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COMPUTER ENGINEERING CURRICULA

FIRST YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE111	Principles of Electronic Engineering	4	2	6	٣٠	30	٩٠	150	3
٢	ECE112	Electrical Circuit (1)	4	2	6	٣٠	30	٩٠	150	3
٣	ECE113C	Computer Programming	4	2	6	٣٠	30	٩٠	150	3
٤	MPE/STRU181	Civil and Mechanical Engineering	3	2	5	٤٥	-	80	125	3
٥	EMP181	Mathematics (2)(A)	3	2	5	٤٥	-	٨٠	١٢٥	٣

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٦	GEN181	Engineering Legislation	2	-	2	١٠	-	٤٠	٥٠	٢
		Total	٢٠	١٠	٣٠				٧٥٠	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE121	Electronics(1)	4	3	7	٤٥	30	١٠٠	175	3
٢	ECE122	Electrical Circuit (2)	3	2	5	٢٥	25	٧٥	125	3
٣	ECE123	Lab (1)	-	4	4	٣٠	20	٥٠	100	2
٤	ECE124C	Computer Applications(1)	3	4	7	٤٥	30	100	175	3
٥	EMP181	Mathematics (2)(B)	3	2	5	٤٥	-	٨٠	١٢٥	٣
٦	GEN182	English Language(2)	-	2	2	١٥	-	٣٥	٥٠	٢
		Total	١٣	١٧	٣٠				٧٥٠	

SECOND YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE211	Electrical and Electronic Measurements	4	2	6	٣٠	30	٩٠	150	3
٢	ECE212	Principles of Electromagnetic	4	2	6	٣٠	30	٩٠	150	3
٣	ECE213C	Computer Organization(1)	3	2	5	٢٥	25	٧٥	125	3
٤	ECE214C	Computer Programming(2)	4	2	6	٣٠	30	90	150	3
٥	EMP281	Mathematics (3)(A)	3	2	5	٤٥	-	٨٠	١٢٥	٣

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٦	GEN28x	Elective Humanities	2	-	2	١٠	-	٤٠	٥٠	٢
		Total	٢٠	١٠	٣٠				٧٥٠	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE221	Signal Analysis	4	2	6	٣٠	30	٩٠	150	3
٢	ECE222	Electronics(2)	4	3	7	٤٥	30	١٠٠	175	3
٣	ECE223	Lab (2)	-	4	4	٣٠	20	٥٠	100	2
٤	ECE224C	Logic Circuits	4	2	6	٣٠	30	90	150	3
٥	EMP282	Mathematics (3)(B)	3	2	5	٤٥	-	٨٠	١٢٥	٣
٦	GEN280	Technical Reporting(1)	-	2	2	١٥	-	٣٥	٥٠	٢
		Total	١٥	١٥	٣٠				٧٥٠	

THIRD YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE311C	Microprocessor Systems	4	2	6	٣٠	30	٩٠	150	3
٢	ECE312C	Control Systems (1)	4	2	6	٣٠	30	٩٠	150	3
٣	ECE313C	Operating Systems	4	2	6	٣٠	30	٩٠	150	3
٤	ECE314C	System Analysis and Design (1)	3	2	5	٤٥	-	80	125	3
٥	ECE315C	Data Structures	3	2	5	٤٥	-	٨٠	١٢٥	٣

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٦	GEN38x	Elective Course Humanities (3)	2	-	2	١٠	-	٤٠	٥٠	٢
		Total	٢٠	١٠	٣٠				٧٥٠	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE321C	Electronic Circuits(1)	3	2	5	٤٥	-	٨٠	125	3
٢	ECE322C	Computer Architecture	4	2	6	٥٠	-	١٠٠	150	3
٣	ECE323C	Database Design	3	2	5	٢٥	25	٧٥	125	٣
٤	ECE324C	Lab (3)	-	4	4	٣٠	20	50	100	2
٥	ECE34xC	Elective Course(1)	4	2	6	٥٠	-	١٠٠	١٥٠	٣
٦	EPE381	Electrical power and Machines	3	1	4	٣٠	-	٧٠	١٠٠	٣
		Total	١٧	١٣	٣٠				٧٥٠	

