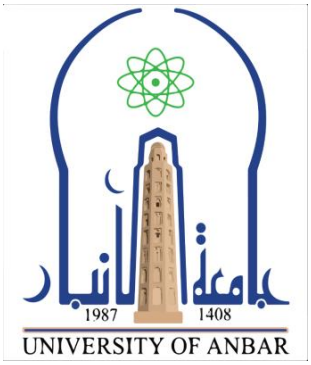

وزارة التعليم العالي والبحث العلمي

جامعة الانبار

كلية علوم الحاسوب وتكنولوجيا المعلومات

قسم انظمة شبكات الحاسوب

نظام بولونيا

Program Curriculum
Program Catalogue
Modules Catalogue
Module Description Form

Republic of Iraq - Ministry of Higher Education and Scientific Research

University of Anbar

Bachelor's degree in} Computer Networks Systems (First cycle)

Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr

Program Curriculum (2023 - 2024)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي

جامعة الأنبار

درجة البكالوريوس في أنظمة شبكات الحاسوب (الدورة الأولى)

أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - كل وحدة اوربية = ٢٥ ساعة

المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UGI	One	1	CNDC110	Information Technology	تكنولوجيا المعلومات	English	2		2		1		3	78	47	125	5.00	C	None
		2	CCIT060	Mathematics	رياضيات	English	3			1	2		3	93	57	150	6.00	B	None
		3	UOA003	English I	اللغة الانكليزية (1)	English	2						3	33	17	50	2.00	S	None
		4	CNDC107	Programming in C++ I	برمجة (1)	English	4		2		1		3	108	92	200	8.00	C	None
		5	CNDC109	Logic Design	تصميم منطقي	English	2		2		1		3	78	47	125	5.00	C	None
		6	CNDC114	Networks Fundamentals	اساسيات الشبكات	English	2		2				3	63	37	100	4.00	C	None
						Total	15	0	8	1	5	0	18	453	297	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Two	1	CNDC108	Programming in C++ II	برمجة (2)	English	4		2		1		3	108	92	200	8.00	C	CNDC107
		2	CNDC111	Logic Circuits and Design	الدوائر المنطقية والتصميم	English	2		2	2			3	93	57	150	6.00	C	CNDC109
		3	CNDC203	Networks and Data Communication	الشبكات واتصالات البيانات	English	2		2	2			3	93	57	150	6.00	C	None
		4	CCIT061	Discrete Mathematics	رياضيات متقطعه	English	3				2		3	78	72	150	6.00	B	None
		5	UOA005	Human Rights and Democracy	حقوق انسان وديمقراطية	Arabic	2						3	33	17	50	2.00	S	None
		6	UOA001	Arabic	اللغة العربية	Arabic	2						3	33	17	50	2.00	S	None
						Total	15	0	6	4	3	0	18	438	312	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Three	1	CNDC201	Data Structures	هياكل بيانات	English	2		2		1		3	78	47	125	5.00	C	None
		2	UOA 011	English II	اللغة الانكليزية (2)	English	2						3	33	17	50	2.00	s	UOA003
		3	CNDC204	Digital Electronic	الكترونيك	English	2		2			1	3	63	62	125	5.00	S	None
		4	CNDC205	computer Architecture	معمارية الحاسبة	English	2				2		3	63	37	100	4.00	E	None
		5	CNDC210	Data Transmission	تراسل بيانات	English	3				1	1	3	63	62	125	5.00	C	None
		6	CNDC208	Object oriented Programming (1)	البرمجة الكيانية (1)	English	4		2		2		3	123	52	175	7.00	C	None
		7	UOA 018	The crimes of the defunct Ba'ath party	جرائم حزب البعث البائد	Arabic	2						3	33	17	50	2.00	S	UOA135
						Total	17	0	6	0	6	2	21	456	294	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UGII	Four	1	CNDC209	Algorithms	خوارزميات	English	2		2			1	3	63	37	100	4.00	C	None
		2	CCIT062	Numerical Analysis	تحليل عددي	English	2		2		1		3	78	47	125	5.00	S	None
		3	CCIT063	Computer Networks	شبكات الحاسوب	English	3		2		1		3	93	57	150	6.00	C	None
		4	CNDC213	web Design Internet	تصميم صفحات الانترنت	English	2		2				3	63	37	100	4.00	C	None
		5	CNDC211	Object oriented Programming (2)	البرمجة الكيانية (2)	English	4		2		2		3	123	52	175	7.00	C	CNDC208
		6	CNDC206	Microprocessors	معالجات الدقيقة	English	2				2	1	3	63	37	100	4.00	E	None
						Total	15	0	10	0	6	2	18	483	267	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Five	1	CNDC305	Visual Programming (1)	البرمجة المرئية (1)	English	3		2		1		3	93	57	150	6.00	C	None
		2	CNDC309	Distributed Database Systems	أنظمة قواعد البيانات الموزعة	English	2		2				3	63	37	100	4.00	E	None
		3	CNDC306	Wireless Networks	الشبكات اللاسلكية	English	2		2		1		3	78	47	125	5.00	C	None
		4	CNDC303	Web Programming	برمجة صفحات الانترنت	English	2		2				3	63	37	100	4.00	E	None
		5	CNDC308	Signal Processing	معالجة اشارة	English	2				2		3	63	37	100	4.00	E	None
		6	CNDC401	network operating system	نظم تشغيل الشبكة	English	2		2		1	1	3	78	47	125	5.00	S	None

					Total	13	0	10	0	5	1	18	438	262	700	28.00			

UGIII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Six	1	CNDE301	Software Engineering	هندسة برمجيات	English	3				2		3	78	47	125	5.00	E	None
		2	CNDC304	Visual Programming (2)	البرمجة المرئية (2)	English	2		2		1		3	78	72	150	6.00	C	CNDC305
		3	CNDE302	Multimedia	وسائط متعددة	English	2		2				3	63	37	100	4.00	S	None
		4	CNDC223	Internet of Things	أنترنت الاشياء	English	2		2		1		3	78	47	125	5.00	E	None
		5	CNDC307	Network Programming	برمجة شبكات	English	2		2		2		3	93	57	150	6.00	C	None
		6	CNSC313	soft computing	الحوسبة	English	2				2	1	3	63	37	100	4.00	C	None
						Total	13	0	8	0	8	1	18	453	297	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	seven	1	CNDC413	Information Security	امنية معلومات	English	2				2	1	3	63	37	100	4.00	C	None
		2	CNDC405	Web Application Development	تطوير تطبيقات الانترنت	English	2		2		1		3	78	47	125	5.00	E	None
		3	CNDC403	Software Defined Networks (SDN)	الشبكات المعرفة بالبرمجيات	English	2		2		1		3	78	47	125	5.00	E	CNDC405
		4	UOA 019	Research Methodology	منهج بحث	English	2				2		3	63	37	100	4.00	B	None
		5	CNDC407	Cloud computing	حوسبة السحابية	English	2		2		1		3	78	47	125	5.00	E	None
		6	CNDC409	Artificial intelligence	الذكاء الاصطناعي	English	2		2		1		3	78	47	125	5.00	C	None
						Total	12	0	8	0	8	1	18	438	262	700	28.0		

	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Eight	1	CNDC406	Switching and Routing Network	التبديل والتوجيه في الشبكة	English	3		2		1	1	3	93	57	150	6.00	C	None
		2	CNDC408	Network Protocols	بروتوكولات وخدمات الشبكات	English	2		2		1	1	3	78	47	125	5.00	C	None
		3	CNDC404	Networks Security	امنية شبكات	English	2			1	2		3	78	47	125	5.00	C	None
		4	CNDE411	Network Performance and Optimization	تحسين الشبكات	English	2		2		2	1	3	93	57	150	6.00	C	CNDC409
		5	CNDC410	Project	المشروع	English			4		2		3	93	107	200	8.00	C	None
		6		Modeling and Simulation						4		1							
						Total	9	0	10	5	8	4	15	435	315	750	30.0		

						Total	109	0	66	10	49	11	144	3594	2306	5900	236.0		Must be 240 ECTS

Note: The student should complete 4 weeks of Summer Internships to fullfil the requirements of the Bachelor's degree

Structured SWL (hr/w) type		
	CL	Class Lecture
	Lab	Laboratory
	Pr	Practical Training
	Tut	Tutorial
	Lect	Online lecture
	Semn	Seminar

Module type		
	B	Basic learning activities
	C	Core learning activity
	S	Suport or related learning activity
	E	Elective learning activity

SWL:	Student Workload
SSWL:	Structured SWL
USSWL:	Unstructured SWL

Note: Columns O, Q and R are progrmaed, protected and should not be edited

Ministry of Higher Education and Scientific Research
UNIVERSITY OF ANBAR
COLLEGE of COMPUTER SCIENCES AND INFORMATION TECHNOLOGY
DEPT. COMPUTER NETWORKS SYSTEMS

وزارة التعلـــيم العالـــي والبحـــث العلمي
جامـــعـــة الأنبار
كلـــــية علوم الحاسوب وتكنولوجيا المعلومات
قســـم أنظمة شبكات الحاسوب

Program Catalogue | 2023-2024 | دليل البرنامج الدراسي

University of Anbar
جامعة الانبار

First Cycle – Bachelor's Degree (B.Sc.) - *COMPUTER NETWORKS SYSTEMS*
بكالوريوس – علوم أنظمة شبكات الحاسوب

Table of Contents | جدول المحتويات

1. Mission & Vision Statement

Vision Statement

Vision Statement for the Computer Networks Systems Department in a Computer Science and information technology:

"To be a leading Networking Department, empowering students to become skilled professionals in the rapidly evolving field of computer networking, enabling them to drive innovation and shape the future of technology."

Explanation:

1. Leading Networking Department: The vision emphasizes the desire to be at the forefront of networking education, setting the standard for excellence in the field. It reflects a commitment to staying updated with the latest advancements and best practices.
2. Empowering Students: The vision recognizes the importance of empowering students by providing them with a comprehensive education that equips them with the necessary knowledge, skills, and hands-on experience to excel in the networking industry.
3. Skilled Professionals: The vision focuses on producing graduates who are highly skilled and capable of meeting the demands of the evolving

networking landscape. It highlights the aim to develop well-rounded professionals who can adapt to new technologies, troubleshoot complex network issues, and contribute to the growth of the industry.

4. Rapidly Evolving Field: The vision acknowledges the dynamic nature of the networking field. It signifies the department's commitment to keeping pace with emerging trends, technologies, and industry standards, ensuring that students receive an education that is relevant and up to date.
5. Shaping the Future of Technology: The vision highlights the department's aspiration to play a significant role in shaping the future of technology through its contributions to the field of computer networking. It signifies the intention to produce graduates who can make meaningful contributions and lead advancements in networking technologies and practices.

Mission Statement

The mission of the Networking Department in our Computer College is to provide comprehensive and cutting-edge education in the field of networking. We aim to equip our students with the knowledge, skills, and practical experience necessary to excel in the rapidly evolving networking industry.

