

University of Mosul جامعة الموصل

University
Logo

*First Cycle – Bachelor's Degree (B.Sc.) – Networks
science*

بكالوريوس – علوم الشبكات



University of Al Mosul

Bachelor of Computer Science and Mathematics / Department of Networks

بكالوريوس علوم الحاسوب والرياضيات / قسم الشبكات

Table of Contents

1. Overview
2. Undergraduate Modules 2023-2024
3. Contact

1. Overview

This catalogue is about the courses (modules) given by the program of Networks science to gain the Bachelor of Science degree. The program delivers (46) 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 الشبكات للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (48) مادة دراسية، على ، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Modules 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
NT101	Information Technology Basics	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	72

Description

This course introduces students to the essential technical and professional skills required in the field of Information Technology (IT). Through written assignments, students gain an understanding of the operation of computers, computer networks, Internet fundamentals, programming, and computer support. We hope the students also learn about the social impact of technological change and the ethical issues related to technology. Throughout the course, instructional activities emphasize safety, professionalism, accountability, and efficiency for workers within the field of IT. Indeed, this course of an Information Technology under Network Department cover the infrastructure model of information technology discipline that deals with the computation of hardware and software, involving other programming languages, which form an essential part of Information Technology. Therefore, the course offers overview in various fields for information technology in terms of computer networks such as Data Science, Cloud Computing, Software Engineering, and also Artificial Intelligence, Machine Learning,

Block-chain Engineering, etc.

Module 2

Code	Course/Module Title	ECTS	Semester
NT102	Problems Solving & Programming I	8	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	3	108	92
Description			
<p>The course "Problem Solving and Programming I" introduces students to the fundamental concepts of problem solving and programming using the C++ language. Through a combination of theoretical knowledge and practical exercises, students learn how to approach problems systematically, design algorithms, and implement solutions using C++ programming constructs. The course covers essential topics such as variables, data types, control structures, functions, and basic input/output operations in C++. Students gain hands-on experience in writing and executing C++ programs, developing their skills in problem analysis, logical thinking, and algorithmic design. They also learn the importance of code organization, readability, and debugging techniques. By the end of the course, students acquire a strong foundation in C++ programming, problem-solving strategies, and the ability to translate real-world problems into well-structured and efficient C++ programs. This course serves as a stepping stone for further exploration in advanced programming concepts and application development using C++.</p>			

Module 3

Code	Course/Module Title	ECTS	Semester
NT103	Calculus	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	77
Description			
<p>The course description of Calculus provides students with a comprehensive introduction to the fundamental concepts and techniques of calculus. The course focuses on differential calculus and lays the groundwork for further exploration of integral calculus in subsequent courses. Through a combination of lectures, problem-solving exercises, and application-based examples, students develop a solid understanding of calculus and its practical applications. The course description provides the students with how to understand the concept of limits and continuity and their significance in calculus. Also provide the ability to compute derivatives of algebraic, trigonometric, exponential, and logarithmic functions using basic differentiation rules. They help the students to understand how to apply differentiation techniques to solve problems involving rates of change, tangent lines, optimization, and related rates. As well as to analyze functions using differentiation, including determining intervals of increase and decrease, local extrema, and concavity. Interpret and sketch</p>			

graphs of functions using calculus tools and techniques. Learn the concept of antiderivatives and evaluate definite and indefinite integrals. Apply integration techniques, such as substitution and integration by parts, to solve integration problems. Finally, provide a complete overview of understanding the Fundamental Theorem of Calculus and its applications in evaluating definite integrals and finding accumulation functions. Solve real-world problems using calculus concepts and techniques, including applications in physics, economics, and other disciplines. And develop critical thinking and problem-solving skills through the application of calculus to a variety of contexts.