FOURTH YEAR

FIRST SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/ practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE411C	Computer Graphics	3	2	5	٢٥	25	٧٥	125	3
٢	ECE412C	Artificial Intelligence	3	2	5	٢٥	25	٧٥	125	3
٣	ECE413C	Computer Networks(1)	3	2	5	٢٥	25	٧٥	125	3
٤	ECE414C	Project	-	3	3	٦٠	-	-	-	-
٥	ECE44xC	Elective Course(1)	4	2	6	٥٠	-	١٠٠	١٥٠	٣

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٦	ECE44xC	Elective Course(2)	4	2	6	٥٠	-	١٠٠	١٥٠	٢
		Total	١٧	١٣	٣٠				٦٧٥	

SECOND SEMESTER

Serial	Course Code	Course Name	Hours/week			Grades				Test Time
			Lecture	Practical/practice	Total	Course Work	Oral or Practical	Written Exam	Total	
١	ECE421C	Compilers	4	2	6	٤٠	20	٩٠	150	3
٢	ECE422C	Lab(4)	-	5	5	٢٥	25	٧٥	125	2
٣	ECE414C	Project	-	5	5	٧٠	120	-	250	-
٤	ECE44xC	Elective Course(1)	4	2	6	٥٠	-	١٠٠	١٥٠	٣
٥	ECE44xC	Elective Course(2)	4	2	6	٥٠	-	١٠٠	١٥٠	٣
		Total	١٢	١٦	٢٨				٨٢٥	

FIRST YEAR

FIRST SEMESTER

ECE 111: Electronic Engineering Fundamentals   **(4+2)**

Electric conduction mechanisms in conductors and semiconductors-semiconductor doping-energy bands-charges dynamics in semiconductor-bipolar junction and transistor fundamentals-electric machines fundamentals: generators and motors.

ECE 112: Electric Circuits (1)   **(4+2)**

The wave behavior- passive electric circuits-Kirchhoff's laws- different techniques for solving electrical circuits- node voltage technique-mesh current technique-the power in alternating current circuits-the effective and average value of sinusoidal waves-compound power-maximum power factor-Electric circuits behavior-nonlinear resistance-the effect of temperature on resistances and changing its value with temperature.

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ECE 113C: Computer Programming (1)   **(4+2)**

Introduction to programming concepts, Program flow charts, Structured programming in one of the programming languages, Loops, Arrays, Procedures (Functions), Records, Linked lists, Pointers and Recursion.

MPE/STRU 181: Mechanical and Civil Engineering   **(3+2)**

Principles of thermodynamics, Fluid movement, Ideal gas, First law of thermodynamics, Reversible processes, irreversible processes, Second law of thermodynamics, Heat cycle, Thermal equilibrium degree, Gases movement theory, Conduction, Convection, Radiation, Heat exchange, Principles of fluid mechanics

Principles of Architectural and building construction, Building types, Materials used in construction, partitions and its specifications, Methods of thermal insulations, moisture, noise and environmental effects, Methods to prepare a fire protection buildings, Specifications required to prepare the buildings to be a communication centers and its location of usages, Architectural and civil drawings and their testing and commissioning.

EMP181 Mathematics (2)(A)   **(3+2)**

Infinite series, Functions expantion, Diffretiation applications, Maximum and minimum limits, Lagrange multiplications, Restricted maximum and minimum limits applications, High order differential equations, Complex variable functions, Vectors analysis, Standards and vector fields, Vector diversion, Standard fields talus, Vector field alignment, Gauss's theory, Green's theory, Stocke's theory.

GEN 181: Engineering Legislation   **(2+-)**

Laws and responsibilities concerning with engineers – Decision of law of contracts –explanation of laws concerning of engineering in any of that fields.

