**Al-Kitab University**
**Technical Engineering College**
**Computer Engineering Technology**
**Department**

جامعة الكتاب
الكلية التقنية الهندسية
قسم هندسة تقنيات الحاسوب

# Department Courses Short Description 2022 – 2023

### Mathematics I  / CTE02102                                    4 Units
Functions, Type of functions. Extreme values: Increasing and decreasing functions, Limits and Continuity. Differentiation, Maxima and Minimum values. Integration. The applications of indefinite integration. Methods of integration. Application on definite integral. Area under the curve. Area between two curves. Distance. Length of a curve. Matrices and Determinants: Properties and Functions, Area Calculation by Geometric Approximation: Trapezoidal, Simpson.
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### Engineering Drawing  / CTE02103                              3 Units
Introduction to AutoCAD -Drawing Setup in AutoCAD, Coordinate method, Drawing Objects in AutoCAD, Drawing polygon, donut, . . . , Modify menu , Properties and Layers in AutoCAD, Explanation & drawing of electrical &electronic symbol, Drawing of electric, Integrated circuit drawing, Reading different electronic and electric maps.

### Workshop / CTE02104                                          4 Units
The use of different measuring devices in the workshop such as ( ovometer - oscilloscope, equipped with power), how to use caustics - types of caustics used in the workshop - caustic welding training, types of welding used - materials that aid welding - soldering some wires with each other and with some components. How to use soldering iron Sucker (Solder) such as solder absorbent wire clips - (Solder Removal) Training on some electronic components and lifting them from the printed board, the various printed electronic circuits - Learning how to perforate them and install the various electronic components on them.

### Electrical Engineering Fundamentals / CTE02105               7 Units
Symbols and Abbreviations, The Direct Current Network, Kirchhoff's Laws, Series Circuits, Parallel Circuits, Conversion of Delta, Nodal Voltage Method, Loop (mesh)Current Method, Superposıtıon method, The venin's Theorem, Norton's Theorem, Reciprocity Theorem, The Alternating Current, The Effective Vales of Current and Voltage, Complex Numbers, Series and Parallel AC Circuits, Using Kirchhoff's law's, Loop's method . . .          3- Phase Current, 3- Phase System, Y-Connection Delta Connection. Electromagnetism, Permanent and artificial Magnets, Transformers, Direct Current Machines.

### Computer Organization  / CTE02106                            6 Units
Components of Computer System: Parts of the Hardware, Software Types. Computer Architecture and Organization: Von Neumann architecture. Memory Hierarchy. System buses Memory addressing, memory organization, Central Processing Units (CPU ), Computer SW, Microprocessor, Memory units, Computer Generations and Types.

### Computer Programming & Applications / CTE02107      7 Units

Algorithms and flowcharts, C++ language: Variables, Data types, Input / Output, Operators, Relational and Equality Operators, Condition Memory. conditional Statements: If . . . else, Looping. Functions ( local and global variables). Arrays, Character sequences and string handling, Pointers, 7Dynamic.

### Digital Electronics / CTE02108      6 Units

Course Description: Numeric system, logic gates, Karnoff map, logic gates, flips, counters, counters, oscillators, numerical system and analog system.

### Mathematics 2 / CTE02202      4 Units

Sequences and Series: Definition, Geometric Series, Alternating Series, Power Series, Taylor Series, Convergence. Function of Two Variables: Partial Derivatives, the Chain Rule. Directional Derivatives, Gradient, Divergence, Tangent Plane, Maxima and Minimum. Equation of lines, Planes, Curvature. Solution of Ordinary Differential Equations: First and Second Order. Integrals: Double and Triple.

### Microprocessor and Computer Architecture / CTE02203      7 Units

Digital Computer Architecture Definition, Microprocessor Components, Microprocessor Buses, 8085 Microprocessor Architecture, 8086 Microprocessor Architecture, Register Organization, Memory Segmentation, Instruction Set of 8086, Stack memory, Addressing Modes in 8086 Microprocessor, Memory read & write Bus Cycles, Interface Circuits.

