UNIVERSITY of TECHNOLOGY

الجامعة التكنولوجية

Bachelor of Science Honours (B.Sc. Honours) –
Computer Science - Multimedia Branch

بكالوريوس علوم الحاسوب – الوسائط المتعددة

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of computer science – Software branch to gain the Bachelor of Science degree. The program delivers (40) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج علوم الحاسوب للحصول على درجة بكالوريوس العلوم في تخصص الوسائط المتعددة. يقدم البرنامج (٤٠) مادة دراسية مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

LEVEL: UGI

First Course

1

Code	Course/Module Title	ECTS	Semester
PRFU111	programming fundamental	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	3	110	90
Description			
To develop problem solving skills , this course deals with the basic concept of Algorithms and to understand the meaning of programming. So, Understanding the meaning of algorithms and how to write it, Understand the various types of data, Learn how to draw flowchart, Understanding the main data types in C++ (logical and mathematics operations), Capable of writing While an For statements in the program and Have the ability to use conditions (IF , IF else) statements.			

2

Code	Course/Module Title	ECTS	Semester
MATH112	Mathematics	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	93	57
Description			
To understand the Mathematical background and learn the matrix, Types of matrix, Matrix addition, subtraction, and multiplication, Determinant, transpose, and Grammar rule for solving system of equation. Then study the Functions, Domain and range of functions and Graphing of function. So, understand the Limits, Derivation, Series, Integration, and Application of integral area under the curve and Area between two curves.			

3

Code	Course/Module Title	ECTS	Semester
STPR113	statistics and probability	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	93	57
Description			
To develop problem solving skills , this course deals with the basic concept of population, samples , type of samples ,Random variables , discrete and continuous variable. Then study the Data Organization, frequency distribution, histogram, and measurement of central tendency. So understand the measurements of variation (standard deviation, variance, coefficient of variation). Learn about the Probability Theory, probability theorems, Counting techniques, and Conditional probability develop skill with Continuous Probability Distributions and Correlation and Regression			

4

Code	Course/Module Title	ECTS	Semester
COOR114	Computer Organization	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
This course deals with the basic concept Evolution of Computers, Generation of Computers, Super Computers, Mainframe Computers, Personal Computers and Terminals (Different Types). So learn about Classification of Computers Analog Digital and Hybrid Computers, Classification of Computers according to size. Then study the Characteristics of Computers, Block Diagram of a Digital Computer, Operating systems (OS), Input Devices (Mouse, Keyboard,) Output Devices (Printers, VDU, ……) Motherboard, Microprocessor (Central Processing Unit (CPU)), Input / Output Ports Unit, Buses, BIOS, Memory types, and Storage units. So to study the Data representation in computers, Different number systems (Decimal, Binary, Octal, and Hexadecimal), 1's Complement and 2's complement, Floating Point numbers, Coding – ASCII.			

5

Code	Course/Module Title	ECTS	Semester
FUCT115	Information theory	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**

2	2	63	37
Description			
To study the principles of probability theory, Information theory, Mode of the signal system. And the Measure of Information. This course deals with the basic concept of Maximum Entropy for Discrete Source, information rate, Mutual information, Channel Capacity, and Capacity of symmetric channel(Binary Symmetric Channel (BSC) Capacity, Ternary Symmetric Channel Capacity).			

6

Code	Course/Module Title	ECTS	Semester
WORK106	Workshop	2	1
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
	3	46.5	3.5
Description			
ورشة الكهرباء – ورشة السباكة – ورشة اللحام – ورشة النجارة التدريبية – ورشة الحدادة – ورشة السمكرة – ورشة البرادة – ورشة السيارات – ورشة الخراطة – المنهاج مرفق			

Second Course

1

Code	Course/Module Title	ECTS	Semester
STPR121	Structured Programming	8	2
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
4	3	110	90
Description			

This course is to understand the Defining a function, Return statement, Types of functions, Actual and formal arguments, Recursive functions. Then study the Arrays(One dimensional array (declaration, initialization, Accessing),Two dimensional array (declaration, initialization, Accessing)). So develop skill of String manipulation (Structures ,Pointers)