Syndicate of engineer laws – contracts town planning laws – building construction laws , High ways laws – land distribution laws – agriculture land laws – safety rules and regulation for industrial fields , operation of cranes – environmental protection , insurance laws (accident , fires) investment laws , irrigation laws , the relation between owners , rental-employment laws – industrial union.

FIRST YEAR

SECOND SEMESTER

ECE 121: Electronic (1)   **(4+3)**

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Bipolar junction applications-Transistor theory of operation-transistor dynamic and static characteristics-Thyristor-Unijunction devices-the basic characteristics-light emitting devices principles-Laser from semiconductors- light detectors-photocells-Laser characteristics and applications-the integrated circuits technology-the crystal growing-oxidation-film predeposition - Diffusion-and circuit printing and etching

ECE 122: Electric circuits (2)   **(3+2)**

Three phase system-loads in three phase systems- unbalanced operation in electric circuits-transit and steady state in electric circuits-electric circuits analysis using the computer program PSPICE

ECE 123: Lab (1)   **(0+4)**

Electronics basics-logic circuits-using measurement and testing instruments-measurement techniques-elements and techniques in testing and programming the computer

ECE 124C: Computer Applications (1)   **(3+4)**

Study of computer applications in the field of information systems and the Internet, Study of the languages required to build and manage interactive web sites.

EMP182 Mathematics (2)(B)   **(3+2)**

Complex Variable Functions, Complex Quantities Algebra, Multivalues Functions, Analytical functions and Couchy's theory, Complex Series, Taylor and Lourant's seires, Zeroes and Singular points, Infinite series.

GEN 182: English Language (2)   **(-+2)**

A comprehensive curriculum to teach English language to engineering students with concentrating on electrical engineering and computer terminology, Grammar, Grammatical structures, Writing and essay, Teaching using computers, Using multimedia on computers to teach English, Developing reading capabilities.

SECOND YEAR

FIRST SEMESTER

ECE 211: Electric and Electronic Measurement   **(4+2)**

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Definitions-the functions and characteristics of measurement instruments-the standard measurements- statistical analysis for errors in measurement-oscilloscope- signal generator-digital measurement instruments-recording measurement instruments-transducers-data conversion – computer based testing.

ECE 212: Fundamentals of Electromagnetic (4+2)

Direction analysis-static electric field main relations-Gauss's law-Laplace equation-Poisson equation-electrostatic energy-magnetic field theorem-magnetic induction- Faraday's laws-analogy between the electric and magnetic fields-time continuity equations-boundary conditions-time alternating fields and Maxwell's equations

ECE 213C: Computer organization (1) (3+2)

Introduction, Machine Instructions, Timing methodologies, Operating Systems, Input/Output, Organization, Interrupts, Basic Structures of Computers, Assembly language, Assemblers, Macros, Processing Unit Organization, Buses, Arithmetic and Logic Unit (ALU), Stack, Instruction Set Formats, Addressing Modes, Microprocessor Organization, Micro-programmed Control Organization, Control Memory, Address Sequencing, Micro-program sequencer, Microinstruction Formats, Processor design, Signed Numbers Representations, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.

ECE 214C: Computer Programming (2) (4+2)

Fundamentals of Object Oriented Programming in any programming language (e.g. Java), Classes, Inheritance, Input and Output Techniques, Programming for Windows

EMP281 Mathematics (3)(A) (3+2)

Laplace and Inverse Lapalce transformations, Laplace transform of derivatives and integration, Solving of differential and integrating equations, Special Functions, Beta and Gamma Functions, Bessel's functions and Legender's polynomials, Partial Differential Equations, Integral Conversion: Fourier, Laplace, Bessel, Hankle, Hulbert.

GEN 28X: Elective Course of Humanities (1) (2+0)

SECOND YEAR

SECOND SEMESTER

ECE 221: Signal Analysis (4+2)

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Signal representation in time and frequency domain-Continuous and discrete signals-periodic signals- Continuous and discrete Fourier transformations-spectrum representation-a periodic functions-sampling and spectrum analysis-power and energy spectrum.

