

**Ministry of Higher Education
Higher Institute for Engineering
and Technology
at Manzala
Electronics Eng. Dept.**

**First year
First Semester**

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	BS110	Engineering Mathematics (3)	2	2	4	50	-	75	125	3
2	COM 111	Fundamental of Electrical Engineering	3	2	5	30	30	90	150	3
3	COE112	Computers Programming	3	2	5	30	30	90	150	3
4	BS111	Physics (3)	2	2	4	30	20	75	125	3
5	COM 113	Fundamentals of Electronic Engineering	3	2	5	30	30	90	150	3
6	BS100	English for Engineering (2)	0	2	2	15	-	35	50	2
TOTAL			13	12	25				750	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	BS120	Engineering Mathematics(4)	2	2	4	50	-	75	125	3
2	COM 121	Electronic Engineering	3	2	5	30	30	90	150	3
3	MEC12 1	Thermodynamics and Heat Transfer	3	2	5	30	30	90	150	3
4	COM 122	Electronic Tests (1)	2	3	5	30	30	90	150	3
5	COM 123	Electronic Measurements	2	3	5	30	20	75	125	3
6	BS8XX	Humanities (2)	2	-	2	15	-	35	50	2
TOTAL			14	12	26				750	

Lee. Lecture T: Tutorial L: Laboratory *Continuous O:Oral

BS: Basic Science Department Course COE: MEC: Mechanical Eng.

Computer Engineering

COM: Communication Eng.

**Ministry of Higher Education
Higher Institute for Engineering
and Technology
at Manzala
Electronics Eng. Dept.**

Third Year (Computer Engineering)

First Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	COE311	Computers Architecture (1)	3	2	5	30	30	90	150	3
2	COE312	Data Structures and Algorithms	2	2	4	30	20	75	125	3
3	COE313	Control Engineering	2	2	4	30	20	75	125	3
4	COE314	Operating Systems	3	2	5	30	30	90	150	3
5	COE31XE	Elective (1) from List (1)	2	2	4	30	20	75	125	3
6	BS300	Technical Writing in English	0	2	2	15	-	35	50	2
TOTAL			12	12	24				725	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	COE321	Data Bases	2	2	4	20	20	60	100	3
2	COE322	Computers Architecture(2)	3	2	5	30	20	75	125	3
3	COE323	Microprocessors and Assembly Language	2	2	4	20	20	60	100	3
4	COE32XE	Elective (2) from List (2)	2	2	4	30	20	75	125	3
5	COE32XE	Elective (3) from List (2)	2	2	4	30	20	75	125	3
6	COE324	Computer Networks (1)	2	2	4	30	20	75	125	3
7	BS8XX	Humanities (4)	2	-	2	15	-	35	50	2
TOTAL			15	12	27				750	

Lee. Lecture

T: Tutorial

L: Laboratory

O: Oral

BS: Basic Science Department

MEC: Mechanical Eng.

Continuous Course COE: Computer Engineering

COM: Communication Eng.

**Ministry of Higher Education
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and Technology
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Fourth Year (Computer Engineering)

First Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	COE 411	Information System Analysis and Design	2	2	4	30	20	75	125	3
2	COE 412	Computer Security and Information Policies (1)	2	2	4	20	20	60	100	3
3	COE 413	Design of Distributed - Data Bases	2	2	4	20	20	60	100	3
4	COE 414	Dynamic Web Site Development	2	2	4	20	20	60	100	3
5	COE 41XE	Elective (1) from List (3)	2	2	4	30	20	75	125	3
6	COE 41XE	Elective (2) from List (3)	2	2	4	30	20	75	125	3
7	COE 424	Project (1)	-	2	2	50	-	-	50	
TOTAL			12	14	26				725	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	COE 421	Programs Compilers	2	2	4	20	20	60	100	3
2	COE 422	Networks Programming and Management	3	2	5	20	20	60	100	3
3	COE 423	Computers Security and Information Policies (2)	2	2	4	20	20	60	100	3
4	MEC 424	Industrial Engineering	2	-	2	15	-	35	50	2
5	COE 42XE	Elective (3) from List (4)	2	2	4	30	20	75	125	3
6	COE 42XE	Elective (4) from List (4)	2	2	4	30	20	75	125	3
7	COE 424	Project (2)	-	4	4	50	100	-	150	-
TOTAL			13	14	27				750	

Lee. Lecture

T: Tutorial

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BS: Basic Science Department *: Continuous

MEC: Mechanical Eng.

Course COE: Computer Engineering

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Elective Courses
(Computers Engineering)
Third Year

LIST 1

COE 311E : Computers Architecture (3)
COE 312E : Programming for Artificial Intelligence.
COE 313E : Computer Graphics
COE 314E : Computer Peripherals
COE 315E : Advanced Object-Oriented Programming Systems
COE 316E : Unix System Administration
COE 317E : Introduction to Bioinformatics

LIST (2)

COE 321E : Analysis and Processing of Digital Signals
COE 322E : Multimedia Development
COE 323E : Webs Sites Developments
COE 324E : Geographic Information Systems (GIS)
COE 325E : Embedded Systems
COE 326E : Programmable Logic Controllers(PLC)
COE 327E : Computer Interfacing Design

Elective Courses
(Computers Engineering)

Fourth Year

LIST (3)

