Ninevah University
جامعة نينوى

First Cycle – Bachelor's degree (B.Sc.) – Computer Networks and Internet

بكالوريوس علوم – شبكات الحاسوب والانترنت

Table of Contents

1. Overview

This catalog is about the courses (modules) given by the program of Information technology to gain the Bachelor of Network & Internet 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 تكنولوجيا المعلومات للحصول على درجة بكالوريوس في علوم الشبكات والانترنت. يقدم البرنامج (٤٠) مادة دراسية، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
NVU1101	Computer Skills	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	4	63	87
Description			
The Computer Skills module provides foundational knowledge and practical skills in ICT, computer hardware, software, communication, collaboration, and file management. Students learn about integrated and external equipment, online communities, video conferencing, and utilizing platforms like Moodle. They gain proficiency in adjusting operating system settings, organizing files, and understanding storage concepts. Emphasis is placed on data protection, backup strategies, and using Microsoft Word for report creation and printing. Overall, the module equips students with essential computer skills necessary for effective digital engagement, collaboration, and success in academic and professional environments.			

Module 2

Code	Course/Module Title	ECTS	Semester
CIT1120	Programming Principles I	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	63	87
Description			

Programming Principles I is an introductory module that provides a solid foundation in fundamental programming concepts, including flowchart principles. Students will learn about variables, data types, control structures, functions, input/output operations, and how to convert these concepts into flowchart diagrams. Emphasizing problem-solving and logical thinking, the module includes hands-on coding exercises and projects, alongside creating and interpreting flowcharts. By the end, students will write and execute programs, understand program flow through flowchart analysis, and apply programming concepts to solve real-world problems using flowchart-based logic. This module serves as a stepping stone for further programming study and establishes the groundwork for advanced principles and practices.

Module 3

Code	Course/Module Title	ECTS	Semester
CIT1116	Calculus	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	1	63	87
Description			

The "Calculus" module is a fundamental tool for understanding and modeling continuous change and motion. It encompasses the study of derivatives and integrals, which enable us to analyze rates of change, optimize functions, and calculate areas under curves. This module equips users with a deep understanding of mathematical concepts such as limits, differentiation, and integration, allowing them to solve complex problems in various fields, including physics, engineering, economics, and computer science. With the "Calculus" module, users can tackle real-world challenges, make accurate predictions, and gain insights into the behavior of systems governed by continuous functions.

Module 4

Code	Course/Module Title	ECTS	Semester
CIT1115	Principles of Logic	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The module on logic design covers various aspects of digital circuits. It begins with an introduction to number systems, including binary, octal, and hexadecimal, along with conversions between them. Complement representations, such as sign 1's complement and sign 2's complement, are explored. The module also covers codes like BCD, binary, gray code, and ASCII character code. Logic gates, Boolean algebra laws, De Morgan's theorem, and canonical/standard forms (SOP and POS) are discussed. The principle of duality, Karnaugh maps, don't care conditions, and code conversion techniques are also taught. Additionally, the module includes the study of comparator circuits and various adder and subtractor circuits like half adders, full adders, half subtractors, and full subtractors.

Module 5

Code	Course/Module Title	ECTS	Semester
CIT1118	Statistics and Probabilities	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	47	78
Description			

The "Statistics and Probabilities" module is a powerful tool for analyzing and interpreting data through the lens of statistical principles and probabilistic models. It provides users with a comprehensive set of tools and techniques to explore, summarize, and draw meaningful inferences from data. This module enables the calculation of various statistical measures such as mean, median, standard deviation, and correlation coefficients, allowing for a deeper understanding of data patterns and relationships. Additionally, it offers a range of probability distributions and hypothesis testing methods to assess the likelihood of events and make reliable predictions. With the "Statistics and Probabilities" module, users can make data-driven decisions and gain valuable insights into the uncertainty inherent in real-world scenarios.

Module 6

Code	Course/Module Title	ECTS	Semester
NVU1207	Research Methods	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	77
Description			

The Research Methods module is designed to equip students with the necessary knowledge and skills to conduct scientific research effectively. The module covers various research methodologies and techniques used in both qualitative and quantitative research. Students learn about research design, hypothesis formulation, data collection methods, and data analysis techniques. They gain an understanding of sampling methods, survey design, experimental design, and statistical analysis. The module also emphasizes ethical considerations in research, data interpretation, and report writing. By the end of the module, students are expected to have a solid foundation in research methods and be capable of conducting independent research projects.

