	3	1	-	3	1	-	6
EE303	Signals and Systems	2	1	-	2	1	-	4
EE304	Electrical Power I	2	1	-	2	1	-	4
EE305	Electrical Machines II	2	1	-	2	1	-	4
EE306	Communications I	3	1	-	3	1	-	6
EE307	Electrical Engineering Laboratory	-	-	6	-	-	6	6
EE308	Advanced Microprocessors	2	1	-	2	1	-	4
Total		17	7	6	18	7	6	40
		30			30			

EE301 - Antenna & Wave Propagation

Fundamentals of electromagnetic waves and Maxwell's equations and introduction to antenna; Isotropic point radiator and antenna parameters: Gain, efficiency, input impedance, and radiated power; Hertezian Dipole; Loop antenna; Finite length dipole: λ/4, λ/2, λ ,2λ, Nλ wavelength dipole; Array of point source; Array factor and pattern Multiplication; Hallen's equation; Methods of Moments and solution of Hallen's equation; Helical antenna; smith chart and impedance matching; Microstripe patch antenna; Microwave antennas; Reflector type antenna and radar equation; Electromagnetic waves Fundamentals and wave equation; Propagation in a lossless medium; Wave propagation in a conducting medium; Reflection by a perfect conductor; Reflection by a perfect dielectric; Radio wave propagation and polarization; Ionospheric propagation; Tropospheric scatter propagation; Ground wave propagations; Space wave and surface wave; Propagation over a plane earth; Propagation loss and power Budget calculations; Receiver input power & Receiver noise; Transmission lines; Propagation filters; Wave guides; Rectangular wave guide: TE, TEM, and TM modes.

EE302 - Electronics II

Basic IC amplifier stages at low frequencies: bias techniques for ICs, Differential amplifier using BJTs, JFETs and MOSFETs with passive and active loads, output stages; Operational amplifier characteristic using bipolar and BiMOS circuits; Frequency response of amplifiers; Feedback amplifier, Op-amp applications: linear and nonlinear applications; Linear oscillators; Wave shaping and waveform generators: comparators, regenerative comparators, square wave and triangular wave generators; Multivibrators: Transistor based and IC based Multivibrators; Analog Multipliers; Phase Locked Loop (PLL).

E303- Signal and Systems

Briefed syllabus: Signals and systems, Linear time-invariant systems, Fourier analysis for continuous-time signals and systems, Filtering, Sampling, The Bilateral Laplace transform, Z-transform, State space analysis

EE304 – Electrical Power I

General background; elements of power system; Radial, Parallel, Ring and interconnected systems; transmission line constants, performance of transmission line (short, medium and long), general 2 port constants (ABCD constants); power circle diagram; Corona; overhead transmission line insulators; sag and stress calculation; conductors types and performance of underground cables; economic operation of power system.

EE305 - Electrical Machines II

Three phase induction motors-3-phase a/c winding-the rotating electromagnetic field-the equivalent circuit-performance, other modes of operation-starting, Single phase induction motors-main and auxiliary windings-the doubt revolving field theory-the equivalent circuit-performance calculations, Three phase synchronous machines-basic theory of operation — voltage & torque equations for cylindrical rotor machines -voltage & torque equations for salient pole machines. Methods of starting synchronous motors.

EE306 - Communication I

Signals; Amplitude Modulation: (Normal AM, DSB-SC, SSB-SC, VSB and QAM) modulator and demodulator, AM Heterodyne receiver; Frequency Modulation: NBFM, WBFM, FM detection methods (PLL, zero crossing and frequency discriminator) , FM Heterodyne receiver; Frequency Division Multiplexing (FDM); Noise: Thermal noise, noise in AM and noise in FM; Discrete modulation; Digital modulation; Baseband modulation: PCM, Noise in PCM and probability of error in PCM; DM and ADM; Time Division Multiplexing (TDM); Band pass digital communication: OOF, ASK, (PSK,BPSK,QPSK, 8PSK,16PSK), FSK, NCPFSK and CPFSK and (QAM, 8QAM, 16 QAM…… 256 QAM); B.W in digital systems; Introduction to OFDM;