- COE 411E : Computer Control Systems
- COE 412E : Image and Sound Processing Systems.
- COE 413E : Computer Vision
- COE 414E : Parallel and Distributed Computer Systems.
- COE 415E : Software Engineering.
- COE 416E : Neural Networks and Fuzzy Control.
- COE 417E : Ergonomics.
- COE 418E : Safety and Security of Information Networks Systems

LIST (4)

- COE 421E : Computer Networks (2)
- COE 422E : Expert Systems
- COE 423E : Advanced Programming Languages
- COE 424E : Selected Topics in Computer Engineering
- COE 425E : Simulation of Engineering Systems
- COE 426E : Genetic Engineering
- COE 427E : Robotics Systems
- COE 428E : Decision Support Systems (DSS)
- COE 429E : Advanced Web Design

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Third Year (Communication Engineering)

First Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	COM 311	Communication Theory (1)	2	2	4	20	20	60	100	3
2	COM 312	Electromagnetic Waves	2	2	4	20	20	60	100	3
3	COM 313	Electronics (2)	3	2	5	30	20	75	125	3
4	COE 313	Control Engineering	2	2	4	20	20	60	100	3
5	BS300	Technical Writing in English	-	2	2	15	-	35	50	2
6	COM 31XE or COE 312	Elective from List (1)	2	2	4	30	20	75	125	3
7	COE 311	Computers Architecture (1)	3	2	5	30	30	90	150	3
TOTAL			14	14	28				750	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	COM 321	Communication Theory (2)	3	2	5	30	30	90	150	3
2	COM 322	Electronics Tests (3)	2	3	5	30	30	90	150	2
3	COM 323	Digital Signal Processing	3	2	5	30	30	90	150	3
4	COM 32XE	Elective from list (2)	2	2	4	30	20	75	125	3
5	COM 32XE	Elective from list (3)	2	2	4	30	20	75	125	3
6	BS8XX	Humanities (4)	2	-	2	15	-	35	50	2
TOTAL			14	11	25				750	

Lee. Lecture

T: Tutorial

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Course COE: Computer Engineering

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Fourth Year (Communication Engineering)

First Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	COM 411	Communication Theory (3)	3	2	5	30	30	90	150	3
2	COM 412	Electronics (3)	3	2	5	30	20	75	125	3
3	COM 413	Antennas and Wave Propagation	3	2	5	30	20	75	125	3
4	COM 41XE or COE 322 or COE X1X E	Elective 1 from list (3)	2	2	4	30	20	75	125	3
5	COM 41XE or COE 322 or COE X1X E	Elective 2 from list (3)	2	2	4	30	20	75	125	3
6	BS80X	Humanities (5)	2	-	2	15	-	35	50	2
7	COM 424	Project (1)	-	2	2	50	-	-	50	-
TOTAL			15	12	27				750	

Second Semester

No	Code	Course Name	Hours/Week			Marks			Total	Hrs
			Lee	T/L	Total	Term Work	O/L	Final		
1	COM 421	Communication Theory (4)	2	2	4	20	20	60	100	3
2	COM 422	Industrial Electronics	2	2	4	20	20	60	100	3
3	COM 423	Electronics Tests (4)	1	3	4	20	20	60	100	3
4	MEC 424	Industrial Engineering	2	-	2	15	-	35	50	2
5	COM 42XE or COE 327	Elective 1 from list 4	2	2	4	30	20	75	125	3
6	COM 42XE or COE 327	Elective 2 from list 4	2	2	4	30	20	75	125	3
7	COM 424	Project (2)	-	4	4	50	-	100	150	-
TOTAL			11	15	26				750	

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Elective Courses

(Communication Engineering)

Third Year

LIST (1)

COM 311E : Acoustics and Ultrasound Engineering

COM 312E : Computer Circuits Design

COM 313E : Optical Electronics

COM 314E : VLSI Design

COM 315E : Modern Communication Systems

COE 312 : Data Structures and Algorithms

LIST (2)

COM 321E : Printed Circuit Design and Fabrication

COM 322E : Mobile Communications

COM 323E : Fiber Optics

COM 324E : Power Electronics

Elective Courses

(Communication Engineering)

Fourth Year

LIST (3)

COM 411E : Broad Casting Video Conference

COM 412E : Digital Control Systems

COM 413E : Selected Subjects in Communication Engineering

COE 322 : Computers Architecture (2)

COE 314E : Computer Peripherals

COE 416E : Neural Networks and Fuzzy Control

LIST (4)

COM 421E : Satellite Systems

COM 422E : Telecommunications

COM 423E : Trouble Shooting of Digital Systems

COM 424E : Guidance and Control

COM 425E : Microwave Engineering

COM 426E : Digital Image Processing

COM 427E : Advanced Topics in Communication Engineering

COE 327 : Computer Interfacing Design

Electronics Engineering Courses

First Year

BS 110 Engineering Mathematics (3) (2+2)

Infinite Series -Expansions of Functions -Differential Applications : Upper and Lower Limits, Lagrange Equations-Differential Equations with higher orders, Complex Variables Vectors Analysis ,Scalar and Vector Product, Vector Differential-Gauss Theorem-Green Theorem -Stock Theory- sequence and series-Taylor's expansion.

COM 111 Fundamentals of Electrical Engineering (3+2)

Vectorial various presentations -charges column's law kirchow's law - electric field strength -electric flux -Gauss law –static electronic field in insulators - fields distribution -Maxwell's equation -laplace coefficient -direct electronic current -current density -power and Joule's law -resistance and electric conductivity - laplace equation for electrical conducting media -constant magnetic field -materials classification and its constructional properties -free electronic theory -layers theory - electrical insulator processes -optical processes of material -magnetic materials - ferrous magnetism -thermal effects .