Our department is committed to fostering a dynamic learning environment that promotes innovation, collaboration, and critical thinking. We strive to empower our students to become competent and resourceful professionals who can meet the challenges of networking in today's interconnected world.

Key Principles:

1. Quality Education: We are dedicated to delivering high-quality education that meets industry standards and prepares our students for successful careers in networking. Our curriculum is regularly updated to reflect the latest advancements and emerging technologies in the field.
2. Practical Experience: We emphasize hands-on learning and practical experience to ensure that our students develop the necessary skills to design, implement, and troubleshoot networks. Through lab exercises, projects, and industry partnerships, we provide opportunities for real-world application of theoretical concepts.

3. Professional Development: We foster a culture of continuous learning and professional development among our students and faculty. We encourage participation in workshops, seminars, industry conferences, and certification programs to enhance technical expertise and stay abreast of industry trends.

4. Ethical Practices: We emphasize the importance of ethical behavior and responsible use of technology in networking. Our students are trained to prioritize privacy, security, and ethical considerations in all their networking activities. We promote integrity, professionalism, and adherence to ethical guidelines.
5. Community Engagement: We actively engage with the local and global networking community to foster networking excellence and contribute to its advancement. We organize events, seminars, and conferences to facilitate knowledge sharing and networking opportunities for our students and faculty.

2. Program Specification

Program code:	BSc-MECH	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

3. Program Goals

The goals for the Networking Department in a computer college may vary depending on the specific objectives and priorities of the institution. However, here are some common program goals that a Networking Department might strive to achieve:

1. Provide comprehensive networking education: The Networking Department should aim to deliver a comprehensive curriculum that covers fundamental and advanced concepts in computer networking. This includes topics such as

network protocols, network security, routing and switching, wireless networks, network management, and emerging networking technologies.

2. Develop practical skills: The department should focus on equipping students with hands-on skills that are applicable to real-world networking scenarios. Practical training should involve configuring and managing network devices, troubleshooting network issues, designing network infrastructures, and implementing network security measures.
3. Keep pace with industry trends and advancements: The field of networking is rapidly evolving, with new technologies, protocols, and trends emerging regularly. The Networking Department should strive to stay up-to-date with these advancements and incorporate relevant and cutting-edge topics into the curriculum. This ensures that students are equipped with the knowledge and skills needed to adapt to the ever-changing networking landscape.
4. Promote teamwork and collaboration: Networking professionals often work in teams and collaborate with colleagues to design, implement, and manage networks. The program should emphasize the importance of teamwork and provide opportunities for students to work collaboratively on networking projects and assignments. This helps develop their interpersonal and communication skills, as well as their ability to work effectively in a team-based environment.
5. Prepare students for industry certifications: Many networking professionals pursue industry certifications to validate their skills and enhance their career prospects. The Networking Department should align the curriculum with relevant industry certifications, such as Cisco Certified Network Associate (CCNA) or CompTIA Network+, and provide resources and guidance to help students prepare for these certifications..
6. Ensure high-quality teaching and learning: The department should prioritize the recruitment and professional development of skilled faculty members who possess both industry experience and teaching expertise. Regular assessments and feedback mechanisms should be implemented to ensure the quality of teaching and learning experiences. Additionally, the program should leverage modern educational technologies and resources to enhance the learning environment.
7. Support lifelong learning: Networking professionals need to continuously update their knowledge and skills to keep pace with advancements in the field. The department should encourage and support students' lifelong learning by offering opportunities for professional development, such as continuing education programs, workshops, and seminars. This helps

students stay relevant in their careers and adapt to the evolving demands of the networking industry.

4. Student Learning Outcomes (SLOs)

Student Learning Outcomes for the Networking Department in a Computer College can vary depending on the specific curriculum and goals of the institution. However, here are some common learning outcomes that are typically associated with a Networking Department in a Computer College:

1. Knowledge of Networking Concepts: Students should demonstrate a solid understanding of fundamental networking concepts, including network architecture, protocols, topologies, and technologies.
2. Network Implementation: Students should be able to implement computer networks, considering factors such as scalability, security, reliability, and performance.
3. Network Administration and Management: Students should acquire the skills to administer and manage network systems effectively, including tasks such as configuring network devices, troubleshooting network issues, and ensuring network security.
4. Network Security: Students should understand the principles and techniques of network security, including authentication, access control, encryption, firewalls, intrusion detection, and prevention systems.
5. Network Protocols and Services: Students should have a comprehensive understanding of various network protocols and services, such as TCP/IP, DNS, DHCP, VPN, and others, and be able to apply them effectively in network configurations.
6. Network Performance Optimization: Students should learn techniques to optimize network performance, including analyzing and improving network latency, bandwidth utilization, and response times.
7. Collaboration and Communication: Students should develop effective communication and collaboration skills to work in multidisciplinary teams, interact with clients or users, and present technical information clearly and professionally.
8. Ethical and Legal Considerations: Students should understand the ethical and legal issues related to networking, including privacy, intellectual property, cybercrime, and compliance with industry regulations.

9. Professional Development: Students should develop a commitment to continuous learning and professional growth, keeping up with advancements in networking technologies and industry trends.

5. Academic Staff

ت	الاسم الرباعي	الشهادة والتخصص	اللقب العلمي	Email @uoanbar.edu.iq	Mobile no.
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6. Credits, Grading and GPA

Credits

Grading

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1^{st} module score x ECTS) + (2^{nd} module score x ECTS) + ……] / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NSCC 110	Information Technology	78	97	7.00	C	None
NSDC 113	Mathematics	48	52	4.00	S	None
UOA 140	English I	48	52	4.00	B	None
NSCC 107	Programming C++ (1)	60	65	5.00	C	None
NSCC 109	Logic Design (1)	60	65	5.00	C	None
NSCC 114	Electrical circuits	60	65	5.00	S	None

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NSCC 108	Programming C++(2)	63	87	7.00	C	None
NSCE 111	Logic Design (2)	63	87	6.00	C	COE 1202
NSDC 203	Advanced Mathematics	48	77	6.00	S	None
NSDC 104	Discrete Mathematics	63	87	7.00	S	None
UOA 135	Freedom & Human Rights	48	52	4.00	S	CHE 1301
UOA137	Arabic	33	42	3.00	C	None

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NSCC201	Data Structures	63	62	5.00	S	None
UOA223	English II	48	52	4.00	B	UOA 140
NSDC204	Digital Electronic	63	62	5.00	S	None
NSDC205	Architecture	63	62	5.00	E	None
NSDE210	Data Communication	63	62	5.00	C	None
NSDC208	Object oriented Programming (1)	78	72	6.00	C	None

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NSDC209	Algorithms	78	47	5.00	C	None
NSDC202	Numerical Analysis	78	47	5.00	S	None
NSDC207	Computer Networks	78	47	5.00	C	None
NSDC213	web Design Internet	63	37	4.00	C	None
NSDE211	Object oriented Programming (2)	78	72	6.00	C	NSDC208
NSDC206	Microprocessors	93	32	5.00	E	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NSDC305	Visual Programming (1)	78	47	5.00	C	UOA 2104
NSDE309	Database System	78	47	5.00	E	None
NSDC306	Wireless Networks	78	47	5.00	C	None
NSDC303	Web Programming	78	47	5.00	E	CHE 2308
NSDE308	Signal Processing (1)	63	62	5.00	E	None
NSCC401	Operating Systems	78	47	5.00	S	None

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NSDE301	Software Engineering	63	37	4.00	E	None
NSDC304	Visual Programming (2)	78	72	6.00	C	NSDC305
NSCE302	Multimedia	78	47	5.00	S	None
NSDE312	Distributed Database	78	47	5.00	E	None
NSDC307	Network Programming	78	47	5.00	C	None
NSDE313	Signal Processing (1)	63	62	5.00	C	NSDE308

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NSDC408	Network Protocols	78	72	6.00	C	None
NSDC413	Information Security	63	37	4.00	C	None
NSDC405	Web Application Development (1)	78	47	5.00	E	None
NSCC412	Research Methodology	63	37	4.00	B	None
NSDC407	Mobile Computing	78	72	6.00	E	None
NSDC409	AI (1)	78	47	5.00	C	None

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NSDC406	Switching and Routing Network	93	32	5.00	C	None
NSDC404	Networks Security	63	37	4.00	C	None
NSDE411	AI (2)	78	47	5.00	C	NSDC409
NSDC403	Web Application Development (2)	78	47	5.00	E	NSDC405
NSDC410	Project	93	182	11.00	C	None

8. Contact

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Ministry of Higher Education and Scientific Research
UNIVERSITY OF ANBAR
COLLEGE of COMPUTER SCIENCES AND INFORMATION TECHNOLOGY
DEPT. COMPUTER NETWORKS SYSTEMS

وزارة التعليم العالي والبحث العلمي
جامعة الأنبار
كلية علوم الحاسوب وتكنولوجيا المعلومات
قسم أنظمة شبكات الحاسوب

Modules Catalogue | 2023-2024 | دليل المواد الدراسية

University of Anbar
جامعة الانبار

First Cycle – Bachelor's Degree (B.Sc.) - *COMPUTER NETWORKS SYSTEMS*

بكالوريوس – علوم أنظمة شبكات الحاسوب

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of computer networks systems to gain Bachelor of Science degree. The program delivers (47) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
NSCC110	Fundamentals of Information Technology I	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	97
Description			
This course provides a comprehensive overview of essential topics in the field. Over the course, students will explore various aspects of computer systems, programming, and the underlying technologies that drive them. The course begins with an introduction to computers and programming, followed by an examination of computer history, generations, and hierarchy. Students will gain insights into basic computer components, including the functions of fetch cycle, interrupt cycle, and I/O operations. Semiconductor main memory, such as RAM, ROM, and CACHE, and secondary storage will be covered, along with memory and storage organization. The course further delves into computer software, including application software and middleware, as well as operating systems. Telecommunications systems, computer networks, and their applications will be explored, alongside an understanding of protocols in networking. The syllabus concludes with a study of the layers of the OSI model, a framework for network communication.			

Module 2

Code	Course/Module Title	ECTS	Semester
NSDC113	Mathematics I	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0	48	52
Description			
This course covers fundamental concepts in functions, limits, and derivatives. Beginning with an understanding of function definitions, domain, and range, students will learn to graph functions effectively. The course progresses to explore limits, including their definition, theorems, and various types. Students will then delve into the definition and interpretation of derivatives, followed by an examination of derivative properties and laws. The syllabus includes derivatives of trigonometric functions, exponential functions, logarithm functions, inverse trigonometric functions, and hyperbolic trigonometric functions. The chain rule and its two forms will be studied, along with its practical applications. Additionally, the course covers first, second, and third derivatives, as well as logarithms and their properties. By the end of the course, students will have gained proficiency in functions, limits, and derivatives, enabling them to apply these principles to a variety of mathematical problems and real-world scenarios.			

