University of Diyala

جامعة ديالى

First Cycle – Bachelor's Degree (B.Sc.) - Computer Engineering

بكالوريوس - هندسة الحاسوب

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1. Overview

This catalogue is about the courses (modules) given by the program of Computer Engineering to gain the Bachelor of Science degree. The program delivers (48) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة الحاسوب للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (48) مادة دراسية، على سبيل المثال، مع (6000) إجمالي ساعات حمل الطالب و240 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
UD11	English Language **I**	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	17
Description			

GRAMMAR, READING , MAIN COURSE SPEAKING, LISTENING ,VOCABULARY

am/is/are my/your This is… Introduction dialogues, Everyday English dialogues Introductions, Good morning! Practicing introduction dialogues. People meet each other and introduce someone else. How are you? What's this in English? Numbers 1-10 and plurals., He/she/they His/her. Questions Where are they from?, Two people are on holiday in New York. Students ask and answer questions about where people are from. Countries, Numbers 10-20 A set of cities and countries: Brazil, Spain…, Adjectives: awful, really good, fantastic, beautiful Nouns: centre, hospital, building, park, Verb to be is recycled and extended to include negative and question forms. We're in Las Vegas! Roleplay: in a band., An interview with the band Metro 5. Jobs: a nurse, a doctor.. Personal information: surname, first name, address, married … Social expressions: I'm sorry, thanks, please…, Possessive adjectives. Possessive 's. Has/ have Adjective + noun Irregular Plurals Paddy McNab and his family, My best friend. The alphabet, On the phone, Saying email addresses. Who are they? Listen and identify the people. The family: mother, son.. Describing a friend: very beautiful, really funny…, Present Simple: I/you/we/they a/an Adjective + noun Colin Brodie from Dundee. Role play: At a party. Where is Colin? Who is he with? At a party:, Flavia and Terry are at a party in London. The lexical set of sports/food/drinks. Languages and nationalities., Present Simple: He/she Question and negatives Adverbs of frequency Prepositions of time Lois Maddox Talking about daily routines, Asking and answering questions about daily routines, Lifestyle questionnaire Listening a phone conversation between Lois and Elliot. Days of the week. The time. Words that go together: watch TV, get up early…, Question words Subject pronouns Object pronouns Possessive pronouns This and that A postcard from San Francisco, A holiday postcard. Describing lifestyles, preferences and places, Roleplay: conversations in town. Listening the requests with Can I……..?, Adjectives: lovely, terrible, comfortable, friendly… Opposite adjectives: new/old, big/small Places: chemist, post office, There is /are Prepositions: in, on, under, next to Vancouver-the best city in the world, What to do and where to go. Talking and asking about rooms and furniture, Giving directions. My home town, Steve talks about living in Vancouver. Rooms and furniture: living room, bedroom … In and out of town: beach, mountain, sailing,…, Was/were born Past simple: irregular verbs It's a Jackson Pollock. Telling a story from pictures, Saying the dates in English. Magalie Dromand, Magalie dromand talks about her family. Saying years People and jobs Irregular verbs Have, do, go: have lunch, do homework, go shopping, Past simple: regular and irregular Questions Negatives Ago Dialogues with simple past. Did you have a good weekend? Asking about holidays, A questionnaire, My last holiday, Roleplay: asking and giving directions. Angie and Rick are at work, Jack and Millie's holiday. Weekend activities: go to the cinema, have a meal… Time expressions: on Monday, last night… Sports and leisure: tennis, skiing, windsurfing… Play or go: play tennis, go skiing… Seasons: winter, summer…, Can / can't, Adverbs, Adjective + noun Requests and offers The Internet, What can you do on the internet? Talking about what you can do, Talking about everyday problems, Five people talk about what they do on the internet. Verbs: draw, run, drive… Verb+noun: Listen to the radio, chat to friends Adjective+noun: fast car, busy city, dangerous sport Opposite adjectives: dangerous/ safe, old/modern, old/young., I'd like, You are what you eat, Discussion-what is a good diet? Conversation with Adam,

Shopping: bread, milk, fruit, Please and thank you Some /any, Like and would like People from different parts of the world describe what they eat., Roleplay: Ordering a meal. Birthday wishes, What people want on their birthday. stamps, cheese, ham… Food: cereal, salad, pasta, fish… In a restaurant: menu, starter, desert, soup, salmon Present continuous, Present simple and present continuous. This week is different, Colin, a millionaire, gives money to homeless teenagers What's the matter? Why don't you ….? What is Nigel wearing? Nigel is on holiday, What's the matter. Colours: blue, red, green… Clothes: jacket, trousers, shoes and socks… Opposite verbs: buy/sell, love/hate, open/close…, Future plans, Revision: question words, tenses. Seven countries in seven days, Life's big events: three people talk about their family, education, work and ambitions. A mini autobiography. Eddie is talking to a friend about his holiday plans, social expressions Transport: travel by bus, coach, motorbike, plane… Revision

Irregular verbs, phonetic symbols, consonants and vowels.

