Modules Catalogue | 2025-2026 دليل المواد الدراسية

Northern Technical University

الجامعة التقنية الشمالية

First Cycle – Bachelor's degree (B.Sc.) – Information and Computer Networks Engineering Technology - Kirkuk

الدورة الاولى – بكالوريوس هندسة تقنيات – هندسة تقنيات المعلومات وشبكات الحاسوب –كركوك



Department of Information Technology and Computer Networks
هندسة تقنيات المعلومات وشبكات الحاسوب

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1. Overview

The department of **Information and Computer Network Engineering Technology** is a cutting-edge discipline that bridges the gap between software systems, hardware infrastructure, and communication technologies. It focuses on designing, implementing, securing, and managing the complex digital networks and IT systems that power the modern world. This department integrates several key domains of the digital era:

- **Network Architecture & Design:** Learning how to build robust, scalable, and efficient local (LAN) and wide (WAN) area networks using both wired and wireless technologies.
- **Information Security & Cybersecurity:** Protecting data, networks, and systems from unauthorized access, cyber threats, and vulnerabilities.
- **Cloud Computing & Virtualization:** Designing and managing cloud infrastructure (like AWS, Azure, or Google Cloud) and virtualized environments.
- **Systems Administration:** Managing operating systems (especially Linux and Windows Server) and database systems that support organizational operations.
- **Internet of Things (IoT) & Smart Systems:** Connecting physical devices to the internet to gather data and automate processes.

1.نظرة عامة

يُعدّ قسم **هندسة تقنيات المعلومات وشبكات الحاسوب** تخصصاً رياديا يربط بين البرمجيات، والبنى التحتية للمعدات (Hardware)، وتقنيات الاتصالات. ويُركّز هذا القسم على تصميم وتنفيذ وأمن وإدارة الشبكات الرقمية وحزم أنظمة تكنولوجيا المعلومات المعقدة التي تُشكّل المحرك الأساس للفيض المعلوماتي في العالم المعاصر.

ويجمع هذا القسم بين عدة مجالات رئيسة تُشكّل جوهر العصر الرقمي:

- **معمارية الشبكات وتصميمها** :دراسة كيفية بناء شبكات محلية (LAN) وموسعة (WAN) تتميز بالرصانة، والقدرة على التوسع، والكفاءة، وذلك باستخدام التقنيات السلكية واللاسلكية على حدٍّ سواء.
- **أمن المعلومات والأمن السيبراني** :حماية البيانات والشبكات والأنظمة من الوصول غير المصرح به، والتهديدات السيبرانية، والثغرات الأمنية.



- **الحوسبة السحابية والأنظمة الافتراضية** :تصميم وإدارة البنى التحتية السحابية (مثل AWS و Azure و Google Cloud)والبيئات الافتراضية.
- **إدارة الأنظمة** :إدارة أنظمة التشغيل (ولا سيما Linux و Windows Server)وأنظمة قواعد البيانات التي تدعم العمليات المؤسسية.
- **إنترنت الأشياء (IoT) والأنظمة الذكية** :ربط الأجهزة المادية بالإنترنت لجمع البيانات وأتمتة العمليات التشغيلية.

2. Undergraduate Courses/Modules 2025-2026

Module 1

Module Code	Course/Module Title	ECTS	Semester
ICNE-101	Introduction to Computing & Problem Solving	8	1
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
4	4	123	77
Description			
Introduces programming concepts using the C++ language. Topics include variables, data types, control structures, arrays, pointers, functions, and problem-solving techniques, enabling students to develop, debug, and optimize programs for engineering applications.			

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Module 2

Module Code	Course/Module Title	ECTS	Semester
ICNE-102	Engineering Mathematics	4	1
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
3	1	63	37
Description			
Develops the mathematical foundations required for engineering studies, covering matrices, determinants, functions, differential calculus, integral calculus, and their applications. The course strengthens analytical reasoning and problem-solving skills for technical disciplines.			

Module 3

Module Code	Course/Module Title	ECTS	Semester
ICNE-103	Engineering Drawing	4	1
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Develops the ability to create and interpret engineering drawings using standard drafting conventions. Topics include orthographic projection, sectional views, dimensioning, and computer-aided drafting techniques for engineering design.			

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Module 4

Module Code	Course/Module Title	ECTS	Semester
ICNE-104	Digital Logic Design	4	1
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Introduces the fundamental principles of digital systems, including number systems, Boolean algebra, logic gates, logic simplification, and combinational circuit design. Students develop the skills to analyze, design, and implement digital circuits using standard design techniques.			