Module 3

Code	Course/Module Title	ECTS	Semester
UOA140	English I	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	78	22
Description			
The course covers various aspects of reading, writing, grammar, vocabulary, and everyday English usage. The course begins with a focus on student life, covering reading methods and writing skills, including punctuation and linking ideas. It then progresses to topics such as identifying different parts of speech, daily routines, and words that commonly go together (collocations). Other topics covered include people and the environment, architecture, education, technology, food, drink, culture, cities of the world, brain power, and staying alive. Each topic involves reading exercises to develop skills like skimming, scanning, predicting content, and deriving meaning from context. Writing exercises encompass various aspects, such as using appropriate punctuation, describing buildings, writing letters or emails, and summarizing texts. Throughout the course, students will also enhance their grammar knowledge, expand their vocabulary, and practice everyday English usage. By the end of the course, students will have developed their reading and writing skills, gained a solid understanding of grammar concepts, expanded their vocabulary, and improved their ability to communicate effectively in English in a variety of contexts.			

Module 4

Code	Course/Module Title	ECTS	Semester
NSCC107	Programming in C++ I	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
Over this course, students will delve into various topics and concepts essential for building a strong foundation in C++ programming. The syllabus begins with an overview of programming languages, providing students with a broad understanding of their purpose and significance. Students will then explore algorithms and flow charts, learning how to plan and design program logic. The course progresses to cover the C++ program structure, including the organization of code. Students will gain a solid understanding of data types and variables, as well as input/output statements for interacting with the user. The course also delves into unary minus, increment, and decrement operators, along with assignment, relational, logical, bitwise, and logical operations. Control structures, such as conditional statements (if and if-else), switch statements, and looping statements (do/while and for), are extensively covered. Additionally, students will learn about break and continue control statements and nested loops. By the end of the course, students will have the skills to write and understand basic C++ programs, effectively utilize control structures, and apply fundamental programming concepts to solve problems.			

Module 5

Code	Course/Module Title	ECTS	Semester
NSCC109	Logic Design I	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
This course delves into the distinguishing characteristics of various number systems and coding schemes. It provides an in-depth exploration of number systems including decimal, binary, octal, and hexadecimal. Students will develop the ability to differentiate between different logic gates and gain an understanding of their specific applications. The course emphasizes the practical application of Boolean algebra theories for the design and comprehension of logic circuits. Additionally, students will acquire proficiency in utilizing Karnaugh maps as a valuable tool for logic optimization. By the end of the course, students will have a solid foundation in digital logic design principles and practical skills in utilizing different number systems, logic gates, Boolean algebra, and Karnaugh maps for circuit design and optimization.			

Module 6

Code	Course/Module Title	ECTS	Semester
NSCC114	Electrical Circuits	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
This course provides an understanding of electronic circuits, their principles, and applications. Students will learn fundamental concepts related to circuit analysis, including Ohm's Law, Kirchhoff's Laws, and circuit theorems such as Thevenin's and Norton's theorems. Additionally, the course covers various circuit components such as resistors, capacitors, and inductors, exploring their behavior in different circuit configurations. Moreover, the course emphasizes problem-solving skills, enabling students to analyze and troubleshoot circuitry effectively. By the end of the course, students will have acquired a solid foundation in electronic circuits, preparing them for more advanced studies in the field of networks and electrical engineering.			

Module 7

Code	Course/Module Title	ECTS	Semester
NSCC108	Programming in C++ II	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
C++ 2 is an immersive course that takes your C++ programming skills to the next level. Over the span of 15 weeks, you'll delve into advanced topics and concepts, building upon your foundational knowledge. The course begins by focusing on functions, exploring the nuances of passing parameters by value and reference, as well as recursive functions. You'll then dive deep into the crucial concept of pointers, understanding their purpose and leveraging them effectively in C++ programming. Arrays play a significant role in this course, with in-depth coverage of one-dimensional and two-dimensional arrays. You'll master array declaration, initialization, accessing elements, and performing read/write operations and data processing. String manipulation is another vital topic, where you'll discover the power of member functions from the stdlib library for efficient string handling. The course further equips you with the ability to work with structures, enabling you to organize and manipulate related data elements. You'll even learn to handle arrays of structures, empowering you to manage complex data structures. Finally, you'll be introduced to file handling, allowing you to read from and write to external files seamlessly.			

Module 8

Code	Course/Module Title	ECTS	Semester
NSCE111	Logic Design II	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
This course delves into various types of combinational logic functions essential in digital systems. Students will be introduced to a range of functions, such as adders, comparators, decoders, encoders, code converters, multiplexers (data selectors), and demultiplexers. This course provides a comprehensive understanding of these functions and their applications in designing complex digital circuits. Furthermore, the course initiates the study of sequential logic, focusing on bistable, monostable, and astable logic devices known as multivibrators. Students will explore the characteristics, working principles, and practical applications of these devices. By the end of the course, students will have acquired a solid foundation in designing and implementing combinational logic circuits, as well as a basic understanding of sequential logic devices. They will possess the skills necessary to analyze and construct digital circuits using a variety of essential components and techniques in order to meet the requirements of modern digital systems.			

Module 9

Code	Course/Module Title	ECTS	Semester
NSDC203	Advanced Mathematics	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	77
Description			
This course offers a comprehensive exploration of differential equations and various mathematical techniques to solve them. Over this course, students will dive into the fundamental principles and applications of differential equations. The syllabus begins with an introduction to differential equations, familiarizing students with their nature and significance in mathematics. Types of differential equations, such as linear and nonlinear, are then examined, providing students with a deeper understanding of their characteristics. Students will explore different types of first-order and first-degree equations, including variable separable equations, Leibnitz's (linear) equation, Bernoulli's differential equation, exact differential equations, and non-exact differential equations. The syllabus also covers homogeneous and non-homogeneous differential equations, offering insight into their properties and solution techniques. Second-order differential equations with constant coefficients are extensively studied, providing students with the tools to solve equations of this type. The course further explores Laplace transform and its inverse, introducing students to this powerful mathematical tool for solving differential equations. Power series and Fourier series are also covered, expanding students' knowledge of advanced mathematical techniques.			

Module 10

Code	Course/Module Title	ECTS	Semester
NSDC104	Discrete Mathematics	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
The discrete mathematics course provides a comprehensive exploration of fundamental concepts and techniques used in discrete mathematics. The course begins with an introduction to discrete mathematics, establishing its importance and relevance in various applications. Set theory is then covered, including set operations and cardinality, providing students with a solid foundation for reasoning about collections of objects. Sequences and summations are explored, followed by an introduction to logic and propositional logic, highlighting its practical applications. Mathematical induction and recursion are examined as powerful proof techniques. The course also covers functions, including one-to-one and invertible functions, and their geometric characterization. Relations are discussed, focusing on their computer representation, properties, manipulation, and composition. Graph theory is a significant component of the course, covering graphs, graph models, graph terminology, special types of graphs, and graph representation. Connectivity and trees, including their applications, traversal, and spanning trees, are also studied.			

Module 11

Code	Course/Module Title	ECTS	Semester
UOA135	Human studies	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	52
Description			
The Human Studies course offers a comprehensive exploration of human rights and democracy, delving into the intricate relationship between these two fundamental concepts. Over the span of the course, students will develop a deep understanding of the principles, theories, and practices that underpin human rights and democratic governance. The course begins with an examination of the historical and philosophical foundations of human rights, tracing their evolution and significance in diverse societies. Students will critically analyze key human rights documents and explore the universal values they embody. The study of democracy encompasses an exploration of its various forms, theories, and mechanisms of participation. Students will gain insights into the principles of democratic governance, including the rule of law, political representation, and civil society engagement. By the end of the course, students will have developed a nuanced understanding of human rights and democracy, equipped with the knowledge and critical thinking skills necessary to contribute to the advancement of these principles in their personal and professional lives.			

Module 12

Code	Course/Module Title	ECTS	Semester
UOA137	Arabic	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	42
Description			
The Arabic language course focuses on learning and understanding the rules of the Arabic language and applying them in writing and speaking correctly. The course aims to develop students' skills in using the Arabic language in a proper and eloquent manner. The topics covered in this course include various important linguistic aspects. In the early weeks, the emphasis will be on language rules related to noun gender, number, and agreement. Students will study exemplary usage of numbers in the Arabic language. In the following weeks, the focus will be on other grammatical rules, such as the use of common expressions like "ama wa ima," "in wa an," "am wa aw," and "law wa in." There will also be a focus on proper writing rules, such as writing the middle hamza and the singular on separate lines. Other topics to be covered include similar phonetic letters and their differences, articulation points, and the connected and unconnected "taa." Students will also be introduced to some complex linguistic aspects like "man wa ayy," "an wa in," and "hatta wa rawid."			

Module 13

Code	Course/Module Title	ECTS	Semester
NSCC201	Data Structures	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The Data Structures course provides a comprehensive understanding of the fundamental principles and applications of data structures. Over the duration of the course, students will explore a wide range of topics and develop essential skills in organizing and manipulating data efficiently. The course begins with an introduction to data structures, emphasizing their importance in solving complex problems. Students will also delve into algorithms and complexity analysis, gaining insights into the efficiency and performance of different data structures. The syllabus covers various data structures, starting with arrays and pointers, and progressing to linear lists and their types. Students will learn about stack operations and applications, as well as queue operations and applications. The course includes a review of pointers and structures, consolidating the students' understanding of these foundational concepts. Linked list representation and operations are then introduced, followed by an exploration of basic concepts of trees and graphs. Students will also study graph traversing algorithms, enabling them to navigate and analyze complex networks. The course concludes with a focus on hashing, providing an understanding of this important data structure for efficient searching and retrieval.			

Module 14

Code	Course/Module Title	ECTS	Semester
UOA223	English II	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	52
Description			
The English course offered covers a wide range of topics designed to enhance students' language skills and proficiency. Over the course of 15 weeks, students will explore various aspects of grammar, vocabulary, and everyday English usage. The syllabus begins with a focus on the tense system, providing a solid foundation for understanding verb forms and their usage. Present perfect tense and hot verbs are then introduced, enabling students to express actions and events in the past. Reading and vocabulary development are emphasized in Week 3, enhancing students' comprehension and expanding their word knowledge. The course progresses to cover topics such as forming questions and negative sentences, understanding prefixes and antonyms, and using future forms effectively. Expressing quantity, modals and related verbs, relative clauses, and participles are also covered in the course, enabling students to convey information accurately and with precision. Additionally, students will learn to express habits using "used to" and explore metaphors and idiomatic expressions for effective communication. The course concludes with a focus on hypothesizing, allowing students to speculate and discuss possibilities in English. Throughout the course, students will engage in a variety of activities, including grammar exercises, vocabulary building, and practical everyday English usage.			