Module 2

Code	Course/Module Title	ECTS	Semester
UD12	Arabic Language **I**	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	33	17
Description			

توضيح أهمية اللغة العربية وفوائدها بالنسبة للطالب الجامعي.
اللغة، تفسير وتحليل أول عشرة آيات من سورة الكهف مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية . اللغة، تفسير وتحليل ثلاثة آيات من سورة الحجرات مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية.
الادب، تحليل ثلاثة عشر سطراً من قصيدة سفر ايوب في الشعر الحر للشاعر العراقي بدر شاكر السياب مع حياة الشاعر واهم الاوجه البلاغية والنحوية في القصيدة. الادب، تحليل ثمانية ابيات في الحماس للشاعر ابي الطيب المتنبي مع حياة الشاعر مع اهم الاوجه البلاغية والنحوية في القصيدة.
قواعد اللغة العربية وأهميتها: معرفة اقسام الكلام(الاسم والفعل والحرف)واهم علاماتها. قواعد اللغة العربية :- النكرة والمعرفة، انواع المعارف(العلم) شرح موضوع (اسم العلم والاسم المركب) مع الأمثلة. (الضمائر)شرح موضوع(ضمائر الرفع والنصب والجر) مع الامثلة. اللغة، تفسير وتحليل سورة الاعلى مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية. الادب، تحليل ثمانية ابيات من قصيدة (كن بلسما) للشاعر (ايليا ابي ماضي)مع حياة الشاعر مع اهم الحالات الاعرابية والبلاغية . قواعد اللغة العربية، شرح موضوع (اسماء الاشارة) مع الأمثلة وحالات الاعراب، شرح موضوع (المعرف بالإضافة) مع الأمثلة وحالات الاعراب. شرح موضوع (الحال)معرفة الحال وصاحبها وما هي انواع الحال مع الأمثلة وحالات الاعراب.
الأملاء في اللغة العربية، علامات الترقيم واهميتها في اللغة العربية.
قواعد اللغة العربية، شرح موضوع (العدد)معرفة تميز العدد وماهي اقسام العدد مع الأمثلة وحالات الاعراب.
الأملاء في اللغة العربية، احكام الهمزة(حمزة الوصل، حمزة القطع، كتابة الهمزة في وسط الكلمة).
الأملاء في اللغة العربية: احكام كتابة التاء المربوطة والمفتوحة والالف الممدودة والمقصورة.

Module 3

Code	Course/Module Title	ECTS	Semester
UD14	Human Rights and Democracy	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	17
Description			
محاضرة تعريفية عن المادة واهميتها .. , تعريف الحق والانسان وحقوق الانسان واهمية حقوق الانسان ,حقوق الانسان في الدين الإسلامي والحضارات القديمة. , مصادر حقوق الانسان الدولية والإقليمية والمحلية. ,ضمانات حقوق الانسان الدستورية والقانونية وضمانات حقوق الانسان على الصعيد الدولي. ,ضمانات حقوق الانسان في الإسلام , دور المنضمات الإقليمية في حماية حقوق الانسان. , خصائص حقوق الانسان وتعريف الحريات العامة وانواعه والمقارنة بينها وبين الحقوق , القانون الدولي لحقوق الانسان والقانون الدولي الإنساني ومنظمة الصليب الأحمر., مستقبل حقوق الانسان وسبل تطويرها . , العولمة وحقوق الانسان ., تعريف الديمقراطية وتطورها التاريخي ومبادئها ., الديمقراطية بين العالمية والخصوصية ., اشكال الديمقراطية / الديمقراطية المباشرة., الديمقراطية شبه المباشرة والديمقراطية التمثيلية / اركان النظام التمثيلي / اشكال النظام التمثيلي., المجلس النيابي وانواعه / الانتخاب وشروطه / هيئة الناخبين., تنظيم عملية الانتخاب / تحديد الدوائر الانتخابية / القوائم الانتخابية / المرشحون/ الحملة الانتخابية / التصويت ., نظم الانتخابات., علاقة الديمقراطية بحقوق الانسان وكيفية التأثير والتأثر فيما بينها			

Module 4

Code	Course/Module Title	ECTS	Semester
E 101	Mathematics I	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	1	78	72
Description			
Cartesian coordinates, slope of lines, angle of inclination, functions, types of functions, graph of the functions, domain and range ,identifying functions, Circles and parabolas, Introduction to vectors, Preliminaries, Sum, differences, products and quotients of Composite functions, shifting a graph of a function, scaling and reflecting a graph of a function, Absolute value, Review of trigonometric function, graph of trigonometric function, range and domain, identities, Limits and Continuity, Properties, limits involving infinity, continuity, Transcendental functions, Inverse function, graph of inverse function, Logarithmic and exponential functions, trigonometric functions ,inverse trigonometric functions, hyperbolic functions, inverse hyperbolic functions, Definition of Derivatives, rules of derivative, slopes , tangent lines, chain rule, derivative of trigonometric functions, Implicit differentiation, L hospital's rule, derivative of inverse trigonometric functions, derivative of exponential and logarithmic functions, Applications of derivatives, Speed and acceleration, Relative maximum and relative minimum, Curve sketching with 1st and 2nd derivative, Linearization, rate of change problems, Mean value theorem - Initial value problem**,** Complex numbers**:** Basic definitions. The geometric representations of the complex numbers**,** argand diagram, Basic operations with complex numbers, Euler's Formula			