COM 112 Programming Computer (3+2)

This course presents the Basic Concepts of object-oriented Programming : lexical analysis syntax analysis semantic considerations -Basic Methods for Moderns and Structural Languages -Program Framework - looping -Pointers - Arrays -Functions Classes -Object programming -Files -Structure and Union .

BC111 Physics (3) (2+2)

Heat radiation Optics: Reflection, refraction, interference, diffraction- Polarization optic equipment - Electro Light Effect-Electromagnetic Theory - Parts and Waves - Positive Theory of Light Spreading-Principle of Interference -Principles of Laser Fundamentals of Modern Physics-application of optics.

COM113 Fundamentals of Electronic Engineering (3+2)

Energy levels - charge carriers - transfer phenomenon – diodes - properties and applications for dipoles units -transistor work -static and dynamic properties-thyrstor - unipole units - - basic properties of MOSFET- JFET valves-optical devices -radiation transfer - photocells -laser properties-integrated circuits technology applications - crystal growth - oxidation - propagation - printing and digging of circuits - Field effect transistors - Transistor biasing and circuits - analysis of transistor circuits - transistor amplifier circuits - Frequency response of amplifiers.

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BS120 Engineering Mathematics (4) (2+2)

Laplace transform - inverse Laplace transform - Laplace transform for derivatives and integrals-solution of integral differential equations -periodical function applications . Special functions :- (Beta function -Gamma function -Bessel function -B'essel functions from the first and second types)-partial differentiation - wave equation in one direction-variable separation -Dalimbert method for solving the wave equation -heat propagation in one direction - Laplace transform in polar coordinates .

OM121 Electronic Engineering (3+2)

Introduction to digital electronics: manufacturing technology of the integrated circuits- properties of the digital circuits using dipoles transistor- overview on the logical gates families ,their types and specifications - gates fabricated from the metallic transistors -oxide - Imiconductors and properties of PMOS -CMOS gates-Logical cuits for regeneration - P-N junctions-Diodes and diode Circuits - close Schmidt method-multiple frequency circuits-semiconductors memories -Read only memories types - power sources and regulators --physical properties for semiconductors-charge carrier-(P-N) connection theory - Introduction to differential amplifiers and current mirrors - operational amplifiers - feedback amplifiers - frequency response - wave form generators and wave shapping - Active filters -switched capacitor filter - power electronic circuits : Regulated power supplies - Regulators and power amplifiers.

Principle of thermodynamics -fluid motion -the ideal gas -first law for thermodynamics -reversal and non reversal processes -second law for thermodynamics -thermal cycle -thermal equilibrium degree -motion theory for gases -heat transfer by conduction -free convection -forced convection -heat exchange-principle of fluid mechanics -fluid properties -Bernoulli's equation and its applications -dimensional analysis -model dynamics and analysis.

COM122 Electronic Tests (1) (2+3)

Lab experiments which covers :- principal of electric circuits , electronic circuits and electronic components -principles of computer systems and its components peripheral units and their test methods -lab experiments which covers :- basics of electronics and integrated circuits , using the testing and measuring devices - measuring methods ,elements and test methods of the computer hardware and trouble shooting.

Units-measurement standards- Error in measurements-Measurement principles-analysis, characteristics and applications of instruments used in electrical engineering such as current, voltage, power, impedance, measurement, signal generator - signal analyzer- transducers - actuators - Measurement of process variables - oscilloscope - Instrument calibration.

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Second Year

BS210 Engineering Mathematics (5) (2+2)

Furrier series-numerical analysis - Integrals and transform-finite difference - Newton methods for integration - periodical polynomials -numerical integration and numerical differentiation-least square method-curved connection-linear programming-theory of probability and stochastic -random variables .

COM211 Design of electrical Circuits (2+2)

Direct current circuits - Kirchoff' s laws - Network analysis -network theory circuits and analysis techniques such as node analysis , mesh analysis , superposition and Thevenin's and Norton's equivalent circuits- Inductance and capacitance -- first order circuits and their responses second order circuits and their responses - Sinusoidal steady state analysis – phasor – diagram - three phase circuits mutual inductance and ideal transformers-frequency response Laplace transform and its applications - Fourier analysis

COM212 Electromagnetic (3+2)

Review of vector calculus - orthogonal coordinates-coulomb and Gauss Laws-Electrostatics-Magnetism-Magnetic Field-Maxwell's Equations -Traveling waves and Phasors -Application of Maxwell's Equations-pulse propagation in one direction-transmission line equations- reflection coefficient-capacitance and induction calculation-smith chart- plan waves -reflection from a dielectric of fiber and integrated optics-Laplace and Poisson's equations-Numerical Methods for Electromagnetic Waves Analysis

COM 213 Object - Oriented programming (3+2)

Concepts of object - Oriented programming - Classes, inheritance and message passing fundamentals of Java programming language and its syntax-major class libraries in Java-Java applets-Graphic User Interface programming - practice on Java programming language - Major class library in Java-practice in Java programming languages - Applications of Java to XML data - Java networking features.