Module 5

Module Code	Course/Module Title	ECTS	Semester
ICNE-105	DC Circuit Analysis	6	1
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
Covers the fundamentals of direct current (DC) electrical circuits, including circuit elements, Ohm's law, Kirchhoff's laws, network theorems, and circuit analysis techniques. Practical laboratory exercises reinforce theoretical concepts through hardware implementation and simulation.			

Department of Information

Module 6

Module Code	Course/Module Title	ECTS	Semester
NTU100	Democracy and Human Rights	2	1
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	-	33	17
Description			
Introduces the principles of democracy, citizenship, constitutional rights, human rights, equality, and the rule of law. The course promotes ethical awareness, civic responsibility, and respect for human rights within society.			

Module 7

Module Code	Course/Module Title	ECTS	Semester
NTU101	English Language	2	1
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	-	33	17
Description			
Develops students' English language proficiency with emphasis on reading, writing, listening, speaking, and technical communication. The course supports effective academic and professional communication in engineering and technology contexts.			

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Module 8

Module Code	Course/Module Title	ECTS	Semester
ICNE-106	Programming Language	8	2
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
4	4	123	77
Description			
Introduces to programming concepts using C++, including loops, decisions,objects, inheritance, polymorphism, encapsulation, exception handling, and file processing. The course emphasizes software design and modular programming practices.			

Module 9

Module Code	Course/Module Title	ECTS	Semester
ICNE-107	AC Circuit Analysis	6	2
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
Introduces the analysis of alternating current (AC) circuits, covering sinusoidal waveforms, phasors, impedance, power analysis, resonance, and single- and three-phase circuits. Laboratory work reinforces theoretical concepts through practical measurements and simulations.			

Module 10

Module Code	Course/Module Title	ECTS	Semester
ICNE-108	Introduction to Computer Network	8	2
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	137
Description			
Covers the analysis and design of combinational and sequential of Networking and digital circuits using for transfer and receives signals of network devices. Students develop practical skills in designing and implementing digital systems.			

Module 11

Module Code	Course/Module Title	ECTS	Semester
CAIK-100	Physics	2	2
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	-	33	17
Description			
Introduces fundamental principles of physics relevant to engineering, including mechanics, electricity, magnetism, waves, and modern physics. The course combines theoretical concepts with laboratory experiments to strengthen scientific understanding.			

Module 12

Module Code	Course/Module Title	ECTS	Semester
NTU102	Computer1	4	2
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Provides essential computer skills, including computer hardware and software fundamentals, operating systems, office applications, internet technologies, and introductory programming concepts to support engineering studies.			

Module 13

Module Code	Course/Module Title	ECTS	Semester
NTU103	Arabic Language	2	2
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	-	33	17
Description			
Develops students' proficiency in Arabic through grammar, writing, reading comprehension, and effective communication, with emphasis on academic and professional language skills.			

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Module 14

Module Code	Course/Module Title	ECTS	Semester
ICNE-201	Computer Networks	6	3
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
The course provides an overview of computer networking concepts, protocols, architectures, devices, addressing, routing, switching, and network security.			

Module 15

Module Code	Course/Module Title	ECTS	Semester
ICNE-202	Analytical Mathematics	6	3
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
Students develop fundamental mathematical and analytical skills through the study of functions, equations, matrices, vectors, differentiation, and integration.			

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Module 16

Module Code	Course/Module Title	ECTS	Semester
ICNE-203	Computer Architecture	6	3
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
This course examines the structure and organization of computer systems, focusing on processors, memory, input/output systems, instruction sets, and data representation.			

Module 17

Module Code	Course/Module Title	ECTS	Semester
ICNE-204	Object-Oriented Programming	8	3
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
4	4	123	77
Description			
Students will explore the principles of object-oriented programming, including classes, objects, inheritance, polymorphism, encapsulation, and abstraction, while developing practical skills in designing and implementing structured software applications.			

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Module 18

Module Code	Course/Module Title	ECTS	Semester
NTU-200	Baath Regime Crimes in Iraq	2	3
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	-	33	17
Description			
This course examines the major crimes and human rights violations committed during the Baath regime in Iraq, focusing on their historical context, causes, consequences, and impact on Iraqi society.			

Module 19

Module Code	Course/Module Title	ECTS	Semester
NTU-201	English Language	2	3
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	-	33	17
Description			
The course develops students' abilities in English communication, focusing on reading, writing, listening, speaking, vocabulary, and grammar to support effective academic and professional communication.			