ECE 222: Electronics (2)   (4+3)

JFET and MOSFET characteristics and theory of operation-MOSFET types-FET biasing-FET digital and analog applications-IC fabrication-VLSI IC –IC testing-power supply circuits design-Unregulated power supply-voltage references-PNPN diode-Thyristor applications-Bidirectional devices-semiconductor cell and related devices.

ECE 223: Lab (2)   (0+4)

Using oscilloscope - resonance circuits-zener diode circuits troubleshooting-optical electronics devices-the counters-the amplifiers-the integrated circuits regulators-JFET transistors-computer programming and organization applications

ECE 224C: Logic Circuits   (4+2)

Binary Number Systems, Boolean Algebra, Karnaugh Maps, Memory Elements, Latches, Flip-Flops, Synchronous Sequential Circuit, Integrated Circuits Logic Families, Shift Registers, Counters, Sequential Circuits, Combinational Circuits, Adders, Subtractors, Memory.

EMP282: Mathematics (3)(B)   (3+2)

Prtial Differential Equations, Wave Equations, Methods of seperation of variables, Laplace and poassoinan equations, Using of Integration Conversion in Solving Differential Equations, Numerical Analysis, Least Square, Numerical integration, Finite Difference Method, Probabilities and Statistical Theories, Random Variables, Cummulative Distribution Function, Moments, Gaussian Distibution, possonian Distribution, Matrics Analysis.

GEN 280: Technical Reports (1)   (0+2)

A comprehensive curriculum to teach the engineering students on technical English writing. The curriculum develop the ability of the students to write a short practical requirements, training the students on briefing the data.

THIRD YEAR

FIRST SEMESTER

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ECE 311C: Microprocessor Systems   (4+2)

Microprocessor theory and design, Semiconductors technology , Architecture, Assembly language, Input/Output, Peripheral design, Applications and connections.

ECE 312C: Control Systems (1)   (3+2)

Introduction of control systems and feedback systems concepts, Modeling of discrete-time systems using difference equations and the Z-transform, Samples of test signals, State-space analysis, Time-response of control systems, Control systems stability, Digital controller design.

ECE 313C: Operating Systems   (4+2)

Hardware principles, processes concepts, processes scheduling, Memory Organization and management for single user and multi user systems, virtual memory organization and management, hard disk scheduling and usage in an optimum method, file systems management, studying of some of the most commonly used operating systems.

ECE 314C: System Analysis and Design (1)   (4+2)

Information requirements analysis, Physical and logical data flow diagrams, Processes' specifications, Writing and presenting systems proposal, Some practical applications.

ECE 315C: Data Structures   (3+2)

Practical data structures and its analysis, Lists, Sets, Trees, Priority queue, Stacks, Linked stacks, Balanced trees data structures, Advanced tree structures, Recurrence relations, Advanced sorting algorithms, Big *O,* Worst case analysis, Lower bounds analysis, Basic principles of Algorithm design, Divide and conquer, Backtracking, Dynamic Programming.

GEN 38X: Elective Course Humanities (3)   (2+0)

THIRD YEAR

SECOND SEMESTER

ECE 321C: Electronic Circuits (1)   (3+2)

Hybrid parameters-high frequency amplifiers impedance-Tuned and intermediate amplifiers-Bode plot and the frequency response-Matched oscillators-Mixing and modulation circuits-Power amplifiers.

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ECE 322C: COMPUTER ARCHITECTURE (4+2)

High performance of computer architecture including pipeline architecture, High speed memory systems, Vector processors, Parallel processors and interconnection networks.

ECE 323C: Database Design (3+2)

Introduction to database concepts and operations, basic principles, database architecture, storage structure and indexing, database structure: hierarchal, network, relational, Relational database and SQL languages, relational Algebra and calculus, Normalizations, Keys, functional dependency, Multi-valued functional dependency, Design of a simple Database, Overview of data retrieval languages.

ECE 324C: Laboratory (3) (-+4)

The experiments in this course include the following topics: Data Communication, Control Systems, computer circuits, signal analysis, operating systems, computer architecture, programming analysis.