COM214 Design of Logic & Digital Circuits (2+2)

Boolean algebra - Logic gates - Logic Minimization - Logic and digital units concepts-number systems and data representation-k-maps Boolean algebra-decision elements - combinational and sequential circuits -- flip - flops - minimization techniques , design and construction of logic subsystems - such as decoders , multiplexers , adders , and multipliers - Combinational logic circuits - sequential logic circuits -Introduction to AID and DIA converters - Introduction to digital Integrated circuits.

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BS 220 Engineering Mathematics (6) (2+2)
Sets-Groups-Relations and Functions-Finite Elements-Partial Differential Equations -Computer Applications to initial value and boundary value problems- Numerical Methods.

COM 221 Design of Electronic Circuits (3+2)
Semiconductors and their characteristics. P-n Junction. Diodes and diode circuits. Bipolar junction transistors. Field-effect transistors. Transistor biasing and circuits. Analysis of transistor circuits. Transistor amplifier circuits. Frequency response of amplifiers. Introduction to differential amplifiers and current mirrors. Operational Amplifiers-741 op-amp circuits, Feedback amplifiers. Comparators. Waveform generators and waveshaping. Active filters. Switched-capacitor filters. Power electronic circuits: Regulated power supplies, regulators, and power amplifiers.

COE 222 Computer Applications in Electronic Engineering (2+2)
Theories and Techniques of Numerical Analysis-Using Software Packages in Electronic Engineering- e.g Mat Lab-Lab View-Circuit Maker-etc for Design and Study Circuits Properties and Electronic Systems -Control Systems -Design of Electronic Equipments-Computer modeling of communication system.

COM 223 Electronic Tests (2) (2+3)
These experiments concerned by: Computer Architecture concepts- Computer peripherals and interfaces- Communication circuits - Electronic devices- Control circuits and computer control-Electronic units perporites- Computer control processes.

COM 224 Electrical machines (3+2)
Transformers- DC machines- AC machines- Synchronous machines- Special electrical machines (Step motors- Fixed magnet machines- Two phase servo motors)- Electronic control of electrical machines- UPS systems- Power distribution networks- Earthing -Protection of electric equipment.

Third Year

(Computer Engineering)

COE311 Computer Architecture (1) (3+2)

Introduction- Computer Instructions- Timing- Input/output-interrupt circuits- Design of simple computer- principles of Assembly Language and its properties- Assembler properties- Macros- CPU organization- Bus- Arithmetic and logic unit- Instruction types(RISC-CISC)- Types of addressing- Microprocessor organization- Micro program control organization- control memory- sequential addressing-sequential Micro programs- types of Micro programs- Design of mathematical processor- Methods for handling signed numbers- Input/ output organization- Memory Hierarchy- Linked Memory- Virtual Memory- Volatile memory- cache design- Performance measurement-structure of instruction set- Design of data Buses for the processor-Memory Architecture- Multiprocessing for input/output operations.

COE 312 Data structure and Algorithms (2+2)

Theoretical and realistic data structure and methods of its treatment- Linear lists- arrays- Trees- Gueus with priority- stacks-Assemblable stacks- Balanced Trees structures- Advanced balanced trees structures- application for problem solving- including avoiding repetition in choosing validation methods- advanced storing methods-searching- Efficiency of handling methods- Entity Relationship diagram- Severe cases Analysis- Minimum level of problem complexity- principle Methods in Algorithm Design including Decomposition- Debugging- Resuming and dynamic programming-operations on trees and lists in memory and storage media.

COE 313 Control Engineering (2+2)

Introduction to Automatic Control systems Modeling of physical systems -- Laplace Transform - Transfer Function -- Block Diagram - Signal Flow Diagram - Open loop and closed loop systems - Disturbances - Steady State Errors - stability - Root Locus methods frequency analysis - stability analysis in time and frequency domains -performance of dynamic systems-state space representation- compensators-phase lead-phase lag-controllers design in time domain - PID controllers-computer control- PLC-Matlab tool boxes applications-Time domain Design and Frequency domain design of control systems.

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COE 314 Operating systems (3+2)

Operating system concept- Functions- structure- Kernel-Interrupts- System calls- concept of operation Execution- procedures-Synchronization- scheduling-paging- Task switching- Memory management- File system- protection organization- Application on windows and Unix- Synchronous programming- logic structure of operating system- File and memory Management- System components- Network concepts.

COE 321 Data Bases (2+2)

Introduction to Data Base concepts- Data Base structure- Data Base Management systems components- storing and Indexing- Data Models for Hierarchical Data Base- Relational Data Base- Distributed Data Base- SQL- GBE- Data Base Theory- Normalization- Primary Keys- Analysis- Functional Dependence- Multivalued Dependence-Data Base Implementation- Administration- Security- Concurrence control Data Compression- Sizing and Timing.

COE 322 Computer Architecture (2) (3+2)

Pipe lined processors- High speed Memory Systems- parallel programming- Multiprocessors- Multithreaded processors- small and large- scale multiprocessor systems- shared Memory coherence and

COE 323 Microprocessor and Assembly Language (2+2)

Microprocessor Architecture- Microprocessor Programming and Interfacing- Types of Microprocessor- Assembly Language- Software Development- Input/ Output Design- Applications- Interfacing-Connection- Memory components- Support Circuits- Machine Language and Assembly Language.