### Instrumentation and Measurements / CTE02204      6 Units

Fundamentals of measurements, units and measures, errors, statistical analysis, DC and AC measurement devices, the effect of loading, input loss, difference and measurement amplifiers, oscilloscopes: screen, amplifiers, spectrometers, transducers and stereoisomers, passive and self-generating transducers, liquid crystal displays, charge-coupled devices, optical fiber stereotypes, measurements, digital: principles of information conversion, analog-digital converters, digital voltage measurement, grounding, shielding, noise.

### Computer Programming 2 / CTE02205      6 Units

C++ Review, Introduction to Object-Oriented Programming in C++, Objects and Classes, Inheritance, Polymorphism, I/O and File management.

### Communication Fundamentals / CTE02206      6 Units

Transmission lines, Smith charts, Fourier Transform, Signals through linear systems, Filter, AM systems, AM and FM systems, PAM, PDM, PPM, Digital modulation.

### Computer Application / CTE02207      4 Units

Introduction to Matlab: Variables & constants, Operational & logical Statements. Functions, Selection & Conditional Statements, Switch-case statement, loops. Arrays: Definition and Operations, Mathematics in Matlab: Operations, Functions, Differentiation, Integration. Fast Fourier Series, Laplace, . . . . Graphics: Simple Plot Functions ( 2 and 3 D). Linear Algebra : Solving Linear Equations, Calculating Eigenvalues. Introduction to Simulink

**Electronics / CTE02208**                                              **6 Units**
Physics of semiconductor, Physic of Transistor, Diode equivalent circuits DC
analysis, Ac to DC , Circuits, Common Emitter, BJT transistor AC equivalent
circuits, Transistor Amplifier, Common Gate (C.G) and Common Source (C.S),
Power Amplifiers, Operational Amplifier circuits, Inverter and non-inverter,
Integration and diff., Oscillators, Integrated Circuits.


**Electronic Systems Simulators / CTE02301**                            **4 Units**
Number Systems, Logic Circuit Design Components, Comparators Logic Circuits, Decoders
and Encoders, Multiplexers and De multiplexers, Programmable Logic Devices (PLDs),
Programmable Logic Arrays (PLAs), Programmable Array Logic (PAL), Structure and
Operation of Clocked Synchronous Sequential Networks, Analysis of Clocked Synchronous
Sequential Networks, Modeling Clocked Synchronous Sequential Network Behavior, State
Table Reduction, Completing the Design of Clocked Synchronous Sequential Networks,
The Algorithmic State Machine (ASM), ASM Charts, State Assignments, ASM Tables,
ASM Realization, Structure and Operation of Asynchronous Sequential Networks, Analysis
Of Asynchronous Sequential Networks, Races in Asynchronous Sequential Networks,
Reduction of Input-Restricted Flow Tables, A General Procedure to Flow Table Reduction.


**Engineering Analysis / CTE02302**                                     **6 Units**
Laplace Transform, Z- Transform, Matrices and Linear System of Equations,
Cayley- Hamilton theorem, Probability and Statistics, Numerical Computations of
Non-Linear Equations ( Bisection, False Position, and Newton – Raphson
Methods). Solution of Linear System of Equations ( Direct and Iterative Methods).


**Control Engineering Fundamentals / CTE02303**                         **6 Units**
A control system introducing a way of making components which could be
mechanical, electrical, hydraulic. The function of the control system is to regulate
the output of the system in accordance with some input signal. The controlled output
may be position, velocity, acceleration, temperature, etc. The output is required to
track and follow the input signal as closely as possible.