Module 7

Code	Course/Module Title	ECTS	Semester
CIT1220	Programming Principles II	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	93	82
Description			

Programming Principles II is an intermediate-level module that builds upon the foundational concepts covered in Programming Principles I. This module focuses on more advanced programming principles and practices. Topics include arrays, pointers, exception handling, structures, file handling, and testing in software development. The module aims to equip students with the necessary skills to tackle complex programming tasks and develop high-quality software solutions.

Module 8

Code	Course/Module Title	ECTS	Semester
CIT1215	Logic Design	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	112
Description			

The Logic II module covers a range of topics related to digital circuits. It begins with circuits like the 7-segment display, parity generator, and checker circuits, as well as the design of a 4-bit binary full adder and binary subtractor. The module then moves on to circuits for 2's complement, adder/subtractor, and BCD addition. Students learn about binary multiplication, magnitude comparison, and combinational logic circuits such as decoders, encoders, multiplexers, and demultiplexers. Sequential logic circuits, including SR-latch, D-latch, J-K flip-flop, and T-flip flop, are also covered. The module concludes with topics like counters, shift registers, and analog-to-digital/digital-to-analog conversion.

Module 9

Code	Course/Module Title	ECTS	Semester
CIT1219	Advance Statistical Software	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
	3	63	62
Description			

The "Advanced Statistical Software" module is a comprehensive tool that equips users with advanced analytical capabilities to extract meaningful insights from complex datasets. With a rich collection of statistical algorithms and models, this module enables users to perform sophisticated analyses, including regression analysis, multivariate analysis, time series analysis, and hypothesis testing. It offers a user-friendly interface, empowering both experienced statisticians and novice users to explore and interpret data effectively. Additionally, the module supports data visualization, providing intuitive graphical representations to aid in understanding complex statistical relationships. With its powerful features, the "Advanced Statistical Software" module is a valuable asset for researchers, analysts, and decision-makers in various fields.

Module 10

Code	Course/Module Title	ECTS	Semester
NVU1204	English Language I	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
		63	62
Description			

English is the language of international business, diplomacy, and academic discourse, and is essential for both personal and professional communication in today's globalized world.

To give you an idea, basic vocabulary that forms part of college level English can be divided into categories such as: Nouns - people, places, things, and ideas.Verbs - action words used in sentences to convey meaning. Adjectives - words used to describe or qualify as nouns. Adverbs - words that modify verbs, adjectives, or other adverbs. Pronouns - words used in place of nouns Prepositions - words used to denote relationships between nouns. Conjunctions - words used to connect or join two clauses. Determiners - words used to identify nouns. Interjections - words that denote strong emotions

At advanced levels, there is a much wider range of vocabulary, including academic and technical terms.

Module 11

Code	Course/Module Title	ECTS	Semester
CIT2302	Data Structures and Algorithms I	8	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	78	122
Description			

Data Structures and Algorithms I is a module that introduces students to the fundamental concepts and techniques of organizing and manipulating data efficiently. The module covers various data structures such as arrays, linked lists, stacks, queues, trees, and graphs, along with their properties, advantages, and applications. Students learn algorithmic analysis techniques to evaluate the efficiency and time complexity of algorithms. They gain practical implementation skills, problem-solving abilities, and algorithmic thinking to design and implement efficient algorithms.

Module 12

Code	Course/Module Title	ECTS	Semester
NETW2301	Data Communications and Networking	7	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	93	82
Description			

The "Data Communications and Networking" module provides a comprehensive introduction to the fundamentals of data communications and computer networking. It covers essential topics such as data components, communication modes (simplex, duplex, half duplex), analog and digital modulation, multiplexing techniques, data representation using line coding, and an overview of transmission impairments. The module also explores computer networks, including LAN, WAN, MAN, Extra-Net, Intra-Net, and Inter-Net, along with client-server and peer-to-peer models. Students gain a solid understanding of network protocols and models, including OSI and TCP/IP. Additionally, the module delves into the physical layer, transmission media (guided and unguided), switching techniques, data link layer protocols, network layer design and devices, transport layer services, application layer protocols, network management, network security, and cloud networking concepts.