EPE 381: Electrical Power and Machines (3+1)

DC Machines, Magnetic circuit, Windings, E.M.F, DC Motors, Exiting methods, B-H curve, Torque and Speed, Starting, Speed Control, DC Generators, separately exited Motors, Self exited machines, Parallel operation, Efficiency of DC machines, Losses, Maximum efficiency, Transformers, Types, Construction, EMF equations, Efficiency.

FOURTH YEAR

FIRST SEMESTER

ECE 411C: Computer Graphics (3+2)

Computer graphics concepts, Graphics packages and its binding with standard software languages, 2D and 3D algorithms, Mathematics for modeling, Mathematics for transformation, Mathematics for projection, Mathematics for clipping, introduction to modeling, texture mapping, rendering, shading and lighting, different practical applications.

ECE 412C: ARTIFICIAL INTELLIGENCE (3+2)

Principles of Artificial Intelligence, probabilistic search, knowledge coding, expert system engineering, natural language processing, knowledge representation, Robot, AI languages application, Neural networks.

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ECE 413C: Computer Networks(1)   **(3+2)**

An introduction to the principles of communication networks, Network Standards, Phone Networks, ISDN and B-ISDN, Signals, LANS and WANS, Evaluating Networks performance.

ECE 414C: Graduation Project   **(-+3)**

The Student is asked to design and implement a project in one of the areas related to his study, The project should represent a real Engineering application and encourage the ability to work and produce within a team. The student should follow an Engineering approach based on a scientific basis to implement the project. When finishing it, should make and present a detailed report about his work.

FOURTH YEAR

SECOND SEMESTER

ECE 421C: COMPILERS   **(4+2)**

simple sentence construction, symbol tables, scanning tokens, scanning sentences, code generation, error identification, code optimization, runtime environment, bootstrapping and porting

ECE 422C: Laboratory (٤)   **(-+5)**

The experiments in this course include the following topics: components of computer networks, network protocols, computer architecture, Applications Of Artificial Intelligence, Database design.

ELECTIVE COURSES FOR THIRD YEAR

ECE 341C: System Analysis and design (2)

Data coding, task scheduling, training, system test and update, some practical applications.

ECE 342C: Programming languages

Principles of programming languages, architecture of programming languages, processing time, memory management, study of one programming language.

ECE 343C: Software Engineering

Lifecycle of programs and applications, Customer needs evaluation, Different program structures, Program properties and measurement techniques, Project management and its applications.

ECE 344C: Selected topics in computer engineering

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This course includes some topics which meet special interests of students and the department. It is a flexible course that could include recent topics which are not covered in other subjects. It could include topics related to software, hardware and systems.

ELECTIVE COURSES FOR FOURTH YEAR

ECE 441C: Image processing

Fundamentals, Digital image processing, Applications, 2D transformations, preprocessing techniques, edge detection, Applications of some practical problems.

ECE 442C: Peripheral Devices

Input and Output devices, Monitors, audio output, keyboard and related devices, printers, plotters, Tape devices, storage media, magnetic disks and tapes, Optical devices, maintenance of peripheral devices.

ECE 443C: Computer security

Security attacks and methods of defense, Encryption and decryption techniques, Viruses, security of operating systems and databases, Security of PCs, networks and communications, Ethics of security.

ECE 444C: Operations Research and Management Systems

Quantitative decision-making, Modeling of the classical selection, Replacement, Maintenance, Reliability Problems, Stochastic Methods, Simulation, Expert Systems, Decision analysis, Project management, PERT Techniques, Computer Methods in Project Management, Scheduling, Resources Analysis.

ECE 445C: Distributed Processing

Architecture of distributed systems, operating systems of distributed systems, Networks and distributed databases.

ECE 446C: Advanced Control Systems

Differentiation of maximum values, Variable differentiation and continuous ideal differentiation, Value principle and Hamiliton-Jacobian theory, Examples of ideal control systems, Separate variable differentiation and the principle of the separate maximum value, Linear and non-linear programming, dynamic programming methods, Applications on Artificial intelligence in control systems.