2

Code	Course/Module Title	ECTS	Semester
DIST122	Discrete Structures	5	2
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
3	1	63	62
Description			
This course deal with Set theory, Mathematical induction, Relations(Computer representation of relations and Digraph, Manipulation of relations, Properties of relations, and Composition of relations), Functions, Graphs(Matrices and graph,Trees, rooted tree, ordered rooted tree,polish notation, with examples), and Finite state machines			

3

Code	Course/Module Title	ECTS	Semester
LODE123	logic Design	6	2
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
3	3	95	55
Description			
This course is to develop the skill of Number system (Decimal, Binary, Octal, Hexadecimal), then understand the Addition and subtraction, Logic gats, Boolean algebra and simplification and demerger's and K-map. So to learn about Combinational universal NAND and NOR logic, Half-adder, full-adder, 4-bit parallel adder, and Subtract adder and Decoder, encoder, multiplexer, and demultiplexer. So to understand the Sequential logic circuits and Flip-flop, SR, D, and JK flip-flop, Shift register 3-bit and 4-bit, Binary counter 3-bit and 4- bit.			

4

Code	Course/Module Title	ECTS	Semester
COTE124	Coding Techniques	4	2
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	2	63	37
Description			
The course aims to teach students the properties of codes and their respective fitness for specific applications. Understanding Error Correction and the methods used to solve errors: Coding theory aims to provide a solid understanding of error correction techniques in communication systems. Code Decoding: Coding theory aims to provide techniques for decoding received codewords to recover the original information. Also, the module aims to analyze the performance of error-correcting codes. Students learn how to calculate and evaluate metrics like error probability, bit error rate, and throughput. coding theory contributes to improving data reliability, security, and efficiency in real-world scenarios.			

5

Code	Course/Module Title	ECTS	Semester
PRDM125	Principles of Digital Media	5	2
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
3	3	80	45
Description			
In this course, student will know the facts related to MM Know the terminology of MM and the course instructor explains the concepts, techniques and problems of MM. In addition, the student remembers, describes and enumerates these concepts after graduating.			

6

Code	Course/Module Title	ECTS	Semester
WORK106	Workshop	2	2
Lectures (hr/w)	**Lab./Prac./Tutor.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
0	3	46.5	3.5
Description			
ورشة الكهرباء – ورشة السباكة – ورشة اللحام – ورشة النجارة التدريبية – ورشة الحدادة – ورشة السمكرة – ورشة البرادة – ورشة السيارات – ورشة الخراطة – المنهاج مرفق			

LEVEL: UGII

First Course

1

Code	Course/Module Title	ECTS	Semester
OBOP211	Object Oriented Programming	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	3	110	90
Description			
Overview for functions and parameter transmission, inline functions and function overloading, Introduction to OOP and its main features, Defining a Simple Class with Inline Member Functions, Constructors and destructors functions, Friends functions, Friend class, Default Arguments and Implicit Member Argument, Constant Members and Scope Operator, Member Initialization List, and Static members, Member pointers and reference members, Class object members and object arrays. Operator overloading, Inheritance and derived classes, Class hierarchy notation, Multiple inheritance, Function template definition and instantiation, Class template definition and instantiation, Class template members, Virtual function definition, polymorphism, Types of polymorphism.			

2

Code	Course/Module Title	ECTS	Semester
DAST212	Data Structures	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45
Description			
This course introduce the introduction to Data Structures with all Types and Memory representation for 1D and 2D arrays, Linear list and Linear list types, Stack Operations and some examples. Then learn the Queue and Queue Operations, Circular Queue with Operations. Also provide the skill to use Linked List, Linked-Stack, Linked-Queue, Linked-Queue and Recursion.			

3

Code	Course/Module Title	ECTS	Semester
NUAN213	Numerical Analysis	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45
Description			
This course explains the concept of Numerical analysis and solving sets of equation, Elimination and iterative methods, Interpolating polynomials, Lagrange polynomial, Solving non-liner equation, Numerical differentiation and numerical integration and Numerical solution of ordinary differential equations. So introduce the topics of Curve-fitting and approximations, the solution of integral equation, trapezoidal method, Simpsons method.			