Module 15

Code	Course/Module Title	ECTS	Semester
NSDC204	Digital Electronics	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
This course provides a comprehensive understanding of analog and digital electronics, exploring the distinctions between the two domains and their respective components. Students will learn the implementation of combinational logic circuits using logic gates and utilize Karnaugh maps for simplifying Boolean expressions. The course covers various applications of registers and counters, including arithmetic operations and the binary number system. Different types of counters, such as asynchronous, synchronous, decade, up/down, cascade, and counter decoding, will be studied. Sequential logic circuits using flip-flops and latches will be explored, including the design and analysis of shift registers and various types of multivibrators, such as astable, bistable, and monostable circuits. The course also introduces A/D and D/A converters, including R/2R DAC, R/2nR DAC, flash ADC, tracking ADC, slope ADC, successive approximation ADC, digital ramp ADC, and delta-sigma ADC.			

Module 16

Code	Course/Module Title	ECTS	Semester
NSDC206	Computer Architecture	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The Computer Architecture course provides a comprehensive overview of the fundamental concepts and components of computer systems. Over 15 weeks, students will delve into various topics related to computer architecture and gain a deep understanding of the underlying principles. The course begins with an introduction to computer components and a historical review, setting the foundation for further exploration. Data representation in computer systems is then covered, including error detection and correction techniques. Boolean algebra and digital logic are introduced to familiarize students with the building blocks of computer systems. MARIE, a simple computer, is used as a case study to understand the architecture and instruction set design. The course delves into instruction types, memory organization, input/output storage systems, and system software. Alternative architectures and embedded systems are also discussed, highlighting different design approaches and their applications. The course concludes with performance measurement and analysis techniques to evaluate and optimize computer system performance.			

Module 17

Code	Course/Module Title	ECTS	Semester
NSDE210	Data Communications	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The Data Communication course offers a comprehensive study of the principles and techniques involved in transmitting data across various communication channels. Over the span of 15 weeks, students will explore a range of topics related to data communication and gain a deep understanding of the underlying concepts. The course begins with an overview of data communications, including an introduction to the TCP/IP model. The characteristics of data communications, data representation, and data flow are discussed to establish a solid foundation. Students then delve into the study of data and signals, understanding periodic and non-periodic signals and the relationship between frequency and period. Digital signals, baud rate, and types of channels are covered in detail. Bandwidth, both of a signal and a channel, as well as Shannon capacity, are explored to understand the capacity and efficiency of data transmission. Time domain and frequency domain representation of signals are also studied. The course further examines digital-to-digital and analog-to-digital conversions, transmission modes, analog transmission techniques, and analog-to-analog conversions. Transmission media, including guided and unguided media, are discussed, along with the concept of multiplexing, including frequency-division multiplexing, wavelength-division multiplexing, and time-division multiplexing.			

Module 18

Code	Course/Module Title	ECTS	Semester
NSDC208	Object Oriented Programming I	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
The Object-Oriented Programming I course provides students with a solid foundation in the fundamental concepts and principles of object-oriented programming using Python. Over the duration of the course, students will review key programming language concepts and gradually transition into the world of object-oriented programming. The course begins with a review of programming language basics, covering variables, comments, and Python data types. Students then delve into more advanced topics, including operators, conditions, if statements, loops, functions, and arrays. The core focus of the course is on understanding and applying object-oriented programming concepts. Students are introduced to class fundamentals, exploring member access, constructors, and destructors. They also learn about inline functions within a class and arrays of objects. The course covers pointers to objects, friend functions, and overloading constructors, allowing students to develop a deeper understanding of class interactions and object manipulation. Students also learn about passing objects to functions and returning objects from functions.			

Module 19

Code	Course/Module Title	ECTS	Semester
NSDC209	Computer Algorithms	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
This course provides students with a comprehensive understanding of the fundamental concepts and techniques used in algorithm design and analysis. Throughout the course, students will explore various algorithms and learn how to analyze their efficiency and effectiveness. The course begins with an introduction to basic concepts in algorithmic analysis, setting the foundation for understanding and evaluating algorithms. Students then delve into the fundamentals of algorithm design, including the importance of algorithmic efficiency and the use of the Big-O notation to analyze algorithm complexity. The course covers a range of classic algorithms and problem-solving techniques. Students learn about linear and binary search problems, as well as different sorting algorithms such as bubble sort, heap sort, quicksort, merge sort, insertion sort, and selection sort. These algorithms are studied in detail, including their underlying principles and step-by-step implementation. Graph algorithms are also a key focus of the course. Students explore different graph searching techniques, including depth-first search, and learn about the shortest path algorithm.			

Module 20

Code	Course/Module Title	ECTS	Semester
NSDC202	Numerical Analysis	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
This course provides students with a comprehensive understanding of numerical methods and techniques used in solving mathematical problems and equations. Throughout the course, students will explore various direct and iterative methods for solving linear systems of equations, as well as numerical analysis methods for differential and integral equations. The course begins with an introduction to direct methods for solving linear systems of equations. Students learn about Gaussian elimination methods, including simple Gaussian elimination, Gaussian elimination with partial pivoting, and Gauss-Jordan method. Determinant evaluation and LU decompositions, such as Doolittle's LU decomposition and Doolittle's method with row interchange, are also covered. Iterative methods for solving linear systems of equations are then introduced. Students study iterative methods like the Jacobi iteration, Gauss-Seidel method, and Successive Over Relaxation (SOR) method. The course also covers other numerical analysis techniques such as the Newton-Raphson method for finding roots of equations, the Runge-Kutta method for solving ordinary differential equations, and interpolation techniques using the Lagrange polynomial. Data approximation and Neville's method are explored for approximating functions from given data points.			

Module 21

Code	Course/Module Title	ECTS	Semester
NSDC207	Computer Networks	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The Computer Networks course provides an introduction to the fundamental concepts and principles of computer networks. Students will explore topics related to the structure, operation, and design of computer networks. The course begins with an overview of computer networks and the TCP/IP model, which serves as the foundation for modern networking. It then delves into switching techniques and their relationship to the TCP/IP layers. Circuit-switched networks and packet-switched networks are discussed, including their phases, efficiency, and delay. The data-link layer is explored, covering services, addressing, and protocols such as ARP (Address Resolution Protocol). Error detection and correction techniques are examined, including types of errors, redundancy, and block coding. Cyclic codes and the Cyclic Redundancy Check (CRC) are also covered. Data link control services, including framing, flow control, and error control, are studied. The differentiation between connectionless and connection-oriented services is explored. Media access control methods, such as random access (e.g., ALOHA), Carrier Sense Multiple Access (CSMA), and Controlled Access, are discussed. The course also covers network layer design issues and addresses routing, IPv4, and IPv6.			

Module 22

Code	Course/Module Title	ECTS	Semester
NSDC213	Web Design	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
This comprehensive web design course explores the essential skills required to envision, develop, and program captivating internet sites and web pages. Students will master the art of combining text, sounds, pictures, graphics, and video clips to create engaging online experiences. With a strong emphasis on design principles and layout techniques, participants will learn how to craft visually appealing websites from scratch or enhance existing ones. Through hands-on projects and practical exercises, aspiring web designers will gain the expertise needed to transform their creative visions into compelling digital interfaces.			

Module 23

Code	Course/Module Title	ECTS	Semester
NSDE211	Object Oriented Programming II	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
This course builds upon the foundational concepts of object-oriented programming and delves deeper into advanced topics and techniques. Students will explore various aspects of object-oriented programming, including operator overloading, inheritance, and polymorphism. The course begins with an introduction to operator overloading, allowing students to redefine operators to work with custom classes. The use of member functions for operator overloading is also covered. Access control in base classes is discussed, including the use of public, protected, and private members. Inheritance is introduced, enabling the creation of derived classes that inherit properties and behaviors from base classes. The course covers constructors, destructors, and their relationship with inheritance. Passing parameters to base class constructors and accessing members of the parent class are explored. Method overriding in Python inheritance is discussed, allowing derived classes to redefine methods inherited from base classes. Examples and exercises on inheritance are provided. Other topics covered include composition, multilevel inheritance, and hierarchal and hybrid inheritance. The concept of polymorphism, which allows objects of different classes to be treated as objects of a common superclass, is also covered.			

Module 24

Code	Course/Module Title	ECTS	Semester
NSDC205	Microprocessors	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	93	32
Description			
The Microprocessor course provides students with a comprehensive understanding of microprocessors, with a specific focus on the 8086 microprocessor architecture and its programming. The course begins with an introduction to microprocessors, highlighting their importance and applications. The architecture of the 8086 microprocessor is then explored, covering topics such as registers, memory segmentation, addressing modes, and the flag register. Different operating modes of the 8086 microprocessor, including minimum mode and maximum mode, are discussed, along with concepts such as interrupts and direct memory access (DMA). The instruction set of the 8086 microprocessor and assembly language programming are covered in detail. Students learn about program structure, string and array manipulation instructions, as well as arithmetic and logic instructions.Advanced topics in assembly language programming are introduced, providing students with a deeper understanding of the subject. This includes an exploration of the architecture of the 80386 microprocessor, signals description, buses, memory models, logical and physical addresses with paging.			

Module 25

Code	Course/Module Title	ECTS	Semester
NSDC305	Visual Programming I	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The Visual Programming course is designed to introduce students to the fundamentals of visual programming using the C# programming language and the Visual Studio IDE. The course begins with an overview of visual programming, highlighting its significance and applications. In Week 2, students are introduced to the C# programming language and the Visual Studio IDE, which are widely used for developing visual applications. Students then delve into the basics of C# programming, covering topics such as variables, data types, operators, and control structures like if-else statements and loops. They also learn about arrays, including 1-D and 2-D arrays, which are essential for storing and manipulating data. The course further explores functions in C#, including methods overloading and recursion, allowing students to write modular and efficient code. Introduction to strings, regular expressions, and concepts like structs and enums are also covered. A significant portion of the course focuses on object-oriented programming (OOP) in C#. Students learn the principles of OOP and how to create classes, objects, and methods in C#. This knowledge enables them to design and develop more robust and reusable code.			

Module 26

Code	Course/Module Title	ECTS	Semester
NSDE309	Database Management Systems	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The Database Management System (DBMS) course covers the fundamental concepts and principles of managing data using a DBMS. The syllabus is structured to provide students with a comprehensive understanding of database design, query languages, and normalization techniques. The course begins with an introduction to DBMS, highlighting its importance in modern information systems. Students learn about the view of data, data abstraction, and the distinction between instances and schemas. Distributed database design is explored also. Database languages, including Data Definition Language (DDL) and Data Manipulation Language (DML), are introduced, enabling students to create and manipulate database structures. Conceptual database design is covered using Entity-Relationship (ER) modeling, which helps students understand the process of mapping real-world entities and their relationships into a database model.The relational data model is introduced, emphasizing the concept of keys and their types. Students learn relational algebra and relational calculus, which are essential for querying and manipulating relational databases. Structured Query Language (SQL) is extensively covered. Domain Relational Calculus (DRC) and its examples are presented as an alternative query language. The course also covers schema refinement, decompositions, and the concept of functional dependencies, which form the basis for normalization techniques.			