Module 4

Code	Course/Module Title	ECTS	Semester
NT104	Logic Design Fundamentals	7	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	93	82
Description			
<p>Logic Design Fundamentals is an introductory course that provides a comprehensive understanding of the fundamental principles and techniques used in digital logic design. The course explores the basic building blocks of digital circuits, including logic gates, combinational and sequential circuits, and introduces students to various methods of representing and manipulating digital information. Students will learn about Boolean algebra, truth tables, and logic functions, and how to design and analyze logic circuits using these concepts. The course also covers topics such as simplification techniques, Karnaugh maps, and state machines. Through theoretical explanations, practical examples, and hands-on projects, students will develop the skills necessary to design and implement digital systems, laying a strong foundation for further studies in computer science or related fields.</p>			

.

Module 5

Code	Course/Module Title	ECTS	Semester
UOM102	English Language1	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	18
Description			
<p>English1 is an introductory course designed to develop the English language skills of students in the Computer Networks Department. The course focuses on building a strong foundation in listening, speaking, reading, and writing skills. Students will learn and practice essential English language components such as vocabulary, grammar, and pronunciation through various interactive activities and exercises. The course aims to improve students' communication abilities, enabling them to effectively participate in academic and professional contexts related to computer networks.</p>			

Additionally, the course emphasizes the development of critical thinking and problem-solving skills through the analysis of authentic texts and discussions on relevant topics. By the end of the course, students will gain confidence in expressing themselves in English and be equipped with the necessary language skills for their future studies and careers in the computer networks field.

Module 6

Code	Course/Module Title	ECTS	Semester
UOM104	Democracy and Human Rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	18
Description			
<p>مادة الديمقراطية وحقوق الإنسان تهدف إلى تعريف الطلاب بمفهوم الديمقراطية وحقوق الإنسان وأهميتهما في المجتمع. تتناول المادة القيم والمبادئ التي تشكل أساس الديمقراطية، مثل حرية التعبير، وحق التصويت، وحق المشاركة السياسية. كما تناقش المادة الحقوق الأساسية للإنسان، مثل حق الحياة، وحقوق المرأة، وحقوق الأقليات، وحقوق العمال. تركز المادة أيضًا على أهمية حماية حقوق الإنسان وتعزيز العدالة الاجتماعية.</p> <p>يشمل منهج المادة دراسة العديد من المواضيع المهمة، مثل التشريعات الوطنية والدولية المتعلقة بحقوق الإنسان، وأثر الديمقراطية في تحقيق التنمية المستدامة، وتحليل الصراعات والانتهاكات لحقوق الإنسان. كما يتم مناقشة حالات دراسية وتحليل السياق الاجتماعي والسياسي للتحديات التي تواجه حقوق الإنسان في المجتمعات المختلفة.</p> <p>تعتمد استراتيجيات التدريس في هذه المادة على مزيج من المحاضرات التوضيحية والمناقشات الجماعية والدراسات الحالية والأنشطة العملية. يتم تشجيع الطلاب على المشاركة النشطة وتوظيف مهارات التحليل والتفكير النقدي في مناقشة قضايا حقوق الإنسان والديمقراطية. تهدف هذه الاستراتيجيات إلى توسيع فهم الطلاب لمفهوم الديمقراطية وحقوق الإنسان وتطبيقها في الحياة العملية.</p>			

Module 7

Code	Course/Module Title	ECTS	Semester
NT107	Problems Solving & Programming 2	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
<p>The course "Problem-Solving and Programming II in C++" focuses on further developing problem-solving skills and advancing programming knowledge using the C++ language. Students delve deeper</p>			

into C++ programming concepts and techniques, such as advanced control structures, file handling, string manipulation, dynamic memory allocation, and exception handling. Through a combination of theory and practical exercises, students learn to write efficient and well-structured programs, analyze complex problems, and implement effective solutions using the C++ language. The course emphasizes logical thinking, algorithmic design, and code optimization. By the end of the course, students gain a solid understanding of intermediate-level C++ programming and problem-solving techniques, preparing them for more advanced programming topics and practical applications in various domains.