4

Code	Course/Module Title	ECTS	Semester
SOEN214	Software Engineering	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**

2	3	80	45

Description

In this course, introduction to Software project planning, Software Scope, Estimation of resources. Introduction to risk analysis &management, Project scheduling & tracking. Software quality and concept. Introduction to analysis, concept , principles, requirement , and phases. software quality Software requirements elicitation. After that,8. Quality function deployment, Use case, Analysis principles and Analysis principals, Information domain is explained ,Modeling. Analysis principals, partitioning , requirement

Software prototypingand Specification principles

5

Code	Course/Module Title	ECTS	Semester
MUTE215	Multimedia Technology	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45

Description

In this cource the student is going to learn Multimedia Technology and discuss the effects of multimedia in your daily life. why multimedia is so powerful to increase human-computer interaction and examine multimedia applications in several areas. Understanding analog and digital conversion process and discuss the hardware requirement of multimedia system

Classify multimedia software based on its function (**Text and Graphics).** Describe how to use text-related element in multimedia design correctly. Compare and contrast between bitmap and vector graphic. Examine how to find graphics and about editing software.**Multimedia Project Development** Discuss 4 main steps in multimedia project development.Discuss 7 Processes of Making Multimedia. Create a storyboard for the animation project. **Web-based Multimedia Applications d**escribe about the characteristics of web-based system Examine the examples of web-based multimedia applications.

6

Code	Course/Module Title	ECTS	Semester
ENLA216	English Language	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	-	33	17
Description			
This course is to enhance the english lanugae of the student. Focusing on Parts of Speech (Noun, verb, adjective, adverb, etc). Punctuation for writing. Linking words for writing. Tenses in English. Active and passive voice and Prepositions of time and place Starting a conversation, formal and informal Introduction, Asking about time. In addition,questions and answers using question words, yes no question and short answers. Using some and any, there is and there are, would like, this and that, can, has and have. discussing reports. Pronouns, Possessive adjective and Possessive ('s)			

Second Course

1

Code	Course/Module Title	ECTS	Semester
DATA221	DataBase	8	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	3	110	90
Description			
This course include explaination of Centralized database system, the purpose of database and Comparing between a file processing system and DBMS. So it include Data Abstraction and file system disadvantage, Entity relationship model, Relational model , Tables joining, Instant and schema And Indexing(Primary indexing, Secondary indexing, Index update, and Hash index)			

2

Code	Course/Module Title	ECTS	Semester
MICR222	Microprocessor	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	3	95	55
Description			
This course is develope skill about Microprocessor and Microcomputer system by explain the Microprocessor Architecture and Register Set, System Buses, Memory types and physical addressing, and I/O devices. So it include the Instruction Set and Format, Addressing Modes, and Assembly Programming Language(Arithmetic and logical Instructions ,Program Control (interrupt and subroutine call)).			

3

Code	Course/Module Title	ECTS	Semester
SOSA223	Sorting and Searching Algorithms	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45
Description			
The topics of this course are explain the Sorting Algorithm(Insertion Sort, Selection Sort, Bubble Sort, Heap Sort, Quick Sort, Merge Sort). Also this course is develop the skill about Searching algorithm(Sequential Search, Binary Search). Then learn Trees(Types of Tree, Binary tree, Binary tree scan, Represent Regulars expression using trees, Binary Search Tree).			

4

Code	Course/Module Title	ECTS	Semester
MUFF224	Multimedia file formats	4	2

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37

Description

The topics of this course are explain the Multimedia file formats; File Formats Definition. Text File Formats. Graphics File Formats. Image Formats. Digital Audio File Formats. Digital Video File Formats.Animation File Formats.