Module 27

Code	Course/Module Title	ECTS	Semester
NSDC306	Wireless Networks	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The Wireless Network course provides an in-depth understanding of wireless communication technologies and their applications. The syllabus covers various topics related to wireless networks, including protocols, transmission control, access methods, and network architectures. The course begins with an introduction to wireless communications, discussing the basics of wireless transmission and the significance of wireless networks in modern communication systems. Layering and the end-to-end argument are discussed, highlighting the importance of protocol layering in wireless network design. Transmission Control Protocol (TCP) is covered. The course delves into TCP over wireless networks, addressing the issues of packet loss, latency, and congestion control in wireless communication. Different access methods such as FDMA, TDMA, CDMA, and contention-based sharing (Ethernet) are explored. Link layer protocols, specifically MACA and MACAW, are also discussed. The course covers wireless mesh networks and the challenges of routing in such networks, including diversity routing techniques. Cellular wireless networks, their architectures, and protocols are introduced, highlighting their importance in providing wide-area wireless coverage.			

Module 28

Code	Course/Module Title	ECTS	Semester
NSDC303	Web Programming	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
This course provides a comprehensive introduction to web programming using PHP. Students will explore the fundamental concepts and syntax of PHP, understanding its role as a scripting language and its wide range of applications. Topics covered include PHP data types, variables, constants, operators, and comments. Students will gain proficiency in PHP control structures, including if-else statements and switch cases, as well as different types of loops. The course also delves into working with strings, functions, and date/time functions in PHP. Students will learn about regular expressions, form handling using GET and POST methods, session and cookie management, file handling, email sending, and database connectivity with MySQLi functions. By the end of the course, students will have a solid foundation in PHP programming and be able to develop dynamic web applications.			

Module 29

Code	Course/Module Title	ECTS	Semester
NSDE308	Digital Signal Processing I	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
This course provides an introduction to the fundamental principles and techniques used in the field of DSP. Students will explore the concept of signal sampling and quantization, gaining an understanding of the conversion process from analog to digital signals and vice versa. The course covers digital signals and systems, focusing on linear time-invariant and causal systems. Students will learn methods for signal manipulation and the format of the difference equation, which enables the representation and analysis of digital signals. The topic of digital convolution will be extensively covered, including the methods used for its computation. The course also introduces the Fourier Transform and its application in analyzing the frequency content of digital signals. Students will learn how to apply the Fourier Transform to various signal processing tasks. The course concludes with a study of digital filters, including their design and implementation.			

Module 30

Code	Course/Module Title	ECTS	Semester
NSCC401	Operating Systems	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The Operating System course provides an overview of the fundamental concepts and functions of operating systems. The syllabus covers a wide range of topics related to operating system design, management, and operation. The course begins with an overview of operating systems, discussing their role, importance, and various types of operating systems. Students learn about the operations and functions performed by operating systems, including process management, memory management, file system management, and I/O management. Process description and control are covered, focusing on how the operating system manages and schedules processes, allocates resources, and handles process synchronization. Threads, which represent the smallest unit of execution within a process, are discussed, emphasizing their benefits and challenges in achieving concurrent execution.			

Module 31

Code	Course/Module Title	ECTS	Semester
NSDE301	Software Engineering	4	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
The software engineering course provides students with a comprehensive understanding of software engineering principles, processes, and metrics. The syllabus covers a wide range of topics related to software development, management, and measurement. The course begins with an introduction to software engineering, highlighting its importance and the evolving role of software in various domains. Students learn about the characteristics of software and the fundamental principles of software engineering. The characteristic of a software engineer and the software application development process are discussed, along with the challenges and potential crises in the field. By the end of the course, students will have a solid foundation in software engineering principles, process models, and metrics. They will be equipped with the knowledge and skills to effectively manage software projects, measure software quality, and make data-driven decisions to improve software development processes.			

Module 32

Code	Course/Module Title	ECTS	Semester
NSDC304	Visual Programming II	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
The Visual Programming 2 course focuses on further enhancing students' knowledge and skills in graphical user interface (GUI) development using C# and Windows Forms. The syllabus covers various topics related to Windows Forms, advanced user interface enhancement, error handling, ADO.Net data access components, and web development with C#. The course begins with an introduction to Windows Forms, providing an overview of GUI development using this technology. Students learn how to create simple GUI applications using Windows Forms and explore the properties, methods, and events associated with forms. By the end of the Visual Programming 2 course, students will have a solid understanding of Windows Forms, advanced GUI development concepts, error handling, data access, and introductory web development using C#. They will be equipped to develop sophisticated Windows Forms applications and have a foundation for further exploration of web development with C#.			

Module 33

Code	Course/Module Title	ECTS	Semester
NSCE302	Multimedia	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The Multimedia course provides students with a broad understanding of multimedia technology and its applications across various domains. The course covers a wide range of topics related to multimedia creation, editing, compression, integration, and distribution. Students begin with an introduction to multimedia, exploring its definition, components, and the role it plays in various industries. They learn about multimedia data basics, including different types of media elements such as text, images, audio, and video, and their characteristics. The course dives into multimedia creation and editing, teaching students how to use multimedia tools and software to manipulate graphics, images, audio, and video. They gain hands-on experience in tasks such as image editing, audio and sound editing, video editing, and animation creation. By the end of the Multimedia course, students will have a comprehensive understanding of multimedia technology and its applications. They will be equipped with the skills to create, edit, compress, integrate, and distribute multimedia content across various domains. They will also be aware of the ethical and legal considerations involved in multimedia production and usage.			

Module 34

Code	Course/Module Title	ECTS	Semester
NSDE312	Distributed Database Management Systems	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
This comprehensive course in Distributed Database Management Systems (DDBMS) offers a deep exploration of the fundamental principles and advanced concepts necessary for effectively managing distributed databases. Over the span of 15 weeks, students will delve into a wide range of topics, beginning with an introduction to DDB and its significance in modern database management systems. The syllabus progresses to cover key aspects such as DDB architecture, components of DDBMS, levels of data and process distribution, DDB integrity, and distributed database transparency features. Participants will also gain practical insights into query processing and optimization techniques, with a focus on query cases and transaction transparency. The course includes a detailed examination of the DO-UNDO-REDO protocol for managing transactions in a distributed environment. Moreover, students will acquire knowledge and skills in distributed database design, data replication, allocation strategies, data recovery methods, and efficient data storage and retrieval mechanisms.			

Module 35

Code	Course/Module Title	ECTS	Semester
NSDC307	Network Programming	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The Network Programming course provides students with the knowledge and skills necessary to develop applications that communicate over computer networks. The course covers various topics related to network programming, web basics, and Python programming. Students begin with an introduction to network programming, understanding the basics of networking and its significance in the modern digital world. They learn about different network protocols, network layers, and the client-server model. By the end of the Network Programming course, students will have the skills to develop networked applications using Python. They will be familiar with networking concepts, socket programming, web development basics, and GUI programming. They will be able to design and implement client-server applications, work with different network protocols, and integrate network functionality into their Python applications.			

Module 36

Code	Course/Module Title	ECTS	Semester
NSDE313	Digital Signal processing II	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	63	62
Description			
This course explores advanced concepts in digital signal processing, focusing on the discrete Fourier transform (DFT), inverse discrete Fourier transform (IDFT), and digital filter design. Students will gain a deep understanding of the DFT and IDFT, their properties, and their application in analyzing frequency content. The Fast Fourier Transform (FFT) and its efficient computation methods, such as decimation-in-frequency and decimation-in-time, will be covered. Additionally, the course covers the difference equation, digital filter structures (FIR and IIR), and their implementation. Practical aspects, such as speech enhancement and filtering, will be addressed. Z-transform will also be covered. By the end of the course, students will possess the skills to apply discrete Fourier transform techniques, utilize the FFT algorithm, and design digital filters for signal processing tasks.			

Module 37

Code	Course/Module Title	ECTS	Semester
NSDC408	Network Protocols & Services	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
The Network Protocol and Services course provides students with a comprehensive understanding of network protocols and the services they offer. The syllabus covers various topics related to network architectures, protocol models, and specific protocols used in networking. The course begins with an overview of networks, protocols, and services, defining their roles and importance in modern communication systems. Students learn about the OSI network architecture and the TCP/IP four layers architecture model, understanding the functions of each layer. Students explore different network architecture models, including IBM SNA, gaining insights into their design principles and applications. By the end of the Network Protocol and Services course, students will have a deep understanding of network protocols and the services they provide. They will be familiar with various protocol models, application layer protocols, transport layer protocols, network layer protocols, and data link layer protocols. They will be able to analyze and troubleshoot network communication issues, design network architectures, and select appropriate protocols for specific networking requirements.			

Module 38

Code	Course/Module Title	ECTS	Semester
NSDC413	Information Security	4	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
The Information Security course provides students with a comprehensive understanding of the principles and techniques used to protect information and ensure its confidentiality, integrity, and availability. The syllabus covers various topics related to information security models, encryption techniques, mathematical foundations, and practical applications. The course begins with an introduction to information security, emphasizing its importance in today's interconnected world. Students learn about the goals of information security, the principles of confidentiality, integrity, and availability, and the various threats and vulnerabilities faced by information systems. By the end of the Information Security course, students will have a solid understanding of information security principles, encryption techniques, and mathematical foundations. They will be equipped with the knowledge and skills to analyze and evaluate security models, design secure systems, and implement cryptographic algorithms. Additionally, students will gain insights into the practical applications of encryption in real-world scenarios and understand the importance of selecting appropriate modes of operation for secure data transmission.			

Module 39

Code	Course/Module Title	ECTS	Semester
NSDC405	Web Application Development I	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
This course focuses on ASP.NET, a robust web application framework developed by Microsoft, designed to empower developers in creating dynamic websites. It provides the flexibility to utilize powerful programming languages such as C# or VB.NET for seamless web application development. ASP.NET serves as a free web framework for constructing websites and web applications using HTML, CSS, and JavaScript. It encompasses the technology required for developing, deploying, and running web applications. As an integral part of the Microsoft .NET Framework, ASP.NET leverages all the features available within the framework, granting developers access to a wide range of classes. By the end of this course, students will have gained practical skills in building web applications using ASP.NET, along with a comprehensive understanding of the underlying .NET Framework.			

Module 40

Code	Course/Module Title	ECTS	Semester
NSCC412	Research Methodology	4	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
The Research Methodology course provides students with the necessary knowledge and skills to conduct effective research in various fields. The syllabus covers a wide range of topics related to the research process, from formulating the research problem to presenting the research findings. The course begins with an introduction to research methodology, where students learn about the definition and importance of research in generating new knowledge. They understand the various approaches and methods used in research and gain an overview of the research process. By the end of the Research Methodology course, students will have acquired the knowledge and skills necessary to conduct research in their respective fields. They will be equipped with a solid understanding of the research process, including formulating research problems, collecting and analyzing data, and presenting research findings. The course prepares students to undertake research projects effectively and contributes to their overall research and analytical skills.			