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Module 20

Module Code	Course/Module Title	ECTS	Semester
ICNE-205	Data Communication and Networking	6	4
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
This course explores the principles of data communication and networking, including transmission media, communication protocols, network architectures, switching, routing, and network performance.			

Module 21

Module Code	Course/Module Title	ECTS	Semester
ICNE-206	Electronic Engineering	4	4
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Students will study the fundamental principles of electronic engineering, including electronic circuits, semiconductor devices, amplifiers, digital systems, and basic signal processing, with emphasis on their applications in modern technological systems.			

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Module 22

Module Code	Course/Module Title	ECTS	Semester
ICNE-207	Database Design and Management	6	4
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
The course focuses on database concepts, data modeling, database design, SQL, normalization, security, and database management techniques, enabling students to develop efficient and reliable database systems.			

Module 23

Module Code	Course/Module Title	ECTS	Semester
ICNE-208	Object-Oriented Software Development	8	4
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
4	4	123	77
Description			
This course emphasizes the development of software using object-oriented principles, including system analysis, design, implementation, testing, and maintenance, with a focus on building reusable, scalable, and reliable software applications.			

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Module 24

Module Code	Course/Module Title	ECTS	Semester
NTU-202	Computer 2	4	4
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Students will build on fundamental computer concepts by exploring advanced topics in computer systems, software applications, data processing, and problem-solving techniques, with emphasis on practical skills and effective use of computing technologies.			

Module 25

Module Code	Course/Module Title	ECTS	Semester
NTU-203	Arabic Language	4	4
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	-	33	17
Description			
The course develops students' skills in Arabic language, focusing on grammar, reading, writing, communication, and linguistic expression to enhance their academic and professional abilities.			

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Module 26

Module Code	Course/Module Title	ECTS	Semester
CAIK-201	Summer Training1	-	4
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
-	2	-	-
Description			
Students gain practical experience by applying academic knowledge in real-world work environments, developing technical, professional, communication, and problem-solving skills relevant to their field of specialization.			

Module 27

Module Code	Course/Module Title	ECTS	Semester
ICNE-301	Digital Signal Processing	6	5
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
The course introduces the principles and techniques of digital signal processing, including discrete-time signals, sampling, filtering, Fourier analysis, and signal transformations, with emphasis on practical applications in communication and computing systems.			

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Module 28

Module Code	Course/Module Title	ECTS	Semester
ICNE-302	Engineering Analysis	4	5
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
The course develops mathematical and analytical methods used in engineering, covering differential equations, complex numbers, matrices, vectors, and numerical techniques to solve engineering problems.			

Module 29

Module Code	Course/Module Title	ECTS	Semester
ICNE-303	Web Systems Programming	6	5
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
4	4	123	27
Description			
The course introduces programming techniques for developing web-based systems, covering client-server architecture, web technologies, databases, dynamic content, and basic web application development.			

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Module 30

Module Code	Course/Module Title	ECTS	Semester
ICNE-304	Linux & Server Administration	4	5
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Students gain practical knowledge of Linux operating systems and server administration, including system installation, configuration, user management, networking, security, services, and performance monitoring.			

Module 31

Module Code	Course/Module Title	ECTS	Semester
CAIK-301	Entrepreneurial Capacity Building	6	5
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
The course develops students' entrepreneurial skills through innovation, opportunity identification, business planning, problem-solving, leadership, and effective decision-making, preparing them to create and manage successful projects and ventures.			

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Module 32

Module Code	Course/Module Title	ECTS	Semester
ICNE-305	Elective	4	5
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			

Module 33

Module Code	Course/Module Title	ECTS	Semester
ICNE-307	Wireless & IoT Networks	6	6
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
The course explores wireless communication technologies and Internet of Things networks, focusing on network architectures, protocols, connectivity, devices, security, and practical applications of IoT systems.			

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Module 34

Module Code	Course/Module Title	ECTS	Semester
ICNE-308	Data and Network Security	4	6
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Students will examine principles and techniques for protecting data and computer networks, including threats, vulnerabilities, encryption, authentication, access control, firewalls, and security mechanisms.			

Module 35

Module Code	Course/Module Title	ECTS	Semester
ICNE-309	DevOps & Network Automation	6	6
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
The course introduces DevOps principles and network automation techniques, focusing on continuous integration, continuous deployment, configuration management, automated network operations, monitoring, and efficient infrastructure management.			