5

Code	Course/Module Title	ECTS	Semester
MUST225	Multimedia software tools	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45

Description

The topics of this course are explain the Multimedia SW Tools in which the student learn the design of- Graphic User Interface (GUI). Painting and Drawing Tools such as Corel Draw. Adobe Illustrator Paint Shop Pro. After that, Image Editing Tools,Adobe Photo Shop, Macro Media Freehand, Microsoft Office Picture. Learn about(Sound Editing Tools) such as Cool Edit, Sound Forge, Macromedia Sound Edit. Video and Digital Movie Editing Tools, Animation Tools, Presentation Tools

6

Code	Course/Module Title	ECTS	Semester
HURI226	Human Rights	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	-	33	17

Description

1- مفهوم الحقوق(تعريف الحقوق-خصائص الحقوق).
2- حقوق الانسان في الشرائع السماوية(الديانتين المسيحية واليهودية- الدين الاسلامي).
3- مصادر حقوق الانسان(المصادر الدولية- المصادر الوطنية).
4- ضمانات حقوق الانسان(الضمانات على الصعيد الداخلي- الضمانات على الصعيد الدولي).
5- التقدم التكنولوجي واثره على الحقوق والحريات(الاحزاب السياسية- حماية الملكية الفكرية).

LEVEL: UGIII

First Course

1

Code	Course/Module Title	ECTS	Semester
COAR311	Computer Architecture	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	3	95	55
Description			
The topics of this course include some Introduction to Computer Organization(RISC and CISC, I/O Organization and Peripheral Control Strategies, I/O Interfaces and Programming, Asynchronous data transfer). So explain the Memory Management, Memory types and Hierarchy, Main Memory address map, and Associative Memory and Content Addressable Memories. Then it include the explaination about Parallel Processing and Difficulties and Solutions in Instruction Pipeline and Vector processing and Array Processing.			

2

Code	Course/Module Title	ECTS	Semester
COTH312	Computation Theory	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		78	47
Description			
This course includes the explaination of Regular Expression, Finite Automata, DFA and NFA, Equivalence of NFA and DFA, Kleen theorem, Two way finite automata with output (mealy machine, moor machine). So develop the skill about the equivalence of mealy and moor machine, and give some introduction to Crammers, Phrase Structure Grammar, Context sensitive Grammar, Context Free grammar(Chomsky Normal Form, Tree, leftmost and rightmost derivations, Regular grammar, Left linear grammar, Right linear grammar, Push down automata, Top down –bottom up derivation, and Turing machine).			

3

Code	Course/Module Title	ECTS	Semester
COGR313	Computer Graphics	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	3	95	55

Description

In this course the student will learn about { Computer Graphics, Cathode Ray Tube (CRT) , Generating color on a RGB monitors, Coordinates system, Raster–can display, Frame Buffer, Scan conversion, Applications of computer graphics }

- Vectors {unit vector, measurement associated with vectors, manipulation vectors, negative vectors and subtracting vectors, scaling Vectors, multiplying vectors uses the "dot Product" & direction Cosine, "cross product" }
- Basic Shapes Drawing (Line, Circle, Ellipse)
- Two Dimension Transformations (Translation, Scaling, Rotation, Reflection, shearing)
- Clipping and Windowing and viewport and polygon

➢ Mathematics for Modelling

- Vector tools and polar coordinates – Vectors fundamentals– Representations of key geometric objects – Intersection of lines, planes and polygons - clipping algorithms – 2D and 3D Affine transformation – 3D Viewing – 3D rendering pipeline – Camera movements – introduction to OpenGL programming – Geometric transformation and viewing – projection and perspective transformation.

➢ Modeling Shapes

- Introduction – solid modeling – polyhedral – Extruded shapes – tessellation – Mesh approximation of smooth objects – Bezier Curves – B splines – NURBS – Interpolation – Hierarchical and physical modeling – Hidden surface removal algorithms– Curve and surface – Interactive graphics.