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ECE 447C: Neural networks

Introduction to human and artificial neural networks, Parallel processing, Main components of neural networks, Classification of neural networks, Backpropagation and counter propagation techniques, Supervised and unsupervised learning algorithms, Processing data for learning, Different architectures of neural networks, Hopfield and Boltzmann models, Some applications of neural networks.

ECE 448C: Information systems

Concepts and components of information systems, Factors of engineering feasibility, Engineering economic analysis, Analyzing alternatives, Cost estimation techniques.

ECE 449C: Selected topics in computer engineering

This course includes some topics which meet special interests of students and the department. It is a flexible course that could include recent topics which are not covered in other subjects. It could include topics related to software, hardware and systems.

ECE 451C: Robotics Systems

Statics and dynamics of robots, Path planning, Sensors, Control of robots (Force and motion), Robotics vision, Robotics programming languages.

ECE 452C: Engineering Systems Simulation

Introduction to modeling and simulation of continuous and interrupted systems, and hybrid systems, Simulation languages, Practical applications.

ECE 453C: Artificial Intelligence programming

Introduction to LISP and Prolog, Programming applications in AI.

ECE 454C: EXPERT SYSTEMS

review of AI principles, knowledge representation methods, logical programming, expert system architecture (knowledge base, working memory, inference engine, inference methods)

ECE 455C: Management Information Systems

Structures rules and organizational policy, Sources of Computer Systems: computer Systems, Distributed Systems, Information Foundations, the user final computation, Management and Organization, foundations of management information systems, information support systems,

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decision support systems, information executive systems, Artificial Intelligence applications, Expert Systems, Library Information Systems, Development and Management of Information Systems.

ECE 456C: Software Engineering

Design Quality Assurance, Design Review, Quality Matrix Design, Evaluation of the dealing with users, programming training, Computer-Aided Engineering Programming, Software Testing, Software Management, Measuring the efficiency of programs.

ECE 457C: Systems Engineering

Systems Sciences, introduction about historical evolution and relations with skills, Operations Research, Systems Analysis and System Engineering, The principles of the basic structure: System Applications in different domains, computer multi-systems, Communication Systems, Industrial Systems, Commercial Systems.

ECE 458C: Computer Vision

Image features, the discovery of lines and contours,   Image segmentation and transformation, Features Extraction of Images, Practical Application of computer vision for Pattern Recognition and Classification.

ECE 459C: Selected Topics in Computer Engineering

This course includes some topics which meet special interests of students and the department. It is a flexible course that could include recent topics which are not covered in other subjects. It could include topics related to software, hardware and systems.

ECE 460C: Computer Networks (2)

Advanced topics in computer networks, Computer networks protocol, Distribution systems, Engineering and applications, Introduction in internet protocol, Transmission engineering protocol, Security in networks.

ELECTIVE COURSES OF HUMANITIES

GEN 281: Industrial Sociology   (2+0)

How to organize the work under the different Establishments, topics including the integration of the development of science and technology of social organization of labor, labor relations, management strategies and the interaction of workers.

GEN 282: Organizational Behavior   (2+0)

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Human performance in organizations, theories of motivation, the movement of groups, power and communications, ethical performance in organizations.

GEN 381: Project Management   (2+0)

Definitions, the project as part of a strategic plan, the relations between the programs, projects, budgets, regulatory plans, organizational processes of project planning, quantitative methods for project management such as, CPM, PERT, project requirements, materials, manpower, facilities, funding, scheduling the project, organizing project, project implementation, project control, performance evaluation.

GEN 382: Environmental Effect   (2+0)

Introduction to science environment, how to evaluate project according to the environmental rules, evaluation methods, evaluation of environmental performance, Environmental Control law and its applications, case study.

GEN 383: Engineering Ethics   (2+0)

The nature of values and ethical considerations, theories of moral values of the engineer in society, ethics in the professional work environment, safety, risk, responsibility, career choice, code of ethics, case study.