Module 41

Code	Course/Module Title	ECTS	Semester
NSDC407	Mobile Computing	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
The Mobile Computing course is designed to provide students with a comprehensive understanding of mobile computing technologies and their applications. The syllabus covers a wide range of topics that are crucial in the field of mobile computing. The course begins with an introduction to mobile computing, highlighting its key elements and concepts. Students then delve into wireless communication techniques, including duplexing and multiple access techniques such as FDMA and TDMA. The course explores specific mobile communication standards like GSM (2G), UMTS (3G), and LTE (4G), along with their respective components and subsystems. Students also learn about USIM, UTRAN, and the architecture of mobile cloud computing. By the end of the course, students will have gained a solid foundation in mobile computing, enabling them to design and develop mobile applications, understand mobile network protocols, and adapt to the evolving landscape of mobile technologies.			

Module 42

Code	Course/Module Title	ECTS	Semester
NSDC409	Artificial Intelligence I	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The Artificial Intelligence I course provides students with an introduction to the field of artificial intelligence and covers foundational topics in problem-solving and logical reasoning. The syllabus includes a comprehensive range of topics that form the building blocks of AI. The course begins with a general introduction to AI, followed by an exploration of the history of AI and its evolution over time. Students then dive into systematic search techniques, focusing on graph concepts and state space representation of problems. Different search algorithms such as depth-first search, breadth-first search, and hybrid search are studied and applied to problem-solving scenarios. By the end of the course, students will have gained a solid foundation in AI, including problem-solving techniques and logical reasoning. They will be equipped with the fundamental knowledge and skills necessary to pursue more advanced topics in artificial intelligence.			

Module 43

Code	Course/Module Title	ECTS	Semester
NSDC406	Network Switching and Routing	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	93	32
Description			
The Network Switching and Routing course provides a comprehensive overview of the principles, strategies, and protocols involved in switching and routing within computer networks. The syllabus covers various topics related to the benefits and drawbacks of switching and routing, their internal structures, and the strategies employed in forwarding and filtering traffic. Students learn about the fundamentals of routing, including the process of finding paths, routing devices, and different types of routes such as static and dynamic routes. Throughout the course, students engage with practical examples and discussions on the application of switching and routing concepts in real-world network scenarios. By the end of the course, students will have a solid understanding of network switching and routing principles, protocols, and strategies, enabling them to design and configure efficient and reliable computer networks.			

Module 44

Code	Course/Module Title	ECTS	Semester
NSDC404	Networks Security	4	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			

The Network Security course provides a comprehensive introduction to the principles, techniques, and tools used in securing computer networks. The syllabus covers a wide range of topics related to network security, including cryptography, access control, malware, encryption algorithms, and web security.

The course begins with an overview of network security, highlighting the importance of protecting information and resources within a networked environment. Students are introduced to public-key cryptography and the Public Key Infrastructure (PKI), exploring concepts such as encryption, decryption, digital signatures, and certificate authorities.
Throughout the course, students engage in practical exercises, case studies, and discussions to reinforce their understanding of network security concepts and their application in real-world scenarios. By the end of the course, students will have a solid foundation in network security principles and techniques, enabling them to analyze, design, and implement secure network solutions.

Module 45

Code	Course/Module Title	ECTS	Semester
NSDE411	Artificial Intelligence II	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			

The Artificial Intelligence 2 course focuses on advanced topics in artificial intelligence and expands upon the foundational concepts covered in an introductory AI course. The syllabus includes various techniques and algorithms used in heuristic search, game playing, expert systems, and dealing with uncertainty.

The course begins by introducing heuristic search algorithms and the role of heuristic functions in guiding search processes. Students learn about algorithms like Hill Climbing, Best-First Search, and A* that utilize heuristics to efficiently navigate problem spaces and find optimal solutions.
Throughout the course, students engage in practical exercises, problem-solving tasks, and discussions to apply the learned concepts. By the end of the course, students will have a deeper understanding of advanced AI techniques and their applications in heuristic search, game playing, and expert systems, equipping them with the knowledge to tackle more complex AI problems.

Module 46

Code	Course/Module Title	ECTS	Semester
NSDC403	Web Application Development II	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
In this course, we explore the utilization of ADO.NET for efficient data access implementation in ASP.NET applications. ADO.NET consists of two pivotal components: Data Providers and DataSet. The Data Provider classes are designed to seamlessly interact with diverse data sources, enabling comprehensive data management operations on specific databases. On the other hand, the DataSet component provides a disconnected representation of result sets from the Data Source, offering complete independence from the original data source. Throughout the course, students will delve into crucial topics encompassing database programming in ASP.NET applications, gaining essential knowledge and practical skills in this domain. By the end of the course, students will have a solid understanding of ADO.NET and its role in facilitating effective data access in web applications.			

Module 47

Code	Course/Module Title	ECTS	Semester
NSDC410	Project in Computer Networks Systems	11	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	6	93	182
Description			
The "Project in Computer Network Systems" is a course designed for fourth-year college students focusing on the practical application of computer network concepts and technologies. In this course, students undertake a hands-on project that involves designing, implementing, and evaluating a computer network system. The course aims to provide students with the opportunity to apply their knowledge and skills acquired in previous networking courses to real-world scenarios. It focuses on enhancing their problem-solving abilities, teamwork, project management, and communication skills. Throughout the course, students work in teams to identify a network-related problem or opportunity and develop a project proposal outlining their objectives, scope, and deliverables. They then proceed with the implementation phase, where they design and configure network components, such as routers, switches, servers, and security mechanisms. By the end of the course, students will have gained practical experience in designing, implementing, and evaluating computer network systems. They will have strengthened their teamwork, problem-solving, and project management skills, preparing them for future careers in the field of computer networks and network administration.			

Contact

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Ministry of Higher Education and Scientific Research
UNIVERSITY OF ANBAR
COLLEGE of COMPUTER SCIENCES AND INFORMATION TECHNOLOGY
DEPT. COMPUTER NETWORKS SYSTEMS

وزارة التعليم العالي والبحث العلمي
جامعة الأنبار
كلية علوم الحاسوب وتكنولوجيا المعلومات
قسم أنظمة شبكات الحاسوب

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Networks Fundamentals**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CNDC114				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	First Class		**Semester of Delivery**		
Administering Department	NSD		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	A fundamental course in computer networks typically covers the basics of networking concepts and technologies. The course is designed to provide students with a foundational understanding of how computer networks operate, how data is transmitted between devices, and the protocols and technologies that facilitate communication.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes for a Networks Fundamentals module typically focus on ensuring that students acquire a comprehensive understanding of basic networking concepts and are able to apply that knowledge in practical scenarios. Here are some example learning outcomes for such a module
Indicative Contents المحتويات الإرشادية	introduction to networks basics of network protocols communications the OSI and TCP/IP networking models IP addressing and subnetting IP networks Network analysis techniques configuration of networking devices

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Hands-On Practice Simulations and Virtual Labs Case Studies Interactive Learning Resources Group Projects Problem-Solving Scenarios Visualization Techniques Progress Monitoring

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment					

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Networking: • Definition and importance of computer networks.
Week 2	Network Topologies: • Bus, star, ring, and mesh topologies. • Advantages and disadvantages of each topology.
Week 3	Networking Devices: Routers, switches, hubs, and bridges. Their functions and roles in a network.
Week 4	OSI Model: • Overview of the OSI (Open Systems Interconnection) model.

	• Explanation of each layer's functions (physical, data link, network, transport, session, presentation, application).
Week 5	TCP/IP Protocol Suite: • Explanation of the TCP/IP protocol stack. • Role of each layer in the TCP/IP model.
Week 6	IP Addressing: • IPv4 and IPv6 addressing. • Subnetting and CIDR notation.
Week 7	Routing and Switching: • Basic concepts of routing. • Introduction to routing algorithms. • Switching techniques and VLANs (Virtual LANs
Week 8	Network Security: • Basics of network security. • Firewalls, encryption, and secure communication protocols
Week 9	Wireless Networking: • Wi-Fi standards and protocols. • Security considerations in wireless networks.
Week 10	Introduction to the Internet: • How the Internet works. • Internet infrastructure and key components.
Week 11	Application Layer Protocols: • HTTP/HTTPS, FTP, DNS, SMTP. • Overview and functions of common application layer protocols
Week 12	Network Management: • Basics of network monitoring and management. • SNMP (Simple Network Management Protocol).
Week 13	Network Troubleshooting: • Common network issues and how to troubleshoot them. • Use of network diagnostic tools.
Week 14	Emerging Technologies: • Introduction to emerging technologies such as IoT (Internet of Things) and SDN (Software-Defined Networking).
Week 15	Ethical and Legal Considerations: • Ethical issues related to network usage.

	• Legal aspects of network communication and data transmission
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to laboratory equipment and safety procedures
Week 2	Identify and describe the functions of common networking devices.
Week 3	Basic Network Configurations
Week 4	TCP/IP Configuration and Troubleshooting
Week 5	Configure VLANs and practice switching.
Week 6	Set up and secure a wireless network
Week 7	Use network management tools to monitor and manage network resources.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Integrated Electronics Analog and Digital & System. Author – Jacob Millman. Christos C. Halkias	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Ministry of Higher Education and Scientific Research
UNIVERSITY OF ANBAR
COLLEGE of COMPUTER SCIENCES AND INFORMATION TECHNOLOGY
DEPT. COMPUTER NETWORKS SYSTEMS

وزارة التعليم العالي والبحث العلمي
جامعة الأنبار
كلية علوم الحاسوب وتكنولوجيا المعلومات
قسم أنظمة شبكات الحاسوب

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics**			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CCIT 060				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level			**Semester of Delivery**		
Administering Department	CND		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Core Mathematical Knowledge: The course aims to provide students with a solid foundation of core mathematical concepts and theories. This includes topics such as algebra, calculus, geometry, discrete mathematics, probability, and statistics. The aim is to ensure that students have a comprehensive understanding of fundamental mathematical principles.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand and Apply Mathematical Concepts: Demonstrate a thorough understanding of mathematical concepts, theories, and techniques relevant to the module. Apply these concepts to solve mathematical problems and analyze mathematical structures and relationships.
Indicative Contents المحتويات الإرشادية	Calculus Linear Algebra Discrete Mathematics Probability and Statistics Differential Equations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Hands-on Practical Exercises Case Studies and Real-World Examples Collaborative Learning Continuous Assessment and Feedback