EE308 - Advanced Microprocessors

Review: (Assembly, memory interface, input/output interface). Interrupts: (Basic interrupts processing, hardware interrupts, expanding the interrupt structure, 8259A programmable interrupt controller, interrupt examples). BIOS system interrupts and BIOS function calls. Direct Memory Access (DMA) and DMA- controlled I/O: (Basic DMA operation, the 8237 DMA controller, shared-bus operation, disk memory systems, video displays). Bus Interface: (the ISA bus, the peripheral component interconnect (PCI) bus, the parallel printer interface (LPT), the serial (COM) ports, the universal serial bus (USB), accelerated graphics port (AGP)). Survey of microprocessors: (the 80188/80186, 80286, 80386 and 80486 microprocessors, the Pentium and Pentium Pro microprocessors, the Pentium II, Pentium III, Pentium 4 and core2 microprocessors). Special purpose and new microprocessors (Mobile Processor, monitoring processor, and DSP processor).

قسم الهندسة الكهربائية

College of Engineering

Electrical Engineering Department

2012-2013

Fourth Year

No.	Subject	First Semester			Second Semester			units
		Hours			Hours			
		Theoretical	Tutorial	Practical	Theoretical	Tutorial	Practical	
EE401	Control System Design	3	1	-	3	1	-	6
EE402	Engineering Project	1	-	1	1	-	1	4
EE403	Electronics III	2	1	-	2	1	-	4
EE404	Communications II	2	1	-	2	1	-	4
EE405	Electrical Power II	3	1	-	3	1	-	4
EE406	Machine & Power Electronics	3	1	-	3	1	-	4
EE407	Computer Networks	1	-	1	1	-	1	4
EE408	Electrical Engineering Laboratory	-	-	6	-	-	6	6
EE409	Digital Signal Processing	1	1	-	1	1	-	4
Total		16	6	8	16	6	8	40
		30			30			

قسم الهندسة الكهربائية

EE401 Control System Design

Introduction to Control Systems (Introduction, Examples of Control Systems, Closed-Loop Control versus Open-Loop Control). Mathematical Models of Control Systems (Linear Approximations of Physical Systems, The Transfer Function of Linear Systems, Mechanical Systems, Electrical and Electronic Systems, Block Diagram Models, Reduction of Block Diagram Rules, Multivariable Systems and Transfer Matrices, Design Examples, The Simulation of Systems Using Control Design Software). Feedback Control System Characteristics (Introduction, Error Signal Analysis, Sensitivity of Control Systems to Parameter Variations, Disturbance Signals in a Feedback Control System). Time response of linear time-invariant control systems. Control of the Transient Response (The Steady-State Error calculations, The Static Steady-State Error Calculations, Design Examples, Control System Characteristics Using Control Design Software). The Stability of Linear Feedback Control Systems (The Concept of Stability, the Routh-Hurwitz Stability Criterion, The Relative Stability of Feedback Control Systems, System Stability Using Control Design Software). The Root Locus Method (The Root Locus Concept, The Root Locus Procedure, Parameter Design by the Root Locus Method, Sensitivity and the Root Locus, The Root Locus Using Control Design Software). Control System Design Using Root Locus Approach. Introduction to system compensation (Design of serial compensators, Lead compensator design, Lag compensator design, Lag-lead compensator design, Design of parallel compensators). Frequency Response Methods and Control System Design Using Frequency Response. Design of conventional controllers (Proportional controllers, Proportional plus derivative controllers, Proportional plus integral controllers, Proportional plus integral plus derivative controllers). Introduction to Digital Control Systems.

EE403 – Electronics III

Sequence generators: design and applications; Analysis and design of synchronous state machines; Analysis and design of asynchronous state machines: timing problems in sequential logic circuits; A/D and D/A converters: types of error in converters, circuits, design of open-loop and feedback techniques; Logic families: principles and characteristics of different logic families (TTL, ECL, MOSFET, and I^2L); Semiconductor memory circuits: memory classification, memory architecture, implementation and applications; Programmable Logic Devices (PLDs): principles and design of array logic circuits, mask and field PLDs, sequential PLDs, complex PLDs, VLSI FPGAs; Hardware design of microcomputers.