Module 8

Code	Course/Module Title	ECTS	Semester
NT108	Computer Organization	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	63	62
Description			
<p>Computer Organization is a comprehensive course that provides a deep understanding of the architecture and organization of computer systems, with a specific focus on the Intel 8086 microprocessor. The course covers the internal structure of the 8086 processor, including its registers, instruction set, and addressing modes. Students will learn about memory organization, addressing schemes, and the interaction between the processor and memory. The course also explores input/output interfaces, interrupt handling, and the role of the system bus. Through hands-on exercises and projects, students will gain practical experience in programming and debugging 8086 assembly language code. Additionally, the course covers advanced topics such as memory segmentation, multitasking, and protected mode operation. By the end of the course, students will have a comprehensive understanding of computer organization principles and be proficient in designing and programming systems using the 8086 processor architecture.</p>			

Module 9

Code	Course/Module Title	ECTS	Semester
NT109	Data communication & Networking	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	62
Description			
<p>Communication and Networks Fundamentals is an introductory course that provides a comprehensive understanding of the fundamental concepts and principles underlying communication systems and computer networks. The course covers various topics such as data transmission, signal encoding, modulation techniques, multiplexing, and error detection and correction. Students will learn about the different network topologies, protocols, and architectures, including local area networks (LANs), wide area networks (WANs), and the internet. The course also explores networking devices, such as</p>			

routers and switches, and the layers of the TCP/IP protocol stack. Through practical exercises and simulations, students will gain hands-on experience in configuring network devices and troubleshooting network issues. By the end of the course, students will have a solid foundation in communication systems and computer networks, enabling them to understand, design, and analyze network architectures and protocols.

Module 10

Code	Course/Module Title	ECTS	Semester
NT110	Probabilities & statistics	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>This course covers the Statistical and probability Modeling in R. The students will learn both theoretical and practical techniques for applying models to data. Focus will be placed on regression models, which are used to model a variable of interest as a function of explanatory variables. Additionally, the students will learn the mathematical fundamentals of linear models, a broad range of models that are the first line of defense in numerous application areas. By the end of the course, the students will be able to critique and distinguish variables and models that are useful for predicting and explaining the behavior of a response variable of interest. Additionally, they will work with the R programming language to perform analyses and generate reproducible reports.</p>			

Module 11

Code	Course/Module Title	ECTS	Semester
NT111	Discrete Mathematics	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	52
Description			
<p>The Discrete Mathematics course at the undergraduate level introduces students to fundamental concepts and techniques used in the field of discrete mathematics. This course focuses on topics such as sets, logic, mathematical reasoning, combinatorics, graph theory, and discrete structures. Students will learn how to analyze and solve problems using mathematical principles and logical reasoning. They will explore concepts such as proof techniques, algorithms, and discrete modeling. Through a combination of lectures, problem-solving exercises, and mathematical proofs, students will develop</p>			

critical thinking and problem-solving skills applicable to various areas, including computer science, cryptography, and operations research. This course aims to provide a strong foundation in discrete mathematics, enabling students to understand and apply mathematical concepts in real-world scenarios.

Module 12

Code	Course/Module Title	ECTS	Semester
UOM101	Arabic Language	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	18
Description			
<p>في هذا المقرر نركز على الكلام العربي على اقسامه، وعلامات كل قسم منه والتعرف على المهارات الغوية في تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين والتغلب على الاخطاء الشائعة لدى المتكلمين والكتاب من خلال حركات الاعراب الاصلية والفرعية بالاضافة الى دراسة الفعل العربي الذي ينقسم نت حيث الصحة والاعلال واللزوم والتعدي من حيث الزمن، هناك الكثير من التفاصيل التي سوف نتناولها في هذا الفصل الدراسي</p>			

Module 13

Code	Course/Module Title	ECTS	Semester
UOM103	Computer	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	27
Description			
<p>Computing Fundamentals and Microsoft Office applications will be covered during this course. Computing Fundamentals focuses on hardware and software and how they work together. The course includes activities and exercises that guide students to explore the Windows operating system, change settings, and customize the desktop. Students also learn how to manage files and folders. On the other hand, the Key Applications focuses on two of the Microsoft Office applications: Word and Excel.</p>			