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Functions: Function Definition, Domain and range of functions, Graphing of function
Week 2	Limits: Definition of limits, Theorems of limits, Type of limits
Week 3	The Definition and Interpretation of the Derivative
Week 4	Properties of Derivative , Some laws of derivatives
Week 5	Derivatives of the six trig functions
Week 6	Exponential Functions, Logarithm Functions
Week 7	Inverse Sine, Inverse cosine

Week 8	Inverse tangent, Alternate Notation
Week 9	The six hyperbolic trigonometric functions I
Week 10	The six hyperbolic trigonometric functions II
Week 11	The two forms of the chain rule
Week 12	Using the chain rule
Week 13	first derivative, second derivative, third derivative.
Week 14	logarithms
Week 15	the properties of logarithms
Week 16	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	George B. Thomas, Jr., Maurice D. Weir, Joel Hass, THOMAS' CALCULUS: EARLY TRANSCENDENTALS, Twelfth Edition, Pearson Education, Inc., 2010.	
Recommended Texts	Howard Anton, Irl Bivens, Stephen Davis, CALCULUS, 10th Edition, John Wiley & Sons, Inc., 2012.	
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Logic 1**			**Module Delivery**	
Module Type	Core			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**CNDC109**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**First Class**		**Semester of Delivery**		
Administering Department	CND		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims to provide students with a solid understanding of digital logic principles and concepts. Students learn about Boolean algebra, logic gates, truth tables, and digital logic circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Demonstrate a solid understanding of digital logic principles, including Boolean algebra, logic gates, truth tables, and the concept of binary representation.
Indicative Contents المحتويات الإرشادية	Introduction to Digital Logic Combinational Logic Design Arithmetic circuits Sequential Logic Design Circuit Testing and Verification

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding Problem-Solving Approach Hands-on Laboratory Experience Design Projects Simulation and Modeling Problem-Based Learning

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction: Digital System
Week 2	Number Systems
Week 3	Octal and Hexadecimal Numbers
Week 4	Number base conversion
Week 5	Theories of Boolean Algebra
Week 6	Digital Logic gates
Week 7	Boolean Expression and Truth table
Week 8	Sum Of Product Simplification
Week 9	Product Of Sum Simplification
Week 10	Exclusive OR
Week 11	NAND gates
Week 12	NOR gates
Week 13	Two- and Three-Variables Karnaugh Maps.

Week 14	Four Variables Karnaugh Maps.
Week 15	Quine-McCluskey method
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to logic gates: AND, OR, NOT
Week 2	Constructing truth tables for basic logic operations
Week 3	Designing and building simple logic circuits using logic gates
Week 4	Verifying the functionality of logic circuits through experimentation
Week 5	Boolean algebra and simplification technique
Week 6	Applying Boolean algebra to simplify logic circuits
Week 7	Advanced logic gates: XOR, NAND, NOR

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Digital fundamentals, Thomas L. Floyd, 11th edition Digital Design, Morris Mano, 4th edition	
Recommended Texts	An Introduction to Logic Technology Fundamentals of logic design	
Websites		

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks (%)**	**Definition**

Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Information Technology**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CNDC110				
ECTS Credits	6				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**		
Administering Department	CND		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Develop technical skills: The primary aim of an IT course is to equip students with the necessary technical skills and knowledge to work effectively in the field of information technology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand fundamental concepts: Demonstrate a solid understanding of fundamental concepts in information technology, including computer systems, networks, databases, programming languages, and software development methodologies.
Indicative Contents المحتويات الإرشادية	Introduction to Information Technology: Overview of information technology concepts, principles, and applications. Historical development and evolution of IT. Ethical, legal, and societal considerations in IT.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Hands-on Practical Exercises Case Studies and Real-World Examples Collaborative Learning Continuous Assessment and Feedback

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	AII
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of Computers and Programming
Week 2	Computer history and generation
Week 3	Generation of Computers & Computer hierarchy
Week 4	Basic Computer Components
Week 5	Computer function (fetch cycle, interrupt cycle, I/O function
Week 6	Semiconductor main memory (RAM, ROM, CACHE)
Week 7	Secondary Storage
Week 8	Memory and storage organization
Week 9	Computer Software (Application software)
Week 10	Middleware
Week 11	Operating Systems
Week 12	Telecommunications systems
Week 13	Computer networks and applications
Week 14	Protocols in networking
Week 15	Layers of the OSI Model
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Networking fundamentals: setting up a local area network (LAN)
Week 2	Network configuration and troubleshooting exercises
Week 3	Introduction to web development: HTML and CSS basics
Week 4	Database management system exercises: advanced SQL queries
Week 5	Mobile app development: creating a simple mobile application
Week 6	IT support and helpdesk management scenarios
Week 7	Troubleshooting and problem-solving in IT environments

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Ralph M. Stair & George W. Reynolds, *Principles of Information Systems*, Ninth Edition, Cengage Learning, 2010. Behrouz A. Forouzan, *Data Communications and Networking*, Fifth Edition, McGraw-Hill, USA, 2013.	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English**			**Module Delivery**	
Module Type	Support			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOA 010				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	**First Class**		**Semester of Delivery**		
Administering Department	CND		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Enhance Language Proficiency: The course aims to enhance students' language proficiency in English, including their reading, writing, speaking, and listening skills. It focuses on improving grammar, vocabulary, pronunciation, and overall communication abilities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Developing advanced reading comprehension skills and critical analysis of various texts. Enhancing writing skills across different genres and formats. Improving oral communication and presentation skills. Expanding language proficiency in English, including grammar, vocabulary, and pronunciation. Analyzing and interpreting literary works from diverse genres and periods. Conducting effective research and demonstrating information literacy. Cultivating critical thinking skills and forming well-supported opinions. Enhancing intercultural communication and understanding. Fostering creativity and imaginative expression through literature and writing. Cultivating a love for lifelong learning in the field of English.
Indicative Contents المحتويات الإرشادية	Study of various literary genres, such as poetry, drama, and prose. Analysis of literary works from different periods and cultural contexts. Development of critical reading and interpretation skills. Exploration of language and linguistics, including grammar, syntax, and phonetics. Introduction to literary theories and their application in analyzing texts. Practice in academic writing, including essay composition and research skills. Development of oral communication and presentation skills. Examination of cultural and historical contexts that influence literature. Integration of technology and digital resources in language and literary studies. Opportunities for creative writing and expression.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Active Reading and Textual Analysis

	Collaborative Learning Writing Workshops and Feedback Technology Integration Creative Expression

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.	1			
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment					

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Student life

	• Reading- ways of reading: reading method • Writing – punctuation, Linking ideas, rules
Week 2	Student life Part of speech- identifying nouns, verbs, adjective, adverbs, and prepositions.
Week 3	Daily routines: • Predicting content • Skimming
Week 4	Daily routines: Words that go together (Collocations, Rules)
Week 5	People and the environment • Scanning- using headings • Meaning from context • Writing (punctuation and rules)
Week 6	Architecture Making notes: notes from study (intensive) reading, labelling diagrams
Week 7	Architecture • Writing about a building – word and phrases • (language to describe buildings)
Week 8	Education • Universities – predicting content, linking ideas • Writing a letter or email
Week 9	Education Spelling rules for plural countable nouns
Week 10	Technology • Reading (invention) Writing (Describing things- writing adscription of advice
Week 11	Food, drink, and culture • Topic sentence: using a topic sentence to help understanding Writers opinion: identifying the writer's opinion
Week 12	• Writing (punctuation ((commas)), linking ideas ((in addition, and using pronouns: avoiding repetition. Prefixes and their meanings
Week 13	Cities of the world • Reading (looking at data: tables charts, and graphs. • Writing (Rules :comparatives and superlatives , linking ideas ; using relative pronouns which and where .
Week 14	Brain Power • Reading: using pronouns and synonyms to avoid repetition. • Writing (common mistakes; typical grammar error , summaries: summarizing the main points of a text
Week 15	Staying alive • Reading: Dangerous diseases of our time • Writing (number in texts ((words or figures? Writing numbers, learning : synonyms and antonyms).
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Headway Plus Beginner	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

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جامعة الأنبار
كلية علوم الحاسوب وتكنولوجيا المعلومات
قسم أنظمة شبكات الحاسوب

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	C++I			**Module Delivery**	
Module Type	Core			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CNDC107				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1		**Semester of Delivery**		
Administering Department	CND		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to introduce students to the fundamentals of programming using the C++ language. Students learn programming concepts such as variables, data types, control structures, functions, and objects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Develop proficiency in the C++ programming language, including a strong understanding of its syntax, semantics, data types, control structures, functions, and object-oriented programming concepts.
Indicative Contents المحتويات الإرشادية	Introduction to C++ Programming Object-Oriented Programming (OOP) in C++ C++ Standard Library Memory Management in C++ Data Structures and Algorithms in C++ C++ Application Development

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding: Hands-on Practice Code Review and Feedback Problem-Solving Exercises

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Overview to Programming Language
Week 2	Algorithms and Flow Charts
Week 3	C++ program structure
Week 4	Data Types and variables
Week 5	Input/ output statements
Week 6	Unary Minus Increment and /decrement Operators.
Week 7	Assignment , Relational ,Logical, Bitwise and Logical operations.
Week 8	Control structures
Week 9	Conditional statements: If and if-else
Week 10	Switch statements
Week 11	The Switch Selection Statement
Week 12	Looping statements
Week 13	Do/While Statement
Week 14	For Statement
Week 15	Break and Continue Control Statements Nested Loops
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Arrays and strings in C++
Week 2	Functions: defining, calling, and passing arguments
Week 3	Pointers and memory management in C++
Week 4	Dynamic memory allocation with new and delete operators
Week 5	Classes and objects in C++
Week 6	Operator overloading in C++
Week 7	Standard Template Library (STL) in C++

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	K. Venugopal and Raj Buyya, *Mastering C++*, McGraw Hill Education, 1997.	
Recommended Texts		
Websites	https://www.learncpp.com/ https://www.w3schools.com/CPP/default.asp	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Arabic			**Module Delivery**	
Module Type	Support			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOA001				
ECTS Credits	2				
SWL (hr/sem)	75				
Module Level		**First Class**	**Semester of Delivery**		
Administering Department		NSD	**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The program aims to help students develop proficiency in reading, writing, speaking, and understanding Arabic. This includes expanding vocabulary, improving grammar skills, and enhancing oral communication abilities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Demonstrate proficiency in reading, writing, speaking, and understanding Arabic at an appropriate level. Display a nuanced understanding of Arab culture, history, traditions, and societal norms. Apply knowledge of Arabic linguistics, including phonetics, morphology, syntax, and dialectal variations, to analyze and interpret Arabic texts. Read and comprehend various types of Arabic texts, including literary works, news articles, and academic writings. Produce coherent and well-structured written work in Arabic, demonstrating effective composition skills.
Indicative Contents المحتويات الإرشادية	Introduction to Arabic Language and Culture: Arabic alphabet and pronunciation Basic vocabulary and grammar Intercultural communication and cultural norms Arabic Reading and Writing: Building vocabulary and improving reading comprehension Sentence structure and basic composition Developing writing skills through practice and feedback Intermediate Arabic Language: Expanding vocabulary and enhancing grammar skills Oral communication and conversation practice Reading and analyzing texts of moderate complexity Arabic Literature: Introduction to classical and modern Arabic literature Reading and analyzing short stories, poems, and novels Exploring themes, styles, and literary techniques

