University of Al-Qadisiyah
جامعة القادسية

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

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1. Overview

This catalogue is about the courses (modules) given by the program of Computer Science to gain the Bachelor of Science degree in computer science. The program delivers (48) 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 علوم الحاسوب. يقدم البرنامج (٤٨) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

Code	Course/Model Title	ECTS	Semester
CSI111	Programming Fundamentals	8	1
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			
1. Enable the student to know the basics of writing algorithms and flowcharts. 2. Enabling the student to know the basics of building and writing code properly. 3. Enabling the student to know the basic functions provided by programming languages. 4. Provide the student with the concepts of programming in C++. 5. Build simple programs to solve simple problems.			
Code	Course/Model Title	ECTS	Semester

CS111	Introduction to Information Technology	4	1
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• Identify the basic components of a computer system. • Learn about software, hardware components, and data storage methods. • Knowing some terms related to information technology such as data mining, data warehouse...etc.			

Code	Course/Model Title	ECTS	Semester
CS112	Logic Design	6	1
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	86
Description			
• Know the types of logical gates • Use the laws of Boolean algebra to simplify Boolean expressions • Writing logical expressions and dealing with them • Identify aggregate logical circuits • Identify sequential logic circuits			

Code	Course/Model Title	ECTS	Semester
UNV112	Human Rights	2	1
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1		17	33
Description			
The course aims to introduce students to human rights and their most prominent sources and characteristics and the historical stages that human rights went through, then to get acquainted with the Universal Declaration of Human Rights and the most prominent articles included in the Declaration, international treaties and covenants and the most prominent international international organizations in the field of human rights and to introduce students to human rights in the monotheistic religions			

Code	Course/Model Title	ECTS	Semester
CSI112	Mathematics	6	1
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		47	103
Description			
• The course aims to provide the student with knowledge of the types of functions. • Enhancing the study and understanding of some mathematical terms such as relations, series, and calculus. • Enable the student to interpret and write mathematical applications in his field of study. • Applying mathematical rules and laws and developing student reasoning and conclusion. • Learn the basic concepts of calculus. • Learn about the connection of functions and its relationship to the endings. • Identify the possibility of derivation of functions and the integration of different functions and its relationship to continuity. • Know the applications of calculus in various sciences. • The ability to use calculus to solve mathematical problems.			

Code	Course/Model Title	ECTS	Semester
UNV111	Economy	2	1
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• To familiarize the student with the patterns of economic and administrative analysis. • That the student be able to distinguish between the applied and analytical side. • That the student has a full perception of economic matters. • That the student be able to benefit from the things he learned in the labor market.			

Code	Course/Model Title	CTS	emester
CSI121	C++ Programming	8	2

Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			
• The student learns how to use the different office functions in building his programs. • That the student be able to use different instructions, concepts and programming ideas in complex graphic structures such as arrays, pointers, functions, symbolic strings and files). • Enabling the student to write and test programs with the possibility of correcting the programming errors in the program. • Enhancing the student's ability to program in C++, taking into account the program's storage space and execution time.			

Code	Course/Model Title	ECTS	Semester
CSI122	Discrete Structure	6	2
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		47	103
Description			
• That the student be able to understand the basics of mathematical logic, methods of mathematical proof, study groups, counting operations, and arrangement methods, in addition to reviewing some concepts of number theory, the most important of which are the greatest common denominator and remainders, as they are considered among the basics of information security. We also review some concepts of schema theory and trees because they give the computer science student some Visualization of the basics of data structures as well as artificial intelligence.			

Code	Course/Model Title	ECTS	Semester
CS121	Computer Organization	6	2
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		47	103
Description			
• This course is concerned with giving basic principles about computer components. • Provides knowledge about each component in terms of function, configuration, and the interaction of these components with each other to perform the functions performed by the computer. These components include processors, memory, and input and output units • It deals with the aggregate language and what is its structure and instructions, as this language is considered important at the level of these components.			

Code	Course/Model Title	ECTS	Semester
UNV122	Arabic	2	2
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		36	68
Description			
• Teaching students writing skills at the level of spelling, grammar and morphology, as well as teaching students the method of analysis Literary text by reference to literary texts considered.			