EE404 - Communications II

Information Theory, Source of information, Entropy, Channel capacity, Source Coding Theorem, Mathematical model of information source, Huffman coding, Shannon-Fano codes, Types of errors, Data compression. Channel Coding, Taxonomy of codes, Spread Spectrum Systems: Introduction, Types of Spread Spectrum Techniques, Direct sequence spread spectrum, Frequency hop spread spectrum, Hybrid direct sequence/frequency hop spread spectrum, & Representation of spread spectrum systems; General Principles of CDMA, CDMA Transmission Channel Models, Examples for CDMA Systems. Wireless Ad-hoc Networks: Introduction to Ad hoc networks, MAC in Ad hoc network, Routing in Ad hoc network, Clustering in Ad hoc network, Power control in Ad hoc network, QoS of Ad hoc network, Applications of Ad hoc networks; Mobile Communication Systems: The Cellular Concept System, Design Fundamentals, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Trunking and Grade of Service, & Improving Capacity in Cellular Systems.

EE405 - Electrical Power II

Evolution of electric power systems; Power system representation; Per unit system; Balanced and unbalanced faults, Symmetrical fault calculations. Symmetrical components, Unsymmetrical faults; Synchronous machine in power system; Power system stability; Power system load flow problems. Direct methods involving inversion of the nodal admittance matrix, iterative methods Gauss-Seidal method, Newton Raphson method; Power system protection including generator protection, transformer protection, and transmission line protection, different types of relay construction and operation. Grounding types.

EE406 - Power Electronics & Machines

Power and Electronics Relationships: Introduction to Power Semiconductor Devices: Thyristors; Triac; Diac; GTO; BJT; IGBT; MOSFET; Optocouplers. Types of firing circuits; Pulse transformers; Free Wheeling Diode; Snubber circuits; thyristor cooling. Converters: series and parallel connection of Thyristors, Thyristor Valves; controlled and uncontrolled Rectifiers; single and three-phase. Force Commutated; Line Commutation Overlap Circuits. Harmonics in Converter Circuits: Methods of Reducing Harmonics PWM Harmonics Calculation. DC to AC PWM Inverters: single and three-phase; UPS. DC choppers and SMPS. AC to AC converters: AC Voltage Controllers; Cycloconverters. Introduction to speed control of DC and AC machines. Introduction to the principles of action of the following types of machines; Single phase series motor; Stepper and Servo motors. Shaded-Pole-Motors; Reluctance Motor; Permanent Magnet Machines; Solid Rotor Machine; Duel Fed Induction Machine; Model of High power small size Machines using Nano technology materials.

E408 - Computer Networks

Introduction to Computer Network, OSI model, Data flow in OSI model, Introduction to the TCP\IP model, Performance: Bandwidth, Throughput, Latency, Processing time, transmission time, Propagation time, Queuing time. Physical Layer, Data Link Layer, Network Layer, Transport Layer, Application layer, Introduction to Queuing Theory (Little's Law, m\m\1 queue, Scheduling: FIFO, Priority, Round Robin and Waited Fair Queuing WFQ), Introduction to Network Security.

EE 409 - Digital Signal Progressing

Classification of signals; Systems; Types of response; Correlation; Auto- & Cross-correlation; Power spectral density; Parsevals theorem; Wiener-Khintchine theorem; White noise; Band limited white noise; Detection by auto- & cross- correlation; Analog Filter Design: Types of filter responses; Butterworth & chebyshev filters; Filter order; Design procedures; The scope of DSP; Sampling and A/D conversion; Basic types of digital signals; Digital processors and Linear Time Invariant (LTI) systems; TMS family; Impulse response of the system; Step response of the system; Digital convolution; Difference equations; The Discrete Fourier Transform (DFT) of a periodic signals; Properties of DFT; Frequency response of LTI processors; Inverse Discrete Fourier Transform (IDFT); Basis of Fast Fourier Transform (FFT); FFT algorithms; FIR (Design of Finite Impulse Response); IIR (Design of Infinite Impulse Response) ; Applications of DSP; OFDM: General Principles, Implementation and Signal Processing Aspects for OFDM, Synchronization and Channel Estimation Aspects for OFDM Systems, Interleaving and Channel Diversity for OFDM Systems, Modulation and Channel Coding for OFDM Systems, & OFDM System Channel Equalizer.