➢ Shading and Illumination Models

- Shading models – Flat shading – Smooth shading – Reflections – Diffuse and specular reflection – Adding color – Antialiasing techniques – Dithering techniques – Creating more shades and color – Opengl – specular highlights – Spotlight – Blending – Reflections – Applying colors– Real world lights.
- Texture and Rendering. Procedural and Bitmaps Textures – Texture Mapping or Image – Bump Mapping – Environmental Mapping – Magnification and Minification -

Minmapped Textures – Ray Tracing Techniques – Adding Textures on to Curved Surfaces – Tiling – Fractals – Texture Mapping.

4

Code	Course/Module Title	ECTS	Semester
ANIM314	Animation	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45
Description			
In this course the student will learn about **Animation such as;** Design for motion. Style frames ➢ Design boards and Developing Concepts. Process to outcome (The inner eye, The outer eye and Image making)			

5

Code	Course/Module Title	ECTS	Semester
INIP315	Introduction to Image processing	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	95	55
Description			
Image Processing, in general terms, refers to the manipulation, improvement and analysis of pictorial information. In this case, pictorial information means a two-dimensional visual image. Digital image processing is concerned with the improvement of quality of a picture that is digitally represented, as that represented in the digital computer.			

6

Code	Course/Module Title	ECTS	Semester
ETHI316	Ethics	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			

Second Course

1

Code	Course/Module Title	ECTS	Semester
WEPR321	Web Programming	8	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	3	110	90
Description			

Web Based Application, The world wide web, The internet and web, The history and growth of the web, internet service provider , Http, The purpose of the web, web application ,The web concepts, Hypertext, web page, web site, web page address, , URL Internet TCP/IP , client/server, Web Based Application, web browsing, The classifying the web sites: environment, the general approach, range of complexity, HTML : basic tags ,insert image and link to pages, image maps , list tags , tables tags , form tags , frameset, Introduction to CSS : cascading style sheet , External Stylesheet & Internal Stylesheet, JavaScript Introduction , put a JavaScript into an HTML page, JavaScript Arithmetic, Logical Operators, Conditional Statements JavaScript, Popup Boxes, Loops JavaScript.

Introduction : JavaScript Functions, Lifetime of JavaScript Variables, Event Handler, Array, string and methods ,Insert Special Characters, Create New object , Method of object set and get date, JavaScript

Math Object , Search Function Regular Expression , Form Validation , JavaScript getElementById, ASP Principles, IIS: internet information server , ASP Objects, Response Object, write , clear, end, redirect, Request Object, get and post methods form and Queerstring, Cookies: Active server pages Create & retrieve cookies, ASP-File System Object, File system object copyfile, copyfolder, createtextfile, deletefile, deletefolder, ADO , SQL, Connection asp with database, objects Insert from asp to db Update ,delete Application e-mail

2

Code	Course/Module Title	ECTS	Semester
CODE322	Compiler Design	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	3	95	55
Description			

1. Introduction to Compiler,
2. Lexical analysis,
3. Syntax of Analysis,
4. Problems of Compiler,
5. First and Follow,
6. Top down Parsing, Predictive Parsing Method, LL(1),
7. Bottom up Parsing, Operation Precedence Parser, Simple Left to Right Parser, Canonical LR Parser,
8. Semantic Analysis,
9. Intermediate Code Generation,
10. Code Optimization,
11. Code Generation.

References: Principles of Compiler Design, Alfred V. Aho, Jeffry D. Ulman 2003.

3

Code	Course/Module Title	ECTS	Semester

IMFP323	Image Feature Processing	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	95	55
Description			
The feature of image processing, in general terms, refers to the manipulation, improvement and analysis of pictorial information. In this case, pictorial information means a two-dimensional visual image. Digital image processing is concerned with the improvement of quality of a picture that is digitally represented, as that represented in the digital computer.			

4

Code	Course/Module Title	ECTS	Semester
GEIS324	Geographical Information System	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	80	20
Description			
In this course the students are going to learn about Geographic Information Systems GIS function of GIS and Spatial data geo in formation the about the application of GIS. The real world and representation of it (Modeling,Maps, Databases,Spatial database). Also about Computer representations of geographic information. Data Processing system and data entry and preparation. Spatial data analysis and Data visualization. Measures of location error on maps.			