COE324 Computer Networks (1) (2+2)

Concepts of communication Networks- Network Technologies-Measurements- protocols and Architecture of computer Networks-Client/ Server Computing- Socket programming- Naming and Addressing media access protocols- Routing Techniques- Network Organization based on the ISO system- Telephony network- ISDN,B-ISDN- signal switching- standards for network Design- Layer and Hierarchical concepts- Frame relay- ATM- Bridges- Routers).

Fourth Year
(Computer Engineering)

COE 411 Information system Analysis and Design (2+2)

Information system Development Cycle- System Analysis -System Design- System programming- Implementation- Testing-Updating- Documentation- CASE package- CASE studies for hospital Information Design and Electronic Library Design-Introduction to Software Engineering.

COE 412 Computer Security and Information Policy (1) (2+2)

Numbering systems- Encryption Algorithms- Network protection- Random Numbers- Numerical and Digital Operations Algorithms- symmetrical and convention encryption methods-symmetrical and primary keys encryption- Electronic signature and confirmation protocols- e- mail protection and security- piracy tools-programs and networks used by pirates for illegal access to information- Information protection Policies.

COE 413 Design of Distributed Data Base (2+2)

Definitions- classification and structuring- Design of Distributed Data Base- advanced query optimization- Query processing-transaction processing- data models and architectures- data management for engineering application areas, including-Bioinformatics- The Internet and data mining- E- R diagram-Normalization- Advanced SQL- Client/ server environment- Object oriented Data Bases- Design and use of Data Base in the web context-web server design.

COE 414 Dynamic Web site Development (2+2)

Element of the Java script Language- Variables- Effects- Data conversion rules- operator priorities - Development of Java script-created objects- screens- Documents- Usage of object for animation - Timins objects- Interactive forms- Frame overview.

COE 421 Programs Compilers (2+2)

Introduction to compiling Techniques including parsing algorithms- schematic processing and optimization- logical and syntax analysis- Regular expression- context- free grammars- Top- Down parsing- efficient parsing- syntax- Directed translation- Intermediate formats- Control flow and data flow- block structures- Procedures calls- Symbol tables- Run- time storage- Error Detection and Recovery- Code optimization- Code generation.

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COE 422 Networks programming and Management (3+2)

Concept of Network Administration - Security management - Integrated Network Administration structures- Network Configuration and signals - Network protocols - Internet Operating System- Encoding and Modulation - Transmission Media - Connection Interfaces- Error detection and correction.

COE 423 Computer Security and Information Policies (2) (2+2)

Knowledge - Data and Information- value of Information-Information growth- Information Technology Boundaries and limitations- social effects of IT- Role of Communication systems-Information and professionalism bad conduct and Information piracy-Legal issues- Misuse of programs and data- Data protection and Legalization- IT code ethics- IT protection- Information protection- Computer protection Structures- Determining security needs inside the network- Data bases and applications on the web- Methods of establishing different protection issues- cryptosystems and cryptanalysis- secure storage- security kernels- Trust Management-Preventing Software vulnerabilities- applied cryptography- Network security.

MEC 424 Industrial Engineering (2+0)

This course provides fundamental concepts for production systems. This course covers demand forecasting. Hierarchical production planning, capacity planning, facilities planning, operation scheduling. Also the topics covered the linear programming, transportation model, network models, simulation model- Materials ing and materials Handling.

COE 424 Project (1) & Project (2) (0+2) (0+4)

The student chooses a project among the approved and offered projects in the department in any of the computer fields and their applications . He will make a plan for the project and collect the needed materials .Students are required to submit and present the project proposal to their project committee appointed by the department.

**Third Year (Computer Engineering)
Elective Courses**

COE 311 E Computer Architecture (3) (2+2)
Systems design methods - vertical machines - system performance - design of orders groups and simplification , memory elements names - programs addresses space - memory assignment -microprocessor and memory interface - linkage memory - high- level computer languages - control structures for microcode - control structures in prolog language : variables types and processing - value representations and operations implementation .

COE 312 E Programming for Artificial Intelligence (2+2)
Condensed introduction to programming by using LISP language and overall review for programming by PROLOG language - programming application in AI field focused on structure of customer accounting system - including research operations - logic -representations ... etc - decision making under uncertainty.

COE 313 E Computer Graphics (2+2)
Fundamentals of computer graphics : Interactive graphics vector generation and point - plotting display . graphical input devices windowing clipping view ports , zooming , geometrical transformations . 2d and 3d algorithms - - advanced raster display architecture . raster algorithms -- special graphic techniques : depth , clipping , dynamic projections , hidden surface , removal , stereopsis , shading , intensity and color , practice with the graphical software Inputs/outputs units -- Monitors - audio-enhanced keyboard -printer and plotters-taps and hard disks- tools such as MathCAD, Corel Draw, Photoshop and 3D-studio Max .

COE 314 E Computer Peripherals (2+2)
Inputs /outputs units – Monitors – audio – enhanced keyboard – printer and plotters – taps and hard disks - input and outputs peripherals for storages- magnetic disks-optical disks-Automation of magnetic tapes-library-hardware maintenance -different computer connection – serial – parallel – AGP - Ir - USB.

COE 315 E Advanced Object – Oriented programming systems (2+2)
Object programming: advanced basics, different components with emphasis on a specific language (e.g. Java) for to applied the language principal: objects-methods- inheritance- messages- applications. Automatic management for memory general programming by using functions and templets standard library algorithms-using inheritance to reuse and generalize the programs.