Module 13

Code	Course/Module Title	ECTS	Semester
CIT2304	Object Oriented Programming (OOP)	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The Object-Oriented Programming (OOP) module introduces students to the principles and concepts of object-oriented programming. They learn the fundamental building blocks of OOP, including classes, objects, inheritance, polymorphism, and encapsulation. The module emphasizes the importance of modular and reusable code through the creation and manipulation of objects. Students gain a deep understanding of concepts like data abstraction, encapsulation, and the relationships between objects. They also explore advanced topics such as inheritance hierarchies, interfaces, and design patterns. Through practical coding exercises and projects, students develop skills in designing, implementing, and testing object-oriented programs, preparing them for software development in various domains.

Module 14

Code	Course/Module Title	ECTS	Semester
CIT2306	Database Systems	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			

The " Database Systems" module provides an overview of database systems and their significance in modern data management. It explores various data models, including relational, hierarchical, network, and object-oriented, with a focus on the relational model. Students learn about the Entity-Relationship (ER) model, entity types, relationships, and mapping ER diagrams to relational schemas. The module covers relational database design and normalization concepts, including functional dependencies and normalization processes. Practical skills in SQL are developed through learning the SQL Data Definition Language (DDL) and Data Manipulation Language (DML) for creating, modifying, and querying databases. Advanced SQL concepts, indexing, query optimization, transaction management, database security, and NoSQL databases are also introduced.

Module 15

Code	Course/Module Title	ECTS	Semester
NVU2305	Human Rights	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		32	68
Description			

The "Human Rights" module serves as a comprehensive framework for promoting and safeguarding the fundamental rights and dignity of individuals. It encompasses a wide range of principles and standards, including civil, political, economic, social, and cultural rights. This module provides users with a deep understanding of human rights concepts, laws, and international conventions. It equips individuals, organizations, and policymakers with the tools and knowledge necessary to protect and advocate for human rights globally. Through its inclusive approach, the "Human Rights" module aims to foster equality, justice, and respect for all, contributing to a more just and inclusive society.

Module 16

Code	Course/Module Title	ECTS	Semester
CIT2402	Data Structures and Algorithms II	7	4

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	97

Description

The Data Structures and Algorithms II module builds upon the foundational knowledge of data structures and algorithms. It starts with an overview of the course and a recap of basic data structures and algorithms. The analysis of algorithms is covered, focusing on asymptotic notation (Big O, Big Omega, and Big Theta) as well as time and space complexity analysis. Sorting algorithms such as Quicksort, Merge Sort, Radix Sort, and External Sorting are discussed. The module includes a midterm exam. Search techniques, including Fibonacci Search, Jump Search, Exponential Search, Ternary Search, and Interpolation Search, are explored. The module then moves on to tree structures, covering B-Trees, B+ Trees, Red-Black Trees, Trie structures, and Fenwick trees. Graph algorithms, including Depth-First Search (DFS), Breadth-First Search (BFS), and Topological Sorting, are studied. Extendible Hashing (Dynamic Hashing) is introduced. The module concludes with a practical project and a review of previously covered topics.

Module 17

Code	Course/Module Title	ECTS	Semester
NETW2410	Network protocols	7	4

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	3	108	67

Description

The networks protocols module delves into the fundamental aspects of computer networking and explores the protocols that facilitate communication across networks. This module covers a wide range of topics, including application layer protocols like HTTP, SMTP, and DNS, transport layer protocols such as TCP and UDP, and internet layer protocols like IP, ICMP, and IGMP. Additionally, it delves into network layer protocols, including routing algorithms and IP addressing, as well as link layer protocols like Ethernet and ARP. The module also examines wireless and mobile network protocols, network security protocols like SSL/TLS and IPsec, and emphasizes the practical implementation and analysis of these protocols. Through this module, students gain a comprehensive understanding of how network protocols function and interact to enable efficient and secure communication in modern computer networks.

Module 18

Code	Course/Module Title	ECTS	Semester
NVU2404	English Language II	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63
Description			

English is the language of international business, diplomacy, and academic discourse, and is essential for both personal and professional communication in today's globalized world.