5

Code	Course/Module Title	ECTS	Semester

DISP325	Digital Signal Processing	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		48	27
Description			
The topics of this course include the explination of the introduction to DSP(D/A, D/A, sampling rate), Signal types, operations and functions, DSP System properties, So it include the Linear Convolution(look-up table method and graphical method, and polynomial method and by Rule applying). Also it explain Fourier Series and Derivations(Deconvolution: Cartona method, and by rule applying, Deconvolution: polynomial method, and Haar Wavelet Transforn Transforn.D/A, A/D and sampling rate.			

6

Code	Course/Module Title	ECTS	Semester
ENAW316	English Academic Writing	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	27
Description			

LEVEL: UGIV

First Course

1

Code	Course/Module Title	ECTS	Semester
OPSY411	Operating System	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**

4	3	110	90

Description

The module focuses on the theoretical concepts and practical aspects of operating systems, including their design, implementation, and management. By the end of the module, students are expected to:

1. Understand the fundamental concepts of operating systems, including processes, threads, scheduling, synchronization, and memory management.
2. Gain knowledge of different types of operating systems, such as batch processing systems, time-sharing systems, and distributed systems.
3. Develop an understanding of the design principles and techniques used in operating system development.

   Acquire practical skills in implementing and managing operating systems through hands-on exercises and assignments.

2

Code	Course/Module Title	ECTS	Semester
ARIN412	Artificial Intelligence	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	80	45

Description

The module focuses on the theoretical concepts and practical aspects of **Artificial Intelligence**
--Knowledge Representation Methods. Logical Representation and Network Representation
-Clause Form andResolution Theorem Proving Problem state space, Search space
Then teach the student types of search methods(Blind Search, Depth First Search, Breadth First Search , Heuristic Search, Hill Climbing Search, Best First Search, A-algorithm and A*-algorithm)
How to use Using Heuristics in games Puzzle Problem Tic Tac Toe Problem -Control Strategy
-Backward Chaining Forward Chaining Rule Cycle (Hybrid Method)

3

Code	Course/Module Title	ECTS	Semester
PARE413	Pattern Recognition	3	1

Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	42
Description			
The module focuses on the theoretical concepts of **Pattern Recognition. The module starts with** Optical Pattern Recognition and Object Description and Representation. the how to select Feature and Generation. SIFT and SIRF. Harris Corner Detection, Template Matching, clustering and classification.			

4

Code	Course/Module Title	ECTS	Semester
DACO414	Data Compression	5	1
3	3	95	30
Description			
In this course data compression, the student will learn how to reduce file size i.e. bit reduction. Data compression is the process of encoding information using fewer bits than the original representation. Any particular compression is either lossy or lossless. Lossless compression reduces bits by identifying and eliminating statistical redundancy. No information is lost in lossless compression. Lossy compression reduces bits by removing unnecessary or less important information. Typically, a device that performs data compression is referred to as an encoder, and one that performs the reversal of the process (decompression) as a decoder. Students will learn number of technoques such as Run Length Encoding, Run Length Text Compression, Relative Encoding and Run Length Image Compression. The Unary Code and General Prefix Code, The Golomb Code, Other Prefix Code and Dictionary methods.			

5

Code	Course/Module Title	ECTS	Semester
DIAU415	Digital Audio	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	3	95	30

Description

In this cource the student will learn about Digital Audio

General basics about digital audio,synthetic sounds and an Introduction to MIDI (Mutual Instrument Digital interface). Then Audio signal, Sampling rate, Nyquist theorem, audio modulation (amplitude modulation, frequency modulation). audio compression.digital rights management

6 Code	Course/Module Title	ECTS	Semester
PROJ426	Project	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
	4	62	38

Description

Research project is an study proposed by teacher (supervisor) and developed by student (fourth class only), this study aim to train the student on it is specialization of scientific (the scientific branch in computer sciences).

Second Course

1

Code	Course/Module Title	ECTS	Semester
MALE421	Machine Learning	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45
Description			

Machine Learning

• Introduction to ML, concept, fundamentals and goals.