Code	Course/Model Title	ECTS	Semester
UNV123	English 1	2	2
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		36	68
Description			

• Understanding and using the English language as a means of communication and learning in their specialties. • Comprehension of the read material, creating a link between its various components • Use colloquial English in their daily lives

Code	Course/Model Title	ECTS	Semester
UNV121	Democracy	2	2
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL \(hr/sem)	USWL (hr/w)
1		17	33
Description			
• The course aims, through its vocabulary, to clarify the concept of democracy, its characteristics and types, and then to examine the impact of direct and indirect democracy on society, and whether the pillars of democracy in its various interrelated types achieve the goals that society aspires to in light of the development of democratic mechanisms throughout history, and how it can be confronted Challenges unique to ruling regimes to limit democracy.			

Code	Course/Model Title	CTS	Semester
CS211	Object Oriented Programming	8	3
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			
• Learn the basics of object-oriented programming (class and object). • Learn the basics of programming languages used with the concept of OOP. • Teaching the student the difference between an object and a restriction. • Learn the concept of Encapsulation. • Programming the concept of inheritance Inheritance. • Programming the concept of Polymorphism.			

Code	Course/Model Title	ECTS	Semester

CS212	Microprocessor and Assembly Language	8	3
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	68	136
Description			
• Identify the basic components of the computer. • Identify the components of microprocessors. • Knowledge of the methods and programming of the machine.			

Code	Course/Model Title	CTS	Semester
CS213	Community Development	4	3
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• Familiarizing the student with the scientific concept of human development, including its administrative activities at the level of organizations and the main functions that work with this concept, and the impact of that on their success and the progress of their economies in light of the contemporary challenges and variables for them to achieve efficiency and effectiveness.			

Code	Course/Model Title	CTS	Semester
CSI211	Numerical Methods	6	3
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	68	86
Description			
• Numerical analysis is used to solve mathematical equations that are difficult to solve or require a long time to solve. • Saving time and effort, especially in equations that need a lot of repetition in order to reach the result or solution • The ability to collect, classify, tabulate, represent and interpret quantitative and numerical data • Generalizing numerical mathematical superlatives on symbolic expressions.			

• The ability to build mathematical models. • Using different thinking methods and the ability to judge the validity and reasonableness of the solution.

Code	Course/Model Title	ECTS	Semester
CS214	Algorithms Analysis and Design	4	3
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
1. Introduction to algorithms. 2 Apply the concepts of algorithms. 3 Realizing the importance of algorithms in practical life. 4. Analyzing algorithms and preferring them over others. 5. Professional design of algorithms			

Code	Course/Model Title	ECTS	Semester
CS221	Data Structure	8	4
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	68	136
Description			
• An introduction to the concept of rules and techniques of data structures. • Developing skills in writing effective algorithms.			

Code	Course/Model Title	ECS	Semester
CS222	Java Programming	6	4
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	86
Description			
• Study the principles of programming in the Java language Study how input and output operations, conditional statements, loops, arrays, and strings work. • Study object, class, oop • Studying programming applications in Java			

Code	Course/Model Title	CTS	Semester
CS223	Computation Theory	4	4
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• The aim of this course is to familiarize students with this core area of computer science, which enables students to focus on the study of mathematical models. These mathematical models allow students to solve various problems in the language construction process. It allows students to learn about mathematical theories and complexity, where mathematical data is processed, proofs are formulated, and regular arithmetic expressions are used to distinguish patterns to represent language. The student can also know the different processes that occur on languages and gives him the ability to think logically in building algorithms.			

Code	Course/Model Title	ECTS	Semester
CS224	Computer Architecture	4	4
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		32	68
Description			
• Identify the basic principles of computer architecture. • Knowledge of computer components. • Knowledge of ways to transfer information between computer parts.			

Code	Course/Model Title	ECTS	Semester
CSI221	Statistics and Probability	4	4
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• This course aims to provide the student with an overview of the principles and concepts of statistics and probability. • The student will be able to differentiate between quantitative and qualitative data and how to represent them. • Enable the student to know the types of distribution such as the normal distribution and use it to represent the types of probabilities. • Introducing students to modern topics in the principles of statistics and probability.			