Module 5

Code	Course/Module Title	ECTS	Semester
E 102	Mathematics II	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	1	78	72
Description			
Integration: Definition, antiderivative, definite and indefinite integral, Integration and transcendental functions:, (trigonometric and inverse trigonometric functions, exponential and logarithmic functions), Integration and transcendental functions:, Integration and transcendental functions (hyperbolic and inverse hyperbolic functions), Numerical integration, Introduction, trapezoidal rule and Simpson's rule, Methods of integration , Substitution method, integration by parts, Methods of integration , Trigonometric substitution method, Methods of integration , Integration by partial fraction method., Application of definite integrals, Areas under the curve, area between curves,, Application of definite integrals Volume by revolution, Application of definite integrals, Length of curve in the plane, Area of surface of revolution, Application of definite integrals, Center of mass, moment of inertia, Application of definite integrals, Area by polar coordinates, Matrix, Definition, matrix algebra, Matrix, Determinant of matrix, Grammar's rule, Inverse of matrix, Gauss Elimination Method			

Module 6

Code	Course/Module Title	ECTS	Semester
CPE 101	Fundamentals of Programming	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	94	81
Description			
Introduction to computer system, Classification of programming languages, Introduction to problem solving, Computers and Programming Languages , Processing a C++ Program, Basics of a C++ Program , Data Types ,Variables, Arithmetic Operators, Assignment and Input Statements, Input / Output , I/O Streams , Predefined Functions , Output Formatting, Control Structures I (Selection) , Relational Operators ,Logical Expressions, If/If…else ,Block Statements, Switch Structures, Control Structures I (Repetition) , While Looping, Do…while Looping, For Looping , Break and continue Statements			

Module 7

Code	Course/Module Title	ECTS	Semester
CPE 103	Fundamentals of Electrical Circuits I	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
Temperature effect of the resistance, Ohm's law, Resistor in series, Resistor in parallel, Kirchhoff 's voltage law, Kirchhoff 's current law, Delta and Star connection, (Delta to Star) and (Star to Delta) Transformation, Current and Voltage Sources, The principle of Superposition, The Thevenin equivalent circuit, The Norton equivalent circuit, Maximum power transfer, The Node Voltage Method, The Mesh Current Method, Preparatory week before the final Exam.			

Module 8

Code	Course/Module Title	ECTS	Semester
CPE 105	Principles of Logic Systems	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	1	63	87
Description			
Introduction to digital quantities and numbering systems, Binary and decimal numbers, Octal and hexadecimal numbers, Conversions between Numbering Systems, Arithmetic operations with different number systems, complements of number systems, Binary codes, BCD codes, Ex-3 code, and gray code., Logic Gates and its applications, Boolean Algebra and Logic Simplification, Simplification with karnaugh Map , The karnaugh Map (two, Three, Four and Five- Variable Karnaugh Maps), Introduction to Combinational Logic circuit and circuit analysis, Functions of Combinational Logic, Preparatory week before the final Exam			

Module 9

Code	Course/Module Title	ECTS	Semester
CPE 107	Engineering Drawing Using AutoCAD	3	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
	3	48	27
Description			
The use of CAD in engineering drawing, description of menu Bar and toolbars, Line, point , Rectangle , Circle , drawing Ellipse , Arc, editing commands , copy, cut , paste, erase , move , selecting objects , selecting objects , CAD Electrical selecting objects, Mechanical/ Special features The use of various layers selecting objects			

Module 10

Code	Course/Module Title	ECTS	Semester
CPE 102	Computer Programming	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	94	56
Description			
String Type, Additional string Operations, Arrays and strings , One-Dimensional Array ,Indexing , Array Searching , c-Strings , Parallel Arrays ,Multidimensional Arrays, Records (Structs) , Accessing struct, Members , I/O structs , Arrays vs Structs, Pointers, Classes, Pointer data types , Address of Operator (&) ,Pointer Variables , Dynamic Arrays, Recursion , Direct Recursion , Indirect Recursion ,Recursion vs Iteration, File Input, File Output			

Module 11

Code	Course/Module Title	ECTS	Semester
CPE 104	Fundamentals of Electrical Circuits II	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
Alternating Quantities, Polarities & Direction, Phase Relations, Average & Effective, Complex representation of A.C Value, Series Configuration, Parallel Configuration, Series and Parallel Configuration, Kirchhoff's voltage law in A.C circuits, Kirchhoff's current law in A.C circuits, Resonance in series circuit, Resonance in parallel circuit, Preparatory week before the final Exam.			