To give you an idea, basic vocabulary that forms part of college level English can be divided into categories such as: Nouns - people, places, things, and ideas.Verbs - action words used in sentences to convey meaning. Adjectives - words used to describe or qualify as nouns. Adverbs - words that modify verbs, adjectives, or other adverbs. Pronouns - words used in place of nouns Prepositions - words used to denote relationships between nouns. Conjunctions - words used to connect or join two clauses. Determiners - words used to identify nouns. Interjections - words that denote strong emotions

At advanced levels, there is a much wider range of vocabulary, including academic and technical terms.

Module 19

Code	Course/Module Title	ECTS	Semester
CIT2420	Microprocessor & Microcontroller	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			

The "Microprocessor & Microcontroller" module provides a comprehensive understanding of the fundamental concepts and practical applications of microprocessors and microcontrollers. Students will delve into the architecture, functioning, and programming of microprocessors, mastering assembly language programming techniques. They will explore addressing modes, instruction formats, data transfer, arithmetic operations, branching, and looping instructions. The module covers subroutines, stack operations, and interrupt handling to enhance program efficiency and responsiveness. Additionally, students will be introduced to microcontrollers, examining their features and comparing them with microprocessors. The module also includes a midterm exam to assess comprehension. Furthermore, students will gain hands-on experience in programming microcontrollers using the C language, focusing on input/output operations, interfacing with peripherals, timers, counters, interrupts, analog-to-digital and digital-to-analog conversions, serial communication protocols, and memory interfacing.

Module 20

Code	Course/Module Title	ECTS	Semester
NETW2402	Distributed Systems	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		33	92
Description			

The distributed systems module provides an in-depth understanding of the principles and concepts underlying the design and implementation of distributed systems. The module begins with an introduction to distributed systems, covering their characteristics, design goals, and different types. A case study on the World Wide Web explores the real-world application of distributed systems. The focus then shifts to distributed system architectures, including architectural styles, middleware organization, system architecture, and example architectures. Processes, threads, virtualization, clients, servers, and code migration are discussed to understand the foundational elements of distributed systems. Communication in distributed systems is explored, covering topics such as foundations, remote procedure call, message-oriented communication, and multicast communication. Case studies on Java RMI and Message Passing Interface provide practical insights. Naming, coordination, consistency and replication, fault tolerance, and security are examined to address important challenges in distributed systems. Through this module, students gain a comprehensive understanding of distributed systems and acquire the necessary knowledge and skills to design, implement, and manage distributed computing environments.

Module 21

Code	Course/Module Title	ECTS	Semester
CIT3556	AI Techniques	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The "AI Techniques" module provides a comprehensive understanding of the fundamental principles underlying artificial intelligence (AI) technology. It explores the core concepts, algorithms, and methodologies used to build intelligent systems. Through hands-on exercises and practical examples, learners gain the necessary skills to design, develop, and deploy AI solutions. By studying the "AI Techniques" module, individuals can harness the power of AI to automate tasks, solve complex problems, and unlock innovative applications across various industries.

Module 22

Code	Course/Module Title	ECTS	Semester
NETW3564	Cloud Computing	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	102
Description			

The Cloud Computing module provides a comprehensive understanding of cloud computing, covering its origins, essential characteristics, and comparisons with traditional IT service providers. It explores architectural influences, cloud scenarios, benefits, limitations, and government policies. The module discusses cloud architecture layers and models (SaaS, PaaS, IaaS), along with their features and challenges. Cloud simulators like CloudSim and GreenCloud are introduced. Risk issues, such as privacy, compliance, and access control, are addressed. Cloud virtualization platforms like VMware vSphere, Microsoft Hyper-V, KVM, Xen, and Docker are explored. The module also covers cloud big data analytics services, data collection, mining, analytics frameworks (Hadoop, Spark), and examples in healthcare and social media. A midterm exam is included.

Module 23

Code	Course/Module Title	ECTS	Semester
NETW3553	Wireless & Mobile Communications	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			

This module provides a comprehensive introduction to wireless and mobile communications. It covers various aspects such as wireless propagation and antennas, wireless LAN technologies like Wi-Fi and Bluetooth, wireless PAN technologies including ZigBee and RFID, and wireless MAN technologies like WiMAX. Students will explore cellular network architecture and components, frequency reuse, cellular capacity, and multiple access techniques like FDMA, TDMA, and CDMA. The module also delves into path loss models, fading effects, shadowing, and multipath propagation, as well as small-scale and large-scale fading phenomena. Additionally, modulation techniques such as ASK, FSK, and PSK are examined. A midterm exam is included to assess understanding and progress.