Code	Course/Model Title	ECTS	Semester

UNV221	English 2	4	4
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• Learn the basic skills of the English language • Learn the basics of reading skill • Learn the basics of writing skill • The ability to listen • Understanding the meanings and adding new vocabulary • Learn to speak and discuss using language vocabulary			

Code	Course/Model Title	ECTS	Semester
CS311	Software Engineering	4	5
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• Provide students with a comprehensive introduction to software engineering. • Provide students with the types of activities needed to produce the system. • Study the important stages of software development. • Building a high quality software system. • Explain the system build life cycle. • Acquisition of knowledge at every stage of building the system. • Understanding of applying software engineering principles to a project.			

Code	Course/Model Title	ECTS	Semester
CS312	Data Base	8	5
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			
• Understand the principles of databases and methods of design. • Understand what database management systems are. • Know the reasons that led to the emergence of distributed databases. • Knowledge of what architectures are available and used to build distributed database systems.			

Code	Course/Model Title	ECTS	Semester
CS313	Computer Graphics	8	5
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			
• Obtaining knowledge and facts related to the types of computer graphics software and techniques. • Students acquire practical skills to use computer drawing programs. • Know the reasons that led to the use of drawing. • Know what are the methods of drawing and used to build a two-dimensional and three-dimensional drawing.			

Code	Course/Model Title	ECTS	Semester
CS314	Websites Programming	6	5
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		64	86
Description			
• This course aims to provide the student with an overview of programming websites. • The student can design advanced web pages through an integrated set of programming languages. • Enables the student to program web pages through a set of programming languages. • Enables students to design web pages that deal with relational databases stored on the Internet. • Enable the student to build effective databases for web applications and update them via the Internet.			

• Enable the student to deal with the Client-Server environment

Code	Course/Model Title	ECTS	Semester
CS315	Web Search and Information Retrieval	4	5
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• The course aims to teach the student the basics of information retrieval. • The course aims to introduce students to the basics of primary treatment. • Giving the student an overview of the components of the information retrieval system. • The course aims to introduce students to the mechanism of search engines.			

Code	Course/Model Title	ECTS	Semester
CS321	Encryption	4	6
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• An introduction to the student in the concept bases of encryption algorithms. • Developing students' skills in encryption algorithms. • Giving the student an overview of encryption and its types. • The course aims to introduce students to the mechanism of encryption algorithms.			

Code	Course/Model Title	ECTS	Semester
CS322	Compilers	6	6
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	86

Description
• The course aims to introduce students to the levels of programming languages. • This course aims to enable the student to understand the stages that every written program goes through in any programming language, from the moment the execution button is pressed until the results appear on the execution screen. • Identify the six stages of this course and the algorithms used in each stage. • Identify the errors that the programmer might make.

Code	Course/Model Title	ECTS	Semester
CS323	Artificial Intelligence	6	6
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	86
Description			
• This course aims to introduce students to the field of artificial intelligence and its relationship to computer science in a logical and practical way • Familiarize students with artificial intelligence algorithms. • Explain and clarify the challenges that we face when building smart systems. • It gives models and examples of smart systems and what are the basic technologies used in these systems.			

Code	Course/Model Title	ECTS	Semester
CS324	Distributed Data Base	4	6
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• Understand the principles of databases and methods of design. • Understand what database management systems are. • Know the reasons that led to the emergence of distributed databases. • Knowledge of what architectures are available and used to build distributed database systems.			

Code	Course/Model Title	ECTS	Semester
CS325	Python Programming	6	6
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	86

Description
• The course aims to introduce students to the Python language. • Developing the student's abilities in the field of programming and the use of modern languages. • Provide the student with new concepts in the field of programming.

Code	Course/Model Title	ECTS	Semester
CS411	Operating Systems	8	7
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			
• Identify the operating system and its importance and advantages and the benefit of the continuous development of these systems • Learn about the functions of the operating system. • Learn about the structure of the operating system. • Learn about operations management and scheduling methods. • Identify the important functions in the operating system.			

Code	Course/Model Title	ECTS	Semester
CS412	Digital Image Processing	8	7
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			
• Learn the basic principles of digital image processing. • Knowledge of color systems used in digital images. • Knowledge of methods of generating digital images. • Learn about the various operations that take place on digital images, such as enlarging digital images, improving digital images, conversions that take place on digital images, as well as knowing ways to improve digital images.			