Module 12

Code	Course/Module Title	ECTS	Semester
CPE 106	Digital Logic Circuits Design	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			
Overview to Combinational Logic circuits, Adders and Subtractions circuits, Series and Parallel Binary Adders circuits, Ripple carry versus Parallel Look-Ahead Carry Adders circuits, Binary multiplier circuits and Magnitude comparators circuit., Encoders, and Decoders circuits, Multiplexers, and Demultiplexers circuits., Parity Generators/Checkers and design of code conversion circuits., Introduction to sequential logic circuits, Flip-Flops:(Latches, Edge-Triggered Flip-Flops) and it's applications., Counters, Preparatory week before the final Exam			

Module 13

Code	Course/Module Title	ECTS	Semester
CPE 108	**Electronic Physics**	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		48	52
Description			
Overview about Insulators, Conductors, Semiconductors, Intrinsic and Extrinsic Semiconductors., PN Junction; Forward and Reverse Biasing, Physical Operation of Diodes (Diode Characteristics) , The DC Analysis of the Diode, The Small Signal Diode Model, Other Diode types, Half Wave Rectifiers, Full Wave Rectifiers, Clipping Circuits, Clamping Circuits, Operation and analysis of the AND & OR Logic Gates using Diodes, Power Supply Construction, Zener Diode Construction and Operation, Zener Diodes Applications and Circuits, Preparatory week before the final Exam			

Module 14

Code	Course/Module Title	ECTS	Semester
UD24	**Extinct Ba'ath Party Crimes**	2	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	17
Description			
<u>الجزء الاول</u> : جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا لعام 2005م، والجرائم النفسية والاجتماعية وآثارها وابرز انتهاكات النظام البعثي في العراق: التعريف بالجريمة لغة وأصطلاحاً، اركان واقسام الجريمة (2 ساعة). جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م : أنواع الجرائم الدولية، القرارات الصادرة من المحكمة الجنائية العليا (2 ساعة). وابرز القضايا التي نظرت فيها المحكمة (2 ساعة).الجرائم النفسية والاجتماعية وآثارها وابرز انتهاكات النظام البعثي في العراق: الجرائم النفسية، اليات الجرائم النفسية (2 ساعة). اثار الجرائم النفسية ، الجرائم الاجتماعية (2 ساعة) . عسكرة المجتمع، موقف النظام البعثي من الدين (2 ساعة) . أنتهاكات القوانين العراقية، صور أنتهاكات حقوق الانسان (2 ساعة) . جرائم السلطة، بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث، أماكن السجون والاحتجاز لنظام البعث (2 ساعة). **<u>الجزء الثاني : الجرائم البيئية لنظام البعث في العراق، جرائم المقابر الجماعية :</u>** الجرائم البيئية لنظام البعث في العراق: التلوث الحربي والاشعاعي – أستعمال الاسلحة المحرمة دولياً ومخاطر الالغام. (2 ساعة). التلوث بالمواد المشعة، أثار أستخدام الاسلحة المحرمة دولياً (2 ساعة). تدمير المدن والقرى (سياسة الارض المحروقة): قصف المدن، قصف العتبات المقدسة والمساجد والحسينيات، معركة نهر جاسم ، حرق آبار النفط (2 ساعة). تجفيف الاهوارو أثارها البيئية والاجتماعية والاقتصادية (2 ساعة). ، تجريف بساتين النخيل والاشجار والمزروعات (2 ساعة). جرائم المقابر الجماعية وموقف الامم المتحدة منها (2 ساعة). احداث المقابر الجماعية المرتكبة من النظام البعثي في العراق، التصنيف الزمني لمقابر ابادة الجماعية في العراق للمدة 1963- 2003 (2 ساعة).			

Module 15

Code	Course/Module Title	ECTS	Semester
CPE 201	**Applied Mathematics I**	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	52
Description			
Power Series Theory of the Power Series Method, Convergence & Divergence, Legendre Polynomials, Extended Power Series, Euler, Fourier Analysis, Fourier Series, Arbitrary Period. Even and Odd Functions, Approximation by Trigonometric Polynomials, Fourier Integral and Applications, Fourier Transform. Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT) and inverse Fourier transform IFT, Laplace Transforms concept and properties, Shifting Theorem. Inverse Laplace Transforms, Transforms of Derivatives and Integrals, Differential Equations, Initial Value Problems, Preparatory week before the final Exam.			

Module 16

Code	Course/Module Title	ECTS	Semester
CPE 202	**Applied Mathematics II**	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	52
Description			
First-Order ODEs: Separable ODEs. Modeling, Exact ODEs. Integrating Factors, Existence and Uniqueness of Solutions for (IVP), Applied problems, Second-Order Linear ODEs: Homogeneous Linear ODEs of Second Order, Homogeneous Linear ODEs with Constant Coefficients, Nonhomogeneous ODEs and Applied problems, Multiple integral: Mathematical definition, Methods of integration, Multiple improper integral, Multiple integrals and iterated integrals, Some practical applications, Partial Differential Equations: Basic Concepts of PDEs, Modeling: Vibrating String, Wave Equation, Solution by Separating Variables. Use of Fourier Series, Laplacian in Polar Coordinates. Fourier–Bessel Series, Laplace's Equation in Cylindrical and Spherical Coordinates, Solution of PDEs by Laplace Transforms, Wavelet, Wavelet bases for discrete and continuous variables, The Haar basis, Differentiable wavelet bases, Preparatory week before the final Exam.			