**Computer Networks Fundamentals / CTE02304**                           **6 Units**
Types of computer Networks, The Reference models, The OSI model, OSI layers
responsibilities, Signals and Encoding transmission media, Multiplexing(FDM,
TDM and **WDM**), Data Link controls and protocols, Types of errors, error
detections ( VRC,CRC,LRC), LAN PROTOCOLS ALOHANET, Cable Television
& Internet over Cable.


**Real Time Systems Design / CTE02305**                                 **6 Units**
Definitions of RTS, signal, system, specification , Analog computer ,Systems, ADC,
DAC, introduction to digital systems, basis interfacing devices, basic interfacing
devices ,data transfer controlling , DMA. serial types ,Controller


**Digital Signal Processing ( DSP ) / CTE02306**                        **6 Units**
Introduction to Digital Signal Processing, Discrete Time Signals and Sequences,
System Properties, Convolution, Frequency Domain Representation, Discrete
Fourier Transform, Fast Fourier Transform, Introduction to Z Transform, Digital
Filter. Introduction to Matlab Programming.

**Digital Communication / CTE02307**                                       **6 Units**

This course introduces the digital communication systems to understand advanced courses in digital/wireless communication systems. The course covers several important topics such as Source coding-decoding, Unit Impulse and Fourier transform, Sampling Theorem, Quantization, PCM modulation, Delta and Adaptive Delta Modulation (DM), and Line coding. In addition, reconstruction of the original signal from the sample signal will be dealt with in later parts of the course.

**Digital Controllers / CTE02308**                                          **6 Units**

Microcontrollers types, differences between microcontrollers and MP. General organization of PIC microcontroller, Serial communication, UART, Oscillator, Baud, and timer/counters. Programming the microcontroller, reading data/signals, Graphic LCD, character LCD, and outputting signals. Principle of PLC, input-output modules of PLC. Numbers systems and codes. Sensors and actuators for industrial applications.

**Power Electronic / CTE02309**                                             **6 Units**

The Power Electronics introducing: the principles of power electronics devices, diode, thyristor, Rectifier circuits Single- phase rectifier: uncontrolled. half controlled and fully controlled Three-_phase rectifier: uncontrolled. half controlled and fully controlled. Diode circuits with Re,. RL and RLC (transient analysis) transient analysis of AC line with RL load. DC line commutation technique. AC voltage controller on- off and single-phase angle controller Dimmer, Linear power supply DC — chopper: principle of switch mode power supply. Step up- down convertor buck boost, Inverter De- to- AC convertor, Single phase half inverter, Single phase bridge inverter, three phase inverter, DC machine control basic machine equations, DC drive, and Control- feedback system of a de drive.

**Computer Networks Simulators / CTE02310**                                 **4 Units**

Computer Networks Simulators introduce network, Simulation techniques as an engineering tool for analysis. planning, dimensioning, monitoring, and building real operating networks, the use of measurement data and configuration data from real networks in simulation, Network Elements (HUBs, SWITCHs (L2, 3), ROUTERs, etc..), IPV6 is necessary and how multi work and Tools to troubleshoot network connectivity problems, and commands to gather network information and troubleshoot IP configuration problems.

**Database Systems / CTE02313**                                             **6 Units**

Introduction to database, DBMS, SQL, ER Model, Relational Data, Indexing, Joining, ACID, Primary Key, F.K

**Computer Networks Protocols / CTE02401**                                  **6 Units**

Introduction to the OSI Reference Model and the TCP/IP Reference Model, Application Layer Protocols, Transport layer Protocols, Network Layer Protocols, Data Link Layer Protocols, Physical Layer Protocols.

**Information Theory and Coding / CTE02402**                                 **6 Units**

The Probability, The conditional Probability and Random Variable, The Channels: Symmetry, Capacity. The types of Coding, The types of Channel Coding.