Module 24

Code	Course/Module Title	ECTS	Semester
NETW3509	Operating Systems	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The Operating Systems I module provides a comprehensive introduction to the fundamental concepts and principles of operating systems. The module covers topics such as the history of operating systems, the role of an operating system, and its functions in managing hardware and software resources. Students learn about process management, including process creation, scheduling, synchronization, and communication. They explore memory management techniques, including virtual memory and memory allocation strategies. The module also covers file systems and storage management, including file organization, directory structures, and disk scheduling algorithms. Students gain an understanding of device management, including I/O operations and device drivers. Through practical exercises and assignments, students develop skills in operating system implementation, troubleshooting, and performance optimization.

Module 25

Code	Course/Module Title	ECTS	Semester
NETW3501	Coding and Information Theory	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The Coding and Information Theory module covers a range of topics related to information transmission, channel capacity, source coding, data compression, and error control coding. Students learn about the principles of information measurement and probability theory, including random variables and probability distributions. The module explores concepts such as entropy, mutual information, and channel capacity for both discrete and continuous channels. Source coding techniques like Shannon-Fano and Huffman coding are discussed, along with compression techniques such as Arithmetic Coding and dictionary-based techniques. Error control coding topics include block codes, convolutional codes, and polynomial representation using GF fields. The module provides a comprehensive understanding of theoretical foundations and prepares students for practical applications in communication systems and information technology.

Module 26

Code	Course/Module Title	ECTS	Semester
NETW3622	Computer Architecture	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The computer architecture module covers various topics. It starts with data representation, understanding how information is encoded and stored in computers. Register transfer and microoperations delve into the movement of data within a computer system. Basic computer organization and design focus on the fundamental components and structure of a computer. Micro-programmed control explores control unit design using microinstructions. The midterm exam assesses understanding thus far. Central processing unit (CPU) studies the CPU's components and operations. Input-output organization examines how computers interact with peripherals. Pipeline and vector processing explore techniques for increasing computational efficiency. Multiprocessors investigate systems with multiple processors working in tandem.

Module 27

Code	Course/Module Title	ECTS	Semester
NETW3602	Security Principles	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	4/63	6/87
Description			

The security principles module offers a comprehensive exploration of cryptographic principles and applications. Students engage in lectures, discussions, and case studies to grasp key concepts. Hands-on activities, practical exercises, and group projects enable the implementation and analysis of encryption algorithms. LFSR-based stream ciphers and mathematical foundations are explored through interactive sessions and problem-solving exercises. AES is studied through practical demonstrations and comparative analysis. Public key cryptosystems, including Diffie-Hellman, are explained using visual aids and role-playing scenarios. Various cryptographic systems, message authentication, digital signatures, key management, and hash functions are covered through workshops, discussions, and practical exercises. The module includes assessment through exams, revision sessions, and practice quizzes to reinforce learning and preparation for the final exam. Overall, students develop a comprehensive understanding of cryptography and its practical implications.

Module 28

Code	Course/Module Title	ECTS	Semester
NETW3613	Internet Infrastructure & Network Simulator	7	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	97
Description			

The "Internet Infrastructure" module provides students with a comprehensive understanding of the fundamental components and concepts related to building and managing the internet. It begins with an introduction to the various aspects of internet infrastructure, including the underlying protocols and the role of internet service providers. The module then explores network simulation tools, allowing students to gain hands-on experience in analyzing and designing network architectures. Network topology design and implementation are covered, emphasizing scalability, reliability, and performance considerations. Students delve into routing protocols, studying their functionalities and configuration for efficient data packet routing. The module also includes network traffic modeling to simulate and predict network behavior. A midterm exam assesses the understanding of these concepts. Quality of Service (QoS) management is explored to ensure optimal network performance, followed by network security simulation to evaluate the effectiveness of security measures. Wireless network simulation investigates the unique characteristics and challenges of wireless networks. Finally, the module focuses on network performance evaluation, covering methodologies, metrics, and optimization strategies to assess and enhance overall network efficiency.