Module 17

Code	Course/Module Title	ECTS	Semester
CPE 203	**Analogue Electronics**	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		48	77
Description			
Introduction: Overview about P.N Junction, Bipolar Junction Transistors (BJT): Construction, Operation and biasing, Overview about Field Effect Transistors types, MOSFET: types, operation and construction, Operation, Characteristics and Biasing of Enhancement MOSFET, Amplifier circuits of Enhancement MOSFET, Small-Signal Equivalent Circuit Models Enhancement MOSFET amplifier, Application Circuits of the Operational Amplifiers (OP Amp), Preparatory week before the final Exam.			

Module 18

Code	Course/Module Title	ECTS	Semester
CPE 204	**Digital Electronics**	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	47
Description			
Introduction to the types of synchronous and asynchronous counters, the cascade counter and counter applications, The conversion register, its types and applications, Information conversion circuits, their types and applications. the diodes and their types, Programmable logic devices, programmable logic arrays, general matrix logic, and an introduction to sequential logic circuits, Preparatory week before the final Exam.			

Module 19

Code	Course/Module Title	ECTS	Semester
CPE 205	**Data Structures and Algorithms**	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2 - 1	78	72
Description			
Introduction to Data Structures, Single Linked Lists, Linked Lists Functions, Reverse List, Double			

Linked Lists, Stack and its Algorithms, Stack Implementation using Array, Stack Implementation Using Linked Lists, Applications of Stack, Infix to Postfix Notation, Evaluation of Postfix Expression, Queue and its Algorithms, Queue implementation using Array, Stack Implementation Using Linked Lists, Circular Queue and its Algorithms, Circular Queue implementation using Array, Circular Queue implementation using Linked List, Trees and its terminologies, Types of Tree and its operations, Tree Traversals, recursion and non-recursion traversals, Tree Applications, Graph and its terminologies, Representation of Graph, Operations of graph, Graph Applications, Breadth First Search (BFS), Depth First Search (DFS), Minimum Spanning Tree, Shortest Path, Searching, Big Oh-O Notation, Efficiency Considerations in Sorting Algorithms, Linear Search, Analysis of Linear Search, Binary Search, Analysis of Binary search, Sorting, Efficiency Considerations in Sorting Algorithms, Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Preparatory week before the final Exam.

Module 20

Code	Course/Module Title	ECTS	Semester
CPE 206	**Software Engineering**	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
Introduction to Software Engineering, Requirements Engineering, Software Design, Software Construction, Software Deployment and Maintenance Software Project Management, Advanced Software Engineering Topics, Case Studies and Practical Projects, Tools and Technologies, Assessment, Preparatory week before the final Exam.			

Module 21

Code	Course/Module Title	ECTS	Semester
CPE 207	**Computer Architecture**	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		48	77
Description			
Overview about digital computer system architecture, Register transfer language; Bus and memory transfers, Arithmetic micro-operations and Logic micro-operations, Basic computer organization and design, Micro-programmed control memory; Control memory, Central processing unit. General register organization, Fundamentals of parallel processing, Pipelining: Basic and Intermediate Concepts, Instruction pipeline. RISC Pipeline, Memory Hierarchy Design, Cache performance optimization, Virtual memory, Multiprocessors and Thread-Level Parallelism, Cache Coherence in Multiprocessor systems, Basic of SIMD Processors and GPUs, Preparatory week before the final Exam.			

Module 22

Code	Course/Module Title	ECTS	Semester
CPE 208	**Object Oriented Programming**	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
Object Oriented Concepts, Merits of Object Oriented Technology. Abstraction, Encapsulation, Information Hiding, Object Model: definition, State, behavior, Identity and messages. Concept of object initialization, constructors, constructor overloading. Name space and references, Access modifiers: Class attributes and methods. Introduction to object model of software development, Used Language features: syntax, data types, data type conversions, control statements, operators and their precedence, Introduction to Class: Instance members and member functions, String Handling, Wrapper classes: Arrays and Vectors, Class relationships: Inheritance and its types, Merits and Demerits, Polymorphism: Dynamic method dispatch, Runtime polymorphism, Abstract classes, Interfaces and Packages, Exceptions: Need for exceptions, Checked Vs Unchecked exceptions, creating custom exceptions, Multithreading: Introduction, Priorities and scheduling, Inter-thread communication, Thread Synchronization and its life cycle, Basic concept of streams I/O stream & reader-writer classes, File handling. Applet and its Life Cycle, Templates, Basic GUI elements , Event Delegation Model and event handling, Practical Examples, Preparatory week before the final Exam.			