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Module 36

Module Code	Course/Module Title	ECTS	Semester
ICNE-310	Blockchain Fundamentals	6	6
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
4	4	123	27
Description			
The course introduces the fundamental concepts of blockchain technology, including distributed ledgers, consensus mechanisms, cryptography, smart contracts, and decentralized applications, with emphasis on security and practical applications.			

Module 37

Module Code	Course/Module Title	ECTS	Semester
ICNE-311	Distributed Systems	4	6
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
This course examines the principles of distributed systems, focusing on distributed architectures, communication, synchronization, resource sharing, fault tolerance, and coordination among interconnected computing systems.			



Module 38

Module Code	Course/Module Title	ECTS	Semester
ICNE-312	Elective	4	6
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			

Module 39

Module Code	Course/Module Title	ECTS	Semester
CAIK-302	Summer Training2	-	6
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
-	2	-	-
Description			
The course provides advanced practical experience through field-based training, enabling students to apply technical knowledge, develop professional skills, and solve real-world problems related to their specialization.			

Module 40

Module Code	Course/Module Title	ECTS	Semester
ICNE-401	IT Service Management (ITIL)	4	7
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
The course introduces IT service management principles based on the ITIL framework, focusing on service delivery, incident management, problem management, change management, and continuous service improvement.			

Module 41

Module Code	Course/Module Title	ECTS	Semester
ICNE-402	Research Methodology	6	7
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
The course develops students' skills in conducting scientific research, including research design, literature review, data collection and analysis, academic writing, research ethics, and presentation of research findings.			

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Module 42

Module Code	Course/Module Title	ECTS	Semester
ICNE-403	Enterprise Network Design	6	7
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
4	4	123	27
Description			
This course focuses on the design and implementation of enterprise networks, covering network architecture, scalability, routing, switching, security, performance, and infrastructure planning for reliable organizational communication.			

Module 43

Module Code	Course/Module Title	ECTS	Semester
ICNE-404	Cloud Computing	4	7
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Students explore cloud computing concepts, service models, deployment models, virtualization, cloud infrastructure, storage, security, and resource management, with emphasis on practical applications of cloud technologies.			

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Module 44

Module Code	Course/Module Title	ECTS	Semester
ICNE-405	Graduation Project 1	6	7
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
-	6	90	60
Description			
Students apply their academic knowledge to identify a practical problem, conduct preliminary research, define project requirements, and develop a suitable plan for designing and implementing their graduation project.			

Module 45

Module Code	Course/Module Title	ECTS	Semester
ICNE-406	AI for Networks	4	7
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
The course explores the application of artificial intelligence techniques in computer networks, focusing on intelligent network management, traffic analysis, anomaly detection, optimization, and automated decision-making.			

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Module 46

Module Code	Course/Module Title	ECTS	Semester
ICNE-407	Intelligent Networking Systems	6	8
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
4	4	123	27
Description			
The course examines intelligent technologies for modern networks, focusing on machine learning, automated network management, adaptive routing, traffic optimization, anomaly detection, and intelligent decision-making in network environments.			

Module 47

Module Code	Course/Module Title	ECTS	Semester
ICNE-408	Edge & 5G Networks	6	8
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	87
Description			
This course examines edge computing and 5G network technologies, focusing on network architecture, low-latency communication, virtualization, resource management, connectivity, and applications in modern intelligent systems.			

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Module 48

Module Code	Course/Module Title	ECTS	Semester
ICNE-409	Software Engineering	4	8
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
The course introduces software engineering principles and practices, covering software development life cycles, requirements analysis, system design, testing, maintenance, project management, and quality assurance.			

Module 49

Module Code	Course/Module Title	ECTS	Semester
ICNE-410	Multimedia	4	8
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
Students explore the principles and technologies of multimedia, including digital text, images, audio, video, animation, and interactive content, with emphasis on multimedia production, processing, and practical applications.			

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Module 50

Module Code	Course/Module Title	ECTS	Semester
ICNE-411	Technical Elective	4	8
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
2	2	63	37
Description			
The course enables students to study specialized technical topics related to their field, enhancing their practical knowledge, technical competencies, and ability to apply advanced concepts in real-world applications.			

Module 51

Module Code	Course/Module Title	ECTS	Semester
ICNE-412	Graduation Project 2	6	8
Class (hr/week)	**Lect. /Lab. /Prac. /Tutor**	**SSWL (hr/w)**	**USWL (hr/w)**
-	6	90	60
Description			
Students complete the development and implementation of their graduation projects by applying acquired knowledge and technical skills, conducting testing and evaluation, documenting results, and presenting the final project outcomes.			

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