• ML types

• Supervised ML

• Unsupervised ML

• Semi-supervised ML

• Reinforcement ML

• Symbol-based Learning, framework, Patrick Winston's approach, version space search, concept space.

• Specific to general search

• General to specific search

• The Candidate Elimination Algorithm (CEA) learning

• Classification based ML

• The ID3 Decision Tree algorithm

• The Random Forest algorithm

• Clustering based ML

• Logistic Regression based ML

• Statistical ML

• The KNN algorithm

• The Naïve Byes algorithm

• Genetic Algorithms (GA), concept, fundamentals, population generation, natural selection, fitness function, crossover, mutation, reproduction.

References

1-Kay Chen Tan***, "Machine learning: Foundations, Methodologies, and Applications"***, 2022.

2

Code	Course/Module Title	ECTS	Semester
CONE422	Computer Network	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	80	45
Description			
This course is develope the skill about Networks by study the Introduction to Computer Networks with network Classification(LAN,MAN and WAN), Network topologies, the advantages and disadvantages of each topology. So study the Transmission Media, Wireless Transmission, The advantages and disadvantages of computer Network Components(NIC, Repeater HUB, Bridge, Router,BRouter,GATEWAY Data Flow), and the Design Issues For (Reference Model,OSI Reference model, The TCP/IP Reference Model , The Relationship of Services to Protocols, So study The Physical Layer, The Data Link Layer, The Network Layer, The Transport Layer, The Session Layer The Presentation Layer, The Application Layer, Data Transmission in the OSI Model and multi media protocols.			

3

Code	Course/Module Title	ECTS	Semester
MUDC423	Multimedia Data Compression	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45
Description			
This couse is connected to the data compression in the first couse the student will gain a better knowledge about his field (multimedia file /data compression).PEG Compression (The Discrete Cosine Transform, Quantization., and Coding Progressive Image Compression Video Compression and MPEG Compression then Audio Compression and Digital Audio.			

4

Code	Course/Module Title	ECTS	Semester
DIVI424	Digital Video	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	45
Description			

Digital video is audio/visual content in a binary format, with information received through the five senses, is analog. That means that it is infinitely variable.
Digital A/V information. Analog data, such as video recorded on tape, is transmitted as electronic signals of varying frequency or amplitude that are added to carrier waves of a given frequency. Basics of video (types of video signals, component video, composite video, s-video).

- Analog video (NTSC video, PAL video, SECAM video).
- Digital video
- Color video representations.
- Characteristics of video streams
- Video quality evaluation methods and metrics (Monitoring and QoS Measurement, Video Quality Measurements).

5

Code	Course/Module Title	ECTS	Semester
MUSE425	Multimedia Security	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	95	55
Description			
The student will start with the basic methods of cipher systems. Then starts with Digital watermarking and powerful tool for multimedia security such as copyright protection, tamper proofing and assessment, broadcast monitoring, and fingerprinting. Types of substitution cipher systems types, Mono alphabetic substitution cipher systems (keywords method), Homophonic substitution cipher systems(Beal cipher, Higher order homophonic) , Introduction to public key systems (secrecy and authenticity), Knapsack ciphers), Merkel-Hellman knapsacks, simple knapsack algorithm), Trapdoor knapsack algorithm, RSA algorithm (encryption and decryption processes), Public-key digital signature algorithms (RSA), DES algorithm, X-box process in DES algorithm with example, Introduction of Stream ciphers, One time Pad system (vernam system), The requirements of steam cipher, Introduction to Information Hiding, Principles of Steganography (Frameworks for Secret Communication, Security of Steganograph Systems, Active and Malicious Attackers), Steganalysis Introduction and Terminology, Multimedia Encryption Problem, the Secure Wavelet Transform, Chaos and Cryptography.Watermarking techniques, watermarking applications.Biometric Recognition.Multimedia Fingerprinting.			

6

Code	Course/Module Title	ECTS	Semester
PROJ426	Project	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	4	62	38
Description			

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