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COE 316 E UNIX System Administration (2+2)

Unix system security Unix system installation Files and Folders management - Users accounting management - Hardware management - System definition - System maintenance - Safety and troubleshooting for Unix server - Definition of Linux operating system and development for modern operating system administration for the stand alone-system or small networks Installation of two or more unix variant (Linux, Free BSD, Solaris) on Intel or spare platforms - configuration of mail - name services and other network utilities - Back up and recovery - security and ethics.

COE 317 E Introduction to Bioinformatics (2+2)

The design and use of computational techniques in genetics. biotechnology, and biology , algorithms and software for sequential alignment, similarity search of sequence databases, structural prediction, inference , searching public genome databases , overview of search tools and packages.

COE 321 E Analysis and Processing of Digital Signals (2+2)

Signal analysis by Fourier (series - transform) - linear , continues and discrete analysis systems (z- transformations) - analog and digital filters analysis - signals and digital systems - transform from analog to digital and vice verse - digital simulation for analog systems - selected topics in digital signal processing - combinational circuits - sequential control.

COE 322 E Multimedia Development (2+2)

Multimedia definition - Multimedia application: Business - education different life fields study of different hardware : memory - strategy media - different inputs outputs devices , study the basic application software uses in Multimedia applications : texts -sound - images - video , selected tropics in Multimedia .

COE 323 E Webs Sites Developments (2+2)

Multimedia - Software and Hardware - application program for multimedia development (text - Audio - Video).

COE 324 E Geographically Information Systems (GIS) (2+2)

Study the graphics program uses in geographically information systems study the different methods used in manipulation and scattering images study different mathematical technique to determined the points levels and find the nearest route between two points and determined the earth nature .

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COE 325 E Embedded Systems (2+2)

Microcontrollers and their applications in embedded systems -topics include assembly and C++ for microcontroller - programming, serial and parallel I/O interfacing, and multimedia interfacing -students perform laboratory experiments and final project to develop a microcontroller - based embedded system.

COE 326 E Programmable Logic Controllers (PLC) (2+2)

Historical development for PLC inputs outputs/ control processing units inspection - principal of programming – solenoids – ON - OFF units Relay control - counters - timers sequencer - problem solver - sequential control by using programmable logic controllers - step programs - Interfacing - sensors and Actuators.

COE327E Computer Interface Design (2+2)

Main Interface circuits units - Direct memory access theory -Interrupts circuits - Synchronized communication circuits - parallel communication Systems - Noises and errors.

**Fourth Year (Computer Engineering)
Elective Courses**

COE 411E Computer Control Systems (2+2)

Samples theory Z-transformation time and frequency analysis - open loops systems - time response and characteristics -discrete systems balance - design of digital filters structure - micro process applications in digital processors - processing lag systems -non - linear control systems .

COE 412E Image and Sound Processing Systems (2+2)

Fundamental concepts - processing methods for digital image -hardware application - software to processing sound and image - 2d transformations - initial processing - image enhancement - image restoration - image compression applied some theories on the experimental problems sound and image files types and their properties .

COE 413E Computer Vision (2+2)

Digital image and their properties - data structures for image analysis -- representation images for processing - image formation -engineering transforms image restructures knowledge based techniques - 3d vision - object representation and recognition - shading texture - linear and non linear mathematical transformation .

COE 414E Parallel and Distributed Computer Systems (2+2)

Shared and distributed memory computers systems Architecture -Operating Systems of Distributed Computers -Networks -Distributes Databases- parallel computations -- Interprocess communication and synchronization terminal, file transfer and message handling protocols -- algorithms for deadlock detection - concurrency control and synchronization in distributed systems - - Network security and rivacy - resource control and management.

COE 415E Software Engineering (2+2)

Programming life cycle and their applications - evaluation techniques for customers' requirements - software structural design -software properties and measurements - project management and their applications.

COE 416E Neural Networks & Fuzzy control (2+2)

Introduction to natural Neural structure introduction to Artificial Neural Networks and parallel processing Artificial Neural Networks main components , Neural Networks classification supervised Neural Networks learning ,self organizing learning , Neural Networks design preprocessing data ,network structure ,learning Algorithms Artificial Neural Networks multilayer models ,Hopfield model Boltezman model , Neural Networks and expert systems ,multilayer nevrnal network applications .

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COE 417E Ergonomics (2+2)

The course emphasizes Human-Machine- environment systems, Workplace layout, Tool design, Occupational fatigue. Environmental effects on human performance which include the effects of noise, Vibration, and atmospheric factors.

COE 418E Safety and Security of Information Networks Systems (2+2)

Information systems- Data transfer technology- Local and distributed information- Computer securing - Data securing-Application- S/W and H/W used for security.

COE 421E Computer Networks (2) (2+2)

Advanced course in networks: Network protocols - Distributed systems- Internet protocols- Transfer protocols- Introduction to VPN-Firewalls protecting networks standards- VPN structures and benefits-Firewalls Settings, construction and management.

COE422E Expert systems (2+2)

Review for fundamentals of AI representation method for logical programming Knowledge - Expert system architecture (knowledge rules - main work memory - user - Inference) - Rules - Frameworks - Inference systems.

COE423E Advanced Programming Languages (2+2)

Development of programming languages – programming – languages processors - language structures - compile phases – data structures and types - control structure working time factors - memory management - review for some languages - prolog - LISP- ADA .