Module 23

Code	Course/Module Title	ECTS	Semester
CPE 209	**Database Systems**	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
Introduction to Database systems, Database Users, Roles and Database administration, Database Architectures and the Web, Introduction to Structured Query Language (SQL), The SQL SELECT statement and Table Joins, Advanced SQL SELECT, SQL programming: stored procedures functions, Relational Algebra & SQL, Database analysis and data modeling, Using High-Level Conceptual Data Models for Database Design, Logical database design, mapping complex data models, Logical database design and normalization, Physical database design, Course projects, Preparatory week before the final Exam.			

Module 24

Code	Course/Module Title	ECTS	Semester
CPE 210	**Microprocessor**	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	47
Description			
Internal Architecture and Features of 8086 Microprocessor, Addressing Modes of 8086, Intel 8086 Instruction Set: Data Movement Instructions, Logical and Arithmetic Instructions, Rotate and Shift Instructions, Intel 8086 Instruction Set: Conditions and Loops, Array and Table Processing, String Instructions, Intel 8086 Instruction Set: Interrupt instructions, Procedures, Pin Configuration of 8086 Microprocessors, Minimum and Maximum modes of 8086, Clock Generator (8284A), Bus Buffering and Latching, Bus Timing, Memory Interfacing: Memory Devices, Memory Address Decoding Using NAND and Decoder, I/O Interfacing: Memory Mapped, I/O Mapped, Address Decoding using NAND and Decoder, I/O Interfacing: I/O instructions and Data Transfer, Intel 8086 Interfacing with 8255 PPI: Introduction to PPI, PPI Structure, Intel 8086 Interfacing with 8255 PPI: Operation, and Programming of 8255 PPI, Interrupt Processing in 8086: Interrupt Pin, Interrupt Vector Table and It's Organization, Interrupt Processing in 8086: Software and hardware Interrupt, Interrupt Priorities, A/D and D/A interface, Keyboard and Display Interface, DMA, Preparatory week before the final Exam.			

Module 25

Code	Course/Module Title	ECTS	Semester
UD21	**English Language II**	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	17
Description			
Indicative content includes the following. i) Grammar has a core place in language teaching and learning. ii) A wide variety of practice tasks in all the four skills are essential to language learning. iii) Everyday expressions, particularly of spoken English, also need a place in the syllabus. These can be functional, social, situational or idiomatic.			

Module 26

Code	Course/Module Title	ECTS	Semester
UD22	**Arabic Language II**	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	17
Description			
دراسة قواعده واصوله وتاريخه . االهتمام بالكالم ، ومحاولة التعمق االهتمام بقواعد اللغة تاصيال وتقعيدا ، وتاريخ ادبها تسجيال وتدوينا ، ونقد نصوصها تفسريا وتاويال الفهم الدقيق الصوات اللغة العربية ، ومعرفة مخارج االصوات ، ومعرفة مخرج كل صوت من اصوات العربية بطريقة مبسطة .وعالقة الدال بالمدلول نشاة اللغة ، وعالقتها بغريها ، وخصائص اصواتها ، وابنية مفرداتها وتراكيبها . تحكم الصلة التي اثرت فيها ، والقوانين عنارص لهجاتها وتطور دالاللتها ، والعوامل البحث ف الفاظها . دراسة قواعده واصوله وتاريخه . االهتمام بالكالم ومحاولة التعمق توليد القدرة عل تذوق النصوص ، وفتح نافذة القدرة عل التحليل والتاويل ، ومعرفة ما يريد ان يقوله النص الادبي وقواعد الجملة العربية . دراسة اساسيات النحو العربي التعرف على تراكيب الجملة الفعلية واالسمية والمركبة.			

Module 27

Code	Course/Module Title	ECTS	Semester
CPE 301	**Engineering Analysis**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		48	77
Description			
Introduction to the engineering analysis, Applications of Differential Equations, Power Series Solutions of D.Es, Frobenius Method, Heat equation, wave equation, Gama, Beta, Bessel's Functions and Bessel's equations, The Z-Transform, The inverse Z-Transform and application, Complex Variables,(Limit and Continuity), Integration In Complex Plan, Elementary Complex Functions, Analytic Functions, Cauchy and Their Riemman, Residues And Residue Theorem.			

Module 28

Code	Course/Module Title	ECTS	Semester
CPE 302	**Numerical Analysis**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		48	77
Description			

Introduction, Errors, Types of Errors, Interpolation, Equal Space Interpolation, Network's Form Interpolation, Unequal Space, Quadratic Interpolation, Solution of Non-Linear Algebraic Equation: Bi-section, Linear, Interpolation, Newton-Raphson Method, Iterative, Numerical Solutions of Linear Systems, Numerical Differentiation, Numerical Integration: Trapezoidal Rule of Integration, Simpson's Rule of Integration Method, Numerical Integration: Development of Special Integration Formulas, Integration of Unevenly Spaced Base Points, Romberg's Integration, Gauss Quadrature Formulas, Ordinary Differential Equations: Euler Method, Modified Euler Method, Range Kutta Methods, Adam's Method.