Module 29:

Code	Course/Module Title	ECTS	Semester
NETW3608	Network Operating Systems	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	78	87
Description			

The "Network OS" module provides students with a comprehensive understanding of network operating systems and their role in managing and securing network infrastructures. Students are introduced to various network services and protocols, including DNS, DHCP, FTP, and HTTP, as well as network security measures and best practices. The module covers network file systems, exploring concepts like NFS and CIFS, and delves into network printing services and backup/recovery strategies. Students also learn network monitoring and troubleshooting techniques to optimize network performance. Additionally, the module covers network virtualization, including VLANs, enabling students to understand the benefits and applications of virtualization technologies in network management. A midterm exam allows students to assess their knowledge and understanding of the module's topics.

Module 30

Code	Course/Module Title	ECTS	Semester
NVU3604	English Language III	5	
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63
Description			

English is the language of international business, diplomacy, and academic discourse, and is essential for both personal and professional communication in today's globalized world.

To give you an idea, basic vocabulary that forms part of college level English can be divided into categories such as: Nouns - people, places, things, and ideas.Verbs - action words used in sentences to convey meaning. Adjectives - words used to describe or qualify as nouns. Adverbs - words that modify verbs, adjectives, or other adverbs. Pronouns - words used in place of nouns Prepositions - words used to denote relationships between nouns. Conjunctions - words used to connect or join two clauses. Determiners - words used to identify nouns. Interjections - words that denote strong emotions

At advanced levels, there is a much wider range of vocabulary, including academic and technical terms.

Module 31

Code	Course/Module Title	ECTS	Semester
NETW4701	Network Security	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

This module explores the application of policy and techniques to secure both public and private networks. Topics covered in this module are threat analysis and management, cryptography, firewalls, isolation, and certificates. Students get practices in scanning the server for vulnerabilities; assess the Windows domain for weak passwords, centralize the local password management, secure the environment by PKI, discover attack using Wireshark, discover malware by intrusion detection system, and block traffic by firewall. Also, students learn how these tasks fit into the more general security administration process.

Module 32:

Code	Course/Module Title	ECTS	Semester
NETW4702	Wireless Sensor Networks (WSNs)	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	78	72
Description			

The module on Wireless Sensor Networks (WSNs) covers their definition, characteristics, applications, and challenges in deployment. It explores radio standards, such as IEEE 802.15.4, and communication protocols like Zigbee, BLE, and WirelessHART. Hardware requirements include sensor node architecture, components, sensor types, and power management. Software aspects cover operating systems, middleware, programming languages, and development tools. WSN system architectures, features, and performance evaluation metrics are discussed, as well as application requirements, case studies, routing protocols, data aggregation, security, privacy, and QoS. The module aims to provide a comprehensive understanding of WSNs and their components, functionalities, and practical considerations.

Module 33:

Code	Course/Module Title	ECTS	Semester
NETW4715	Website Programming I	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			

The "Websites Programming I" module provides a comprehensive foundation in programming for website development. Students gain hands-on experience in building dynamic and interactive websites using a variety of programming languages, such as HTML, CSS, and JavaScript. They learn essential concepts like page structure, responsive design, and user interface development. This module also covers topics like form handling, client-side scripting, and integrating multimedia elements. Through practical projects and assignments, students develop the skills necessary to create visually appealing and functional websites. With "Websites Programming I," students acquire the fundamental knowledge to embark on a successful journey in web development.

Module 34:

Code	Course/Module Title	ECTS	Semester
NETW4765	Data Mining	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The "Data Mining" module is an essential tool for extracting valuable insights and patterns from large datasets. It employs advanced algorithms and statistical techniques to uncover hidden relationships, trends, and patterns within the data. By exploring and analyzing vast amounts of information, this module enables users to identify key variables and make informed decisions. It offers various data mining techniques, such as classification, clustering, association rule mining, and anomaly detection. With its powerful capabilities, the "Data Mining" module empowers businesses and researchers to extract meaningful knowledge from complex data, unlocking new opportunities and driving data-driven strategies.

Module 35:

Code	Course/Module Title	ECTS	Semester
NETW4703	Graduation Project I	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
	4		
Description			

The Graduation Project I module is a capstone experience where students conduct independent research under faculty guidance. They select a project aligned with their interests and career goals, engaging in activities such as literature review, project planning, data collection, and analysis. The module emphasizes research and analytical skills, as well as effective communication of findings. By the end, students develop a comprehensive project proposal and make significant progress in their research, preparing them for Graduation Project II. It serves as a platform for students to showcase their abilities in applying knowledge, critical thinking, and problem-solving in their chosen field.