Code	Course/Model Title	ECTS	Semester
CS413	Technical and Electronic Learning	4	7
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• The student knows the concept of e-learning, its characteristics, and its objectives. • The student knows the nature of e-learning, and explains its advantages, potentials and disadvantages. • The student knows the origins of e-learning, and classifies its types and forms. • The student knows the concept of computer-based e-learning.			

Code	Course/Model Title	ECTS	Semester
CS414	Internet of Things	6	7
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		47	103
Description			
• The Internet of Things (IoT) is the next revolution in computing. The billions of data pumping devices connected to the Internet are already radically changing the way we live and work. This course provides a deep understanding of Internet of Things technologies. Students will learn programming IoT devices (Arduino and Raspberry Pi), sensor and actuation technologies, IoT Zigbee protocols, 5G, NFC, MQTT, etc.), designing network connections and security enforcement, data science for IoT, Internet of Things Cloud-based platforms such as AWS IoT. Students will be guided through lab assignments designed to give them real-world hands-on experience, where they will deploy a distributed Wi-Fi			

monitoring service, a cloud-based IoT service platform serving tens of thousands of heart rate sensors, and more. Students will emerge from the classroom with a cutting-edge education in this rapidly emerging technology sector, and with the confidence to carry out tasks they would typically encounter in industrial environments.

Code	Course/Model Title	ECTS	Semester
CS415	Computers and Networks Security	4	7
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• The course aims to increase the student's knowledge of security in computer networks. • Learn more about the components of the network. • Identify the classification of the network. • Advantages and disadvantages of network topologies.			

Code	Course/Model Title	ECTS	Semester
CS421	Computer Networks	8	8
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			
• The course aims to increase the student's knowledge of computer networks (their advantages and disadvantages). • Learn more about the components of the network. • Identify the classification of the network. • Advantages and disadvantages of network topologies.			

Code	Course/Model Title	ECTS	Semester

CS422	Cloud Computing	4	8
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• This course aims to provide students with an overview of the concepts and basics of cloud computing. Topics covered include: general concepts, cloud computing models, cloud computing fundamentals, cloud computing architecture and management, cloud deployment models, technology drivers of cloud computing, cloud service models, virtualization, programming models for cloud computing, software development in the cloud, networking for computing cloud, cloud service providers, open source cloud support, security in cloud computing, advanced concepts in cloud computing.			

Code	Course/Model Title	ECTS	Semester
CS423	Research Project	6	8
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
	3	45	105
Description			
The student implement and solve one of the problem in computer science			

Code	Course/Model Title	CTS	Semester
CS424	E-Marketing	4	8
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• Apply knowledge of distributed systems technologies and methodologies. • Explain the design and development of distributed systems and their applications • Using the application of basic computer science methods and algorithms in the development of distributed systems and their applications in distributed systems. • Knowledge of the various concepts and mechanisms used in building communication networks between different types of distributed systems.			

Code	Course/Model Title	ECTS	Semester

CS425	Pattern Recognition	4	8
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• Identify the basic principles in distinguishing patterns. • Knowledge of the types of pattern recognition and their usage magazines. • Knowledge of patterns generation methods. • Identify the various operations that take place on the pattern			

Code	Course/Model Title	ECTS	Semester
CS426	Distributed Systems	4	8
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
• Apply knowledge of distributed systems technologies and methodologies. • Explain the design and development of distributed systems and their applications • Using the application of basic computer science methods and algorithms in the development of distributed systems and their applications in distributed systems. • Knowledge of the various concepts and mechanisms used in building communication networks between different types of distributed systems.			

Code	Course/Model Title	ECTS	Semester
CS225	Visual Studio	6	4
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	86
Description			
• The course aims to introduce students to visual programming. • Developing the student's abilities in the field of programming and the use of modern languages. • Provide the student with new concepts in the field of programming.			

Code	Course/Model Title	ECTS	Semester
CS416	Agent and Multiple Agents	4	7

Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			

Code	Course/Model Title	ECTS	Semester
CS427	Computer Vision	4	8
Class (hw/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		32	68
Description			
The student can obtain knowledge in the field of image analysis and how to model the image, in addition to how to detect the edges of objects in different images, how to cut images, how to match two-dimensional shapes in images, and how to analyze medical images. Which gives the student the necessary knowledge in the field of pattern recognition research			