COE 424E Selected Topics in Computer Engineering (2+2)

Faculty and Students are selected the topics. This course is flexible and concerned by current developments in computer engineering. Course contents including the hardware, software, and the protection and security systems.

COE 425E Simulation of Engineering Systems (2+2)

Introduction to modeling and simulation of discrete and continuous systems - simulation languages: SLAM - SimScript – GPSS – SIMAN.

COE 426E genetic engineering (2+2)

Introduction to genetic engineering fundamentals concepts for genetic engineering digital and numerical representation for chromosomes - case study to apply genetic engineering algorithms to he optimal solution .

COE 427E Robotics Systems (2+2)

Robot mechanical and dynamics introduction to computer engineering - trajectory planning and control - sensing instruments to robot control (force - motion) - Robotic vision and visual feedback -robot programming languages - robot applications .

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COE 428E Decision Support Systems (2+2)

Features, Uses , and design strategies of decision support systems-model-based, data - based, and Knowledge-based support systems to aid managerial problem solving.

COE429E Advanced Web Design (2+2)

Developing webpage mapping - creative navigation bar -using frames in web design -adding reliability and powerful properties to webpage -dynamic webpage design tools .

Third Year

(Communication Engineering)

COM 311 Communication Theory (1) (2+2)

Analog to digital converter -introduction to communication systems -Power spectrum -Amplitude modulation using carrying signal -Amplitude demodulation -Narrow band frequency modulation -Phase modulation - phase and frequency demodulation -Amplitude and frequency modulated receivers - impulse modulation PAM ,PWM ,PPM -Noises in modulation systems.

COM 312 Electro Magnetic Waves (2+2)

Maxwell Equations -lorentez power low polarity -Pointing theory -Non electro magnetic waves - Maxwell equation static solutions -dipoles medium types - Polarized medium - homogeneous medium -plazma -boundary conditions - transmission and reflections of plane waves - non vertical projection for plane waves in lossless medium.

COM 313 Electronics (2) (3+2)

Amplifiers classifications-Feedback circuits -Feedback circuits analysis - frequency noises high frequency models -common emitter transistor characteristics -common collector operation characteristics with high frequency - Steady state analysis -Bode plot - using spice performance classes : "A" class- "AB" class-power amplifiers IC's ,controled power amplifiers.

COM 321 Communication Theory (2) (2+2)

Signal analysis and processing in communication systems principles of amplitude angular and pulse modulation. Analysis of Analog and Digital Communication systems-Types of Analog and Digital Modulation - Adaptive filters - Receiver Design - Rate of binary error in channels - Binary rate – Symbol rate - Source types -Amplitude, Frequency and Phase modulation-Coding: Amplitude, cy and phase.

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COM 322

Electronic Tests (3)

(2+3)

Analog and Digital communication - Signal source - Filters and resonance circuits -Amplitude Modulation - Frequency modulation - Sampled data and shape modulation-Code modulation -Amplitude modulation transmitter-Frequency Modulation Transmitter-Summing circuits for frequency modulation Transmitter-Analog to Digital Converters - Direct current control - Stepper motor control - Thermal control -Speech analysis-Sequential transistors Amplifier-Frequency behavior of audio amplifier-Micro electronic systems-Analog integral Transmitter.

COM 323

Digital Signal Processing

(3+2)

Discrete - time signals and systems - Linear time-invariant systems and their properties - Sampling of continuous - time signals and convolution. IIR and FIR filter designs- Effects of finite word length-The discrete Fourier transform - Fast Fourier transform algorithms - Relations between Fourier Transform (FT)- Discrete-frequency FT (DFFT) or Fourier series, Discrete - time FT (DTFT), and Discrete FT (DFT: Discrete both time and frequency).

Fourth Year

(Communication Engineering)

COM 411 Communication Theory (3) (3+2)

Fax System cylindrical and linear transmitters -receiver relatively between transmitter and receiver-photographic transmission instantaneous reception-noise -Matched filter receivers - - source coding and data compression-Block codes-cyclic codes - convolution codes-Data Transmission-Transmission, encoding , decoding , error detection , error correction- Electromagnetic Waves Transmission systems Transmission Lines Waveguides and resonators -Maxwell Equations - Plan waves and noise in communication system -Flow of Electromagnetic power - Channel cooling system for error detection and correction - reflection and refraction - directed waves -TEM waves - Hollow wave directives - synchronization subsystems -Resonators -- Fiber optics -- Matters and Molecules - Antennas and Electromagnetic Energy propagation - Elements of Radar and Radio waves transmission systems-Digital Communication-Encoding of communication Channels.

COM 412 Electronics (3) (3+2)

Basics of operational amplifier subtracter - transient characteristics of OP-Parameter measurements for the OP -Frequency response of the OP - Parameter of the OP - simple applications of the OP - Analog computers - active filters - AC to DC conversion - logarithmic and exponent amplifier - analog to digital conversion digital to analog conversion - pressure amplifiers - oscillators phase locked loops - oscillator circuits using resistance , condensers and OP - Venn bridge oscillator - fine training circuits -communication circuits -laser systems Quantum mechanical principles - Atomic Structure - Energy band theory - Energy band and charge carriers in semiconductors and metals.