Module 36:

Code	Course/Module Title	ECTS	Semester
NETW4815	Website Programming II	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The "Websites Programming II" module delves deeper into the realm of web development, equipping learners with advanced skills and techniques. Building upon the foundational knowledge from the previous module, this course focuses on more complex programming concepts and frameworks. Students will gain hands-on experience in designing and implementing dynamic websites with interactive features, such as user authentication, database integration, and content management systems. Through practical projects and assignments, participants will develop proficiency in popular programming languages like HTML, CSS, JavaScript, and backend technologies like PHP or Python. By mastering "Websites Programming II," students will be well-equipped to create sophisticated, interactive web applications that meet modern industry standards.

Module 37:

Code	Course/Module Title	ECTS	Semester
NETW4801	Network Services Management	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

The Network Management Module provides students with a comprehensive understanding of data communications and network management. It covers computer network technologies, including a review of key concepts. The module explores the foundations of standards, models, and language used in network management, with a focus on SNMPv1. It emphasizes SNMP management, particularly Remote Monitoring (RMON), and its configuration and analysis. Practical skills are developed through lab experiments, including setting up a network, configuring SNMPv1, working with traps and alarms, analyzing network data with RMON, and using network management tools and web-based interfaces. Overall, the module equips students with the knowledge and skills required for effective network management and monitoring using industry-standard protocols and tools.

Module 38:

Code	Course/Module Title	ECTS	Semester
NETW4855	Internet of Things (IOT)	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			

The IoT module offers a comprehensive overview of the Internet of Things, covering topics such as enabling technologies, architecture, communication protocols, data acquisition, analytics, security, integration with artificial intelligence, and product development. Students learn about the hardware and software components of IoT, explore data analysis and visualization techniques, and gain insights into security measures and protocols. Practical skills are developed through hands-on exercises using Arduino/Raspberry Pi, where students interface various components and implement security measures. They also utilize machine learning algorithms for data analysis and prediction. The module emphasizes the development of a comprehensive understanding of IoT principles and the ability to apply them in real-world scenarios. By the end of the module, students are equipped with the knowledge and skills to design, develop, and secure IoT solutions, as well as integrate IoT with artificial intelligence for enhanced functionality.

Module 39:

Code	Course/Module Title	ECTS	Semester
NETW4803	Graduation Project II	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
	4		
Description			

The Graduation Project II module is a culmination of the student's undergraduate studies, focusing on implementing, testing, evaluating, and documenting their project. Students work independently under the guidance of a supervisor to further develop their project from Graduation Project I. They apply their knowledge and skills, conduct research, and utilize appropriate tools and methodologies. The module emphasizes critical thinking, problem-solving, and project management. Students produce a comprehensive report, deliver a final presentation, and demonstrate their abilities in research, technical skills, and communication. By the end of the module, students should have successfully completed their project and gained valuable experience in their chosen field.

Module 40

Code	Course/Module Title	ECTS	Semester
NVU4804	English Language IV	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	62	88
Description			

English is the language of international business, diplomacy, and academic discourse, and is essential for both personal and professional communication in today's globalized world.

To give you an idea, basic vocabulary that forms part of college level English can be divided into categories such as: Nouns - people, places, things, and ideas.Verbs - action words used in sentences to convey meaning. Adjectives - words used to describe or qualify as nouns. Adverbs - words that modify verbs, adjectives, or other adverbs. Pronouns - words used in place of nouns Prepositions - words used to denote relationships between nouns. Conjunctions - words used to connect or join two clauses. Determiners - words used to identify nouns. Interjections - words that denote strong emotions

At advanced levels, there is a much wider range of vocabulary, including academic and technical terms.

Contact

Program Manager:

Mahmood Alfathe | Ph.D. in Computer Engineering | Lecturer

Email: mahmood.alfathe@uoninevah.edu.iq

Mobile no.:+9647709459846

Program Coordinator:

Balqees Agha | Ph.D. in Computer Sciences | Lecturer

Email: balqees.hasan@uoninevah.edu.iq

Mobile no.:+9647703319811