Module 29

Code	Course/Module Title	ECTS	Semester
CPE 303	**Signals and Systems**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		48	77
Description			
Overview of signals and its properties, Signal classifications and Operations, System Classification and Properties, Time Domain Analysis of Continuous Time System, Sampling Theorem, Nyquist Theorem, Aliasing, Time Domain Analysis of discrete Time Systems, Convolution, Deconvolution &Correlation (Auto and Cross-correlation), LTI system, System Response(impulse and unit), Continuous Time Fourier Series, Discrete Fourier Transform(DFT) & Inverse Discrete Fourier Transform(IDFT), Discrete Time Fourier Transform (DTFT) & Properties of Discrete Time Fourier Transform (DTFT), Fast Fourier Transform(FFT).			

Module 30

Code	Course/Module Title	ECTS	Semester
CPE 304	**Digital Signal Processing**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		48	77
Description			
Introduction about digital signals (unit step, impulses, ramp, exponential, cosine), Components of Digital signal processing and its properties & Applications of DSP system, Z-Transforms and Region of Convergence & Properties of Z-Transformer Inverse Z- Transform, Digital filters and Analog filters and their functions, Classification of Digital filters and Filter structures, Types of Digital Filters (FIR and IIR), Finite Impulse Response FIR Filter and filter Specifications, Design FIR filter using Fourier Transform Method, Designing FIR filters Windows Methods (Hamming, Hanning, Black man, and Kaiser Windows), Design (LP, HP.Band pass and Stop pass FIR filters), Infinite Impulse Response of Digital Filter(IIR), IIR filter Design (Pole-Zero placement, Impulse			

Invariant, Matched Z-Transform, and Bilinear Z-transform Methods), Realization Structures For IIR Digital Filters).

Module 31

Code	Course/Module Title	ECTS	Semester
CPE 305	**Digital System Design**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	**78**	**47**
Description			
Introduction: overview of digital system design, Complex programmable logic device (CPLD): construction, operation, Field programmable gate (FPGA): construction, operation, Synchronous sequential circuits: analysis and design of synchronous sequential circuit state and logic diagrams, Synthesis procedure of synchronous sequential circuit, simplification of synchronous sequential circuit by using state reduction, operation of synchronous sequential circuits with programmable logic devices, New method to design synchronous sequential circuit, Algorithmic Finite State Machin, Data path and control units: Finite state machine for data path and control unit, Asynchronous sequential circuits: pules and fundamental modes for asynchronous sequential circuits.			

Module 32

Code	Course/Module Title	ECTS	Semester
CPE 306	**Control Theory**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	**78**	**47**
Description			
Introduction: Basic Definitions and Transfer function, Mathematical Representation of Control Systems, State-Space Representation of Dynamic System, Block Diagram reduction and Signal Flow Graph, Time-Domain Analysis of Control System, Stability of Control System, Root-Locus Analysis, Frequency Response Analysis, Control System Design by the Root-Locus Method.			

Module 33

Code	Course/Module Title	ECTS	Semester
CPE 307	**Statistics and Probability**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	**48**	**77**
Description			
Introduction to statistics and its applications, Basic probability concepts: sample space, events, and probability rules, Understanding randomness and uncertainty, Definition of finite probability spaces, Definition and properties of discrete random variables, Binomial distribution: properties, mean, and variance, Statement and proof of the Central Limit Theorem (CLT), Implications of CLT for the normal distribution, Sampling distributions and their role in inferential statistics, Applications of MLE and MAP in machine learning.			

Module 34

Code	Course/Module Title	ECTS	Semester
CPE 308	**Operating Systems**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		**48**	**77**
Description			
Introduction to Operating Systems (Overview of operating system functions and architecture; Types of operating systems (batch, time-sharing, real-time, distributed); History and evolution of operating systems), System Structure and OS Services (System calls and OS structure (monolithic, microkernel); User mode vs. kernel mode; OS services and API concepts), Processes and Process Management (Process concept, process state, and process control block (PCB); Context switching and process scheduling; Introduction to multi-programming and multitasking), Threads and Concurrency (Difference between processes and threads; Thread management, advantages of threads; Concurrency and parallelism basics), Process Synchronization (Critical section problem and solutions; Synchronization tools: mutexes, semaphores, monitors; Classic synchronization problems (producer-consumer, readers-writers)), CPU Scheduling (CPU scheduling algorithms (FCFS, SJF, Priority, Round Robin); Multiprocessor scheduling; Performance evaluation of scheduling algorithms), Deadlocks (Deadlock characterization and conditions; Methods for handling deadlocks (prevention, avoidance, detection, recovery); Resource allocation graphs and Banker's Algorithm), Memory Management (Basic memory management, partitioning, and fragmentation; Paging and segmentation; Virtual memory and page replacement algorithms), Virtual Memory Management (Demand paging and page replacement policies (FIFO, LRU, Optimal); Thrashing and memory allocation strategies; Working set model), File Systems (File concepts and attributes, directory structures; File system mounting, sharing, and protection; Disk scheduling and allocation methods), I/O Systems (I/O hardware and interfacing with the OS; I/O buffering, caching, and spooling; Device drivers and interrupt handling).			