### Mobile Communication / CTE02403             **6 Units**

Evolution of mobile communications, Mobile Radio System, Type of wireless communication system. Trend in cellular radio and personal communication, Second generation systems, Third generation (3G), fourth generation (4G) systems, fifth generation systems (5G). Cellular system, Hexagonal geometry cell and concept of frequency reuse, channel and co-channel and adjacent interference Handoff strategies. Traffic engineering which includes trunking and grade of service, Improving coverage & capacity in cellular system-cell splitting. Large scale path loss, Path loss of NLOS and LOS systems, Ray ground reflection model. Small scale multipath propagation. Modulation techniques for mobile radio. Multiple access techniques, Frequency division multiple access (FDMA). Wireless systems and Recent trends.

### Security of Computer and Networks / CTE02404       **6 Units**

Symmetric Ciphers Model: plaintext, encryption algorithm, secret key, cihpertext, decryption algorithm, Cryptography, Cryptanalysis, Block and Stream Cipher, Caesar Cipher, Hill Cipher, Playfair Cipher, Polyalphabetic Ciphers, The Transposition Cipher, Euclid's Algorithm, Symmetric - Key Algorithm, Public - Key Algorithms, Authentication Protocol, OSI Security.

### Project Management / CTE02405                 **6 Units**

Introducing Business and its parts such as Profit : Break – Even point, Interests, Machines deterioration and replacement, Problems of decision making, The Linear Programming Model, Graphic Solution, The Simplex Method, revised Simplex, Dual Problem. The Transportation Problem: General Solution, NWC, Least Cost, Vogel. Sensitivity Analysis of LP Problems. Network Analysis: Project Management Critical Path method, PERT.

### Multimedia Computing / CTE02406             **6 Units**

Introduction to Multimedia , Hypertext and hyper media, multimedia on the web , image digitization ,types of images ,image file formats , logical operation on image , image histogram .sound and audio basic , synthetic sound, video basic ,video color models ,type of video signals , video compression , histogram modification

### Smart system modeling / CTE02409              **6 Units**

Artificial neural networks (ANNs), roles of ANNs, inspiration of ANNs, concepts of ANNs, the early structure of ANNs and their evolution. Properties of ANN advantage and limitations. Types of learning rules, learning algorithms, and training algorithms. The back propagation learning procedure (BP), derivation of the BP algorithm, and back propagation training algorithm. Genetic algorithm, its population, Selection mechanisms, crossover, crossover rate, mutation, mutation rate.

### Image Processing . CTE02410                 **6 Units**

A digital image processing introducing a way of recording and presenting information visually. Since vision is the most advanced of our senses, it is not surprising that images play the single most important role in human perception. The information that can be conveyed in images has been known throughout the centuries to be extraordinary - one picture is worth a thousand words, digital image processing includes (image enhancement, image segmentation, image histogram , image segmentation ,image compression).

**Advanced Computer Technology / CTE02431**          **6 Units**

Introducing a set of rules and methods that describe the functionality, organization, and implementation of computer systems. The architecture of a system refers to its structure in terms of separately specified components of that system and their interrelationships such as performance, efficiency, cost, and reliability of a computer system.

**Computer Interface Circuits Design / CTE02432**          **6 Units**

Regulated design of power supply,  Parallel port interface,  RS232 serial interface, Universal serial bus (USB) interface,  Parallel to serial interface, Analog to digital convertor, Digital to analog converter, Applications.

**Advanced Digital Electronics / CTE02433**          **6 Units**

The advanced digital electronics introducing: the FPGAS, EPROM-based technologies, EEPROM-based technologies, flash-based technologies and SRAM-based technologies, operators, data attributes, signal attributes, generate: for/generate, if/generate coding, packages and components and functions and procedures.

**Computer Networks / CTE02434**          **6 Units**

Introduction to computer network, Transmission technology, LAN, topologies, Connection, IOS reference model, TCP/IP reference, Metropolitan area network, Digital signal, Band width.

**Graduation Project / CTE02413**          **4 Units**

Practical application related to the discipline were a report contains the process and results has to be submitted and examined.