COM 413 Antennas and Wave Propagation (3+2)

Basic definitions and theorems- Formulation of the radiation problems - Isotropic point source - Power and field patterns - Directivity and gain - Radiation impedance - Wave polarization - Radiation from current elements- Analysis and design of linear wire antenna - Linear array antenna- Uda - Yagi antenna - Log-periodic antenna- Aperture antenna- Antenna measurement techniques.
Basic principles and analytical techniques of electromagnetic wave propagation-Transmission lines- Waveguides and resonators-Basic microwave networks-Scattering.

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COM 421 Communication Theory (4) (2+2)

Communication systems - audio and radio frequency-different types of radio amplifiers-mixing methods - video amplifiers - oscillators - receivers - super hetrodyn - sensitivity - sound control - televisions - video cameras - Circuit switching and packet switching - Performance estimation – Congestio Control-Digital Communication - modulation-principles of ASK,PSK,FSK - channel coding - Mobile communication - optical communication.

COM 422 Industrial Electronic (2+2)

The usage of electronics in measurement equipments: Length temperature - self waves and its usage in intelligence systems - circuit breakers and its usage in industry and traffic control noise measurement system - different heating system using high frequency for conductive materials-sensitivity systems-loading systems temperature recording and magnetic amplifiers-exhaust system analysis-control system for power electronics-voltage, current, transconductors transistors amplifiers.

COM 423 Electronic Tests (4) (1+3)

Differential amplifiers - non linear amplifiers circuits - active filters - robot assembly-exercises for robotics - application exercises on antennas and television - study and representation of lighting model for antenna transmitters -drawing of performance curves and analysis -directives-experiments on audio communication-experiment on mixing and transmission.

COM 424 Project (1) & Project (2) (0+2) (0+4)

The student chooses a project among the approved and offered projects in the department in any of the electronic and communication fields and their applications. He will make a plan for the project and collect the needed materials. Students are required to submit and present the project proposal to their project committee appointed by the department.

Third Year (Communication Engineering)

Elective Courses

COM 311E Acoustics and Ultra Sounds Engineering (2+2)

Acoustic waves propagations, Optical energy transformers tubes ,gaps ,waves containers and filters, noise listening and speaking Acoustics architecture ,voice emattion applications ,alra sound industrial applications .

COM 312E Computer Circuit Design (2+2)

Introduction to digital electronic- IC's fabrication technology-Binary circuit characteristics using transistors-logic gates families-types and characteristics, metal transistor gates- oxide -semiconductor and gates characteristics NMOS, CMOS, PMOS , regeneration digital logic circuits , flip-flops, schmit impulse - multi vibrator circuits temporary ICS semiconductor memory - ROM types ,static and dynamic writing ,power sources and regulators ,Energy loss Data Bus.

COM 313E Optical Electronics (2+2)

Light emitting semiconductors-optical writing processes-non homogenous positive and negative connections -light emitting devices - photocells .

COM 314E Printed Circuit Design and Fabrication (2+2)

Printed Circuit Board (PCB) scales (size and types)- Surface treatments- Capacitors and coils for PCB connection- Spaces connection- Actual resources and earth's connectors- Components for positioning- Cooling requirements and Group density- Tests for surface- Design rules for different PCB and their applications: Digital, Analog, High frequency, and auto-technical. Programs for PCB design- PCB safety- Light printing- Silc-screen printing- Electronic boards fabrication- Auto-mechanical operations in PCB technology-Multi-layered boards- Technical methods for welding and assembly

COM 315E Modern Communication Systems (2+2)

Digital communication systems synchoronized and asynchoronized computer communication - communication and transfer devices distributors transferring networks open communication networks and their ideal model - Linear signals -Communication services - Radio communications.

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COM 322E Mobile Communication (2+2)

Principles of cellular radio Mobile radio propagation and channel modeling , Multiple access methods , Physical and Logical channels , Digital mobile communication systems :TDMA , GSM , CDMA , WCDMA , multi - carrier and OFDM systems .

COM 323E Fiber Optics (2+2)

Fiber Optic basic principles - Fiber Optic communications - wave propagation -Fiber optics cables and materials calculations - Fiber Optics characteristics measurements.

COM 324E Power Electronics (2+2)

Characteristics of power electronic devices- Power diodes, SCR, GTO, power bipolar, Power MOSFET, Characteristics of magnetic materials, Power transfer core, Iron powder core, Converters AC to DC, DC to AC Frequency change, Solid state motor device, Direct current motor control, Inductor motor control.

**Fourth Year (Communication Engineering)
Elective Courses**

COM 411E Broadcasting and Video Conferencing (2+2)

Mointors types - TV cameras and video sound and video recording devices
- video devices - video conference devices - Communication protocols.

COM 412E Digital Control Systems (2+2)

Discrete-time systems - the Z-transform ,sampling and reconstruction -- state space description - stability of digital control system - Digital Control System - Design using transforms and state space methods non-linear control- digital control system components - Program development - Systems integrity - Design the fabrication Steps.

**COM 413E Selected topics in communication (2+2)
Engineering**

The instructor divides the students into groups to design and implement a small project in their main branch.

COM 421E Satellites Systems (3+2)

Satellites general characteristics Satellites communication systems - receivers and antenas - satellites waves and communication devices.

COM 421E Telecommunications (2+2)

Wireless telephony - Client circuits - Communication cables -Used tones - Telephony circuits- Communication methods- Electronic communication- Communication between cities.

COM 423E Trouble Shooting of Digital Systems (2+2)

The students will exploit fault diagnosis for computers and Networks using software and hardware components- Test of continuity- Types of system components- System Analysis and performance evaluation.