Module 35

Code	Course/Module Title	ECTS	Semester
CPE 309	**Data Communications and Networking**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	**48**	**77**
Description			
Introduction to Data Communications (Definition and importance; Components of data Communications systems; Role of protocols in Communications; Frequency, Spectrum, and Bandwidth; Types of data Communications: simplex, half-duplex, full-duplex), Data and Signals (Data vs. signals; Analog and digital signals; Signal characteristics: amplitude, frequency, phase; Bit rate vs. baud rate), Transmission Impairments and Channel Capacity (Types of noise: thermal, crosstalk, impulse; Signal-to-noise ratio (SNR); Nyquist and Shannon capacity formulas), Digital Transmission Techniques (Signal conversion: digital-to-digital, analog-to-digital; Synchronization methods), Analog Transmission and Modulation (Amplitude, frequency, and phase modulation (AM, FM, PM); Digital-to-analog conversion: ASK, FSK, PSK, QAM), Multiplexing and Switching (Time Division Multiplexing (TDM), Frequency Division Multiplexing (FDM), Wavelength Division Multiplexing (WDM); Circuit switching, packet switching, message switching; Delay, loss and Throughput in Packet-Switched Networks), Introduction to Computer Networks (Definitions and uses of Computer Networks; Types of networks (LAN, WAN, MAN) and topologies; Topologies: bus, ring, star, mesh, hybrid; Standards organizations: ISO, ITU, IETF, IEEE), Protocol Layering and Models (Protocol layering concept; TCP/IP protocol suite; OSI model (brief overview and limitations); Encapsulation and decapsulation), Network Devices (Devices: routers, switches, hubs, bridges; Collision domain vs. Broadcast domain), Physical Layer Concepts (Transmission Media (Guided and Unguided media; Media performance: attenuation, noise, bandwidth; Physical layer transmission standards), Data Link Layer Concepts (Data Link layer services; Framing and addressing; Error Detection and Correction; Flow Control Protocols), Current Trends and Applications (Optional) (IoT Communications basics; Wireless Communications overview (Wi-Fi, Bluetooth); Emerging topics (optical networks, 5G basics).			

Module 36

Code	Course/Module Title	ECTS	Semester
CPE 310	**Web Design**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	**63**	**62**
Description			
Introduction to the Web and Internet (History and evolution of the Internet and the World Wide Web; Web design vs. print design: principles and challenges; Overview of Internet architecture and how websites work), Web Documents (Types of Web Documents; Client-Side Scripting vs. Server-Side Scripting), HTML and Document Structure (HTML/XHTML structure, elements, and			

semantics; Page structuring and use of divs and semantic tags; Creating links, lists, tables, and inserting images), CSS for Styling and Layout (CSS syntax, selectors, and rule structure; Text styling, colors, and backgrounds; The CSS box model: margins, padding, borders; Layout techniques using float, flexbox, and positioning), Client-side Interactivity with JavaScript (Introduction to JavaScript syntax and DOM manipulation; Event handling and basic animations; Simple form validation using JavaScript), Form Design and Processing (Creating and styling forms with HTML and CSS; Input types, labels, placeholders, and validation; Handling form submissions), Server-side Programming with PHP (Basics of PHP syntax, variables, control structures; Embedding PHP in HTML; Processing form data using PHP), Database Connectivity with MySQL (Introduction to MySQL: tables, records, and queries; Connecting PHP to MySQL databases; Performing CRUD operations (Create, Read, Update, Delete), Final Project and Portfolio Presentation (Students design and develop a complete website using HTML, CSS, JS, and PHP/MySQL; Deliverables: source code, written report, design documentation)

Module 37

Code	Course/Module Title	ECTS	Semester
CPE 311	**Artificial Intelligence**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		**48**	**77**
Description			
Definitions and historical development of Artificial Intelligence, Goals and real-world applications of AI across domains, Key branches of AI: Machine Learning, Natural Language Processing (NLP), Computer Vision, and Robotics, Overview of data types (structured, semi-structured, unstructured) and importance of data quality, Introduction to machine learning paradigms: supervised, unsupervised, and reinforcement learning, Data preprocessing techniques: normalization, encoding, and handling missing values, Architecture of neural networks: perceptrons, activation functions, layers, and forward/backward propagation, Application of learning laws (e.g., loss functions, optimization algorithms) in model training, Basic evaluation metrics and model validation techniques, Introduction to Genetic Algorithms: selection, crossover, mutation, and evolutionary cycles, Fundamentals of Fuzzy Logic: fuzzy sets, membership functions, and applications in uncertain systems, Overview of Natural Language Processing (NLP): linguistic levels, common challenges, and core applications.			

Module 38

Code	Course/Module Title	ECTS	Semester
CPE 312	**Digital Image Processing**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	**78**	**47**
Description			

Introduction, Basic image processing operations, Image enhancement, Image restoration, Color image processing, FFT and Wavelet Transforms, Image morphological processing, Image compression, Image segmentation.

Contact

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