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Immersion Communicative Approach Task-based Learning Authentic Materials Technology Integration

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Arabic Language and Culture
Week 2	Arabic Reading and Writing
Week 3	Intermediate Arabic Language
Week 4	Arabic Literature
Week 5	Advanced Arabic Language
Week 6	Arabic alphabet and pronunciation
Week 7	Vocabulary building
Week 8	Sentence structure and basic composition
Week 9	Expanding vocabulary and enhancing grammar skills
Week 10	Reading and analyzing short stories or poem
Week 11	Exploring themes, literary devices, and cultural contexts
Week 12	Reading and analyzing authentic texts of moderate complexity
Week 13	Arabic Translation and Interpretation
Week 14	Practice in translating written texts
Week 15	Review and Assessment
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**C++ II**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CNDC108				
ECTS Credits	**9**				
SWL (hr/sem)	**150**				
Module Level	**1**		**Semester of Delivery**		
Administering Department	NSD		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to provide students with a comprehensive understanding of the C++II programming language. Students learn the syntax, semantics, and features of C++II and gain proficiency in writing efficient and effective code.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Develop proficiency in the C++II programming language, including a strong understanding of its syntax, semantics, data types, control structures, functions, and object-oriented programming concepts. Develop the ability to analyze problems, design algorithms, and implement solutions using C++II programming techniques. Apply critical thinking and logical reasoning to solve programming challenges.
Indicative Contents المحتويات الإرشادية	Introduction to C++ Programming Object-Oriented Programming (OOP) in C++ C++ Standard Library Memory Management in C++ Data Structures and Algorithms in C++ C++ Application Development

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding: Hands-on Practice Code Review and Feedback Problem-Solving Exercises

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4.2

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Function
Week 2	Passing Parameters. Passing by Value. Passing by Reference.
Week 3	Recursive function
Week 4	Pointers
Week 5	Array of One Dimension: Declaration of Arrays.
Week 6	Initializing Array Elements
Week 7	Accessing Array Elements.
Week 8	Read / Write / Process Array Elements.
Week 9	Array of Two Dimension: Declaration of 2D-Arrays.
Week 10	Read / Write / Process
Week 11	Array Elements.
Week 12	String manipulation

Week 13	Member Function of String stdlib Library.
Week 14	Structures
Week 15	Array of Structures.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Review of C++ basics: data types, variables, operators, and control structures
Week 2	Introduction to object-oriented programming (OOP) concepts: classes and objects
Week 3	Implementation of simple classes and objects in C++
Week 4	Inheritance and polymorphism: extending classes and overriding methods
Week 5	Introduction to dynamic memory allocation: new and delete operators
Week 6	Implementation of inheritance and polymorphism in C++
Week 7	File handling: reading from and writing to files

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts		
Recommended Texts	K. Venugopal and Raj Buyya, *Mastering C++*, McGraw Hill Education, 1997.	
Websites	https://www.learncpp.com/ https://www.w3schools.com/CPP/default.asp	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Discrete Mathematics**			**Module Delivery**	
Module Type	Basic			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	CCIT061				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**		
Administering Department	NSD		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to provide students with a solid understanding of the fundamental concepts and principles of discrete mathematics. This includes topics such as sets, logic, proof techniques, functions, relations, and combinatorics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Demonstrate a solid understanding of fundamental concepts in discrete mathematics, including sets, logic, proof techniques, functions, relations, and combinatory. Apply discrete mathematical techniques and methods to solve problems in various contexts, including computer science, algorithms, and cryptography.
Indicative Contents المحتويات الإرشادية	Sets and Logic Proof Techniques Functions and Relations Combinatorics

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Active Learning Concrete Examples and Visualization Step-by-Step Approach Scaffolding Problem-Solving Strategies

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.1
Unstructured SWL (h/sem)	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6

الحمل الدراسي غير المنتظم للطالب خلال الفصل			
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to discrete mathematics
Week 2	Set theory: Set Operations
Week 3	Sequences and Summations
Week 4	Cardinality of Sets and Matrices
Week 5	Logic: Propositional Logic and its applications
Week 6	Mathematical Induction and Recursion
Week 7	Functions: Type of function (one-to-one & invertible function)
Week 8	Geometrical characterization of functions
Week 9	Relation: Computer representation of relations and Digraph
Week 10	Manipulation of relations, Properties of relations Composition of relations
Week 11	Graph theory: Graphs and Graph Models
Week 12	Graph Terminology and Special Types of Graphs
Week 13	Representing Graphs and Graph Isomorphism Connectivity

Week 14	Tree: Introduction to Trees, Applications of Trees
Week 15	Tree Traversal, Spanning Trees
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Ministry of Higher Education and Scientific Research
UNIVERSITY OF ANBAR
COLLEGE of COMPUTER SCIENCES AND INFORMATION TECHNOLOGY
DEPT. COMPUTER NETWORKS SYSTEMS

وزارة التعليم العالي والبحث العلمي
جامعة الأنبار
كلية علوم الحاسوب وتكنولوجيا المعلومات
قسم أنظمة شبكات الحاسوب

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Logic Circuits and Design			**Module Delivery**	
Module Type	Core			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CNDC111				
ECTS Credits	5				
SWL (hr/sem)	150				
Module Level	First Class		**Semester of Delivery**		
Administering Department	NSD		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims to develop students' skills in designing and implementing combinational logic circuits. Students learn how to analyze and design circuits using Boolean expressions, Karnaugh maps, and logic gates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Apply knowledge of combinational logic to design and implement digital circuits using Boolean expressions, Karnaugh maps, and logic gates. Develop the ability to simplify logic expressions and optimize circuit designs
Indicative Contents المحتويات الإرشادية	Introduction to Digital Logic Combinational Logic Design Arithmetic circuits Sequential Logic Design Circuit Testing and Verification

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding Problem-Solving Approach Hands-on Laboratory Experience Design Projects Simulation and Modeling Problem-Based Learning

Student Workload (SWL) الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Combinational Logic: Adder, Subtractor
Week 2	Comparators, Decoders and Encoders
Week 3	Multiplexers (Data Selectors). and DE multiplexers
Week 4	Sequential Logic
Week 5	Latches
Week 6	Flip-Flops: Operating Characteristics
Week 7	Flip-Flop: S-R and J-K Flip-Flops
Week 8	Flip-Flop: Trigger and Delay Flip-Flops
Week 9	Applied Logic
Week 10	Types of Shift Register Data IOS

Week 11	Bidirectional Shift Registers
Week 12	Shift Register Counters
Week 13	Shift Register Applications
Week 14	Ripple Counters
Week 15	Memory and Programmable logic
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Review of propositional logic: syntax, semantics, and truth tables
Week 2	Implementation of propositional logic in a programming language
Week 3	Practice with propositional logic proofs and truth table evaluations
Week 4	Introduction to predicate logic: quantifiers, predicates, and interpretations
Week 5	Practice with predicate logic proofs and interpretation
Week 6	Advanced topics in logic: formal proofs, deduction rules, and logical equivalences
Week 7	Proof strategies and techniques for solving logic problems

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Digital fundamentals, Thomas L. Floyd, 11th edition Digital Design, Morris Mano, 4th edition An Introduction to Logic Technology and Fundamentals of logic design	

Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Networks and Data Communication**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CNDC203				
ECTS Credits	6				
SWL (hr/sem)	**125**				
Module Level	**1**		**Semester of Delivery**		
Administering Department	NSD		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aims of this module are to provide students with a foundational understanding of computer networks and data communication. Through theoretical study and practical application, students will explore key concepts, protocols, and technologies essential for designing, implementing, and managing modern network infrastructures. The module aims to develop students' technical skills in configuring network devices, addressing security concerns, and optimizing network performance. Additionally, it aims to foster critical thinking and problem-solving abilities in analyzing network issues and anticipating future trends in the field. Overall, the module aims to prepare students for professional practice in network engineering, administration, or related areas by equipping them with the knowledge and skills necessary to navigate and succeed in diverse networking environments.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students will understand core concepts and technologies in computer networks, this syllabus provides a comprehensive overview of the Networks and Data Communication course, outlining its objectives, grading structure, schedule, and learning outcomes. By actively participating and completing assignments, students will gain a strong foundation in networking fundamentals, protocols, technologies, and their practical application in various scenarios.
Indicative Contents المحتويات الإرشادية	This syllabus offers a roadmap for the Networks and Data Communication course, encompassing essential networking concepts like models, devices, and protocols. Students will delve into addressing, security, troubleshooting, and emerging technologies like wireless and cloud computing, ultimately aiming to build a solid understanding of network principles, communication, and optimization.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Active Learning Scaffolding Real-World Applications Technology Integration

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment					

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Networking Concepts
Week 2	Network Types and Topologies
Week 3	OSI and TCP/IP models 2 | Network Devices - Physical Layer |
Week 4	Network Interface Cards (NICs)
Week 5	Hubs, Switches, Routers
Week 6	Media and Transmission Characteristics
Week 7	Ethernet
Week 8	IP Addressing and Subnetting

Week 9	Routing Protocols (Static and Dynamic)
Week 10	Routing and Routing Protocols
Week 11	Wired and Wireless Communication
Week 12	Wireless and Mobile Networks
Week 13	Network Devices and Technologies
Week 14	Components of a Data Communication System
Week 15	LAN Design and Implementation
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		

Websites	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Human Rights and Democracy			**Module Delivery**	
Module Type	Support			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOA005				
ECTS Credits	2				
SWL (hr/sem)	100				
Module Level		First Class	**Semester of Delivery**		
Administering Department		NSD	**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Understand the concepts of rights and democracy: The aim of this module is to provide students with a solid understanding of the principles, theories, and values underpinning rights and democracy, including their historical development and contemporary significance. 2. Examine the relationship between rights and democracy: This module aims to explore the interplay between rights and democracy, analyzing how democratic systems uphold and protect individual and collective rights, and how rights contribute to the functioning of democratic societies. 3. Critically assess the challenges to rights and democracy: The aim is to develop students' critical thinking skills in evaluating the challenges and threats faced by rights and democracy, such as authoritarianism, populism, inequality, discrimination, and violations of human rights. 4. Analyze the role of institutions and mechanisms in safeguarding rights and democracy: This module aims to examine the role of various institutions, such as legislative bodies, courts, civil society organizations, and international bodies, in protecting and promoting rights and democracy. 5. Explore the intersectionality of rights and democracy: The aim is to foster an understanding of the intersectionality between different rights and how they intersect with democratic processes, including social, economic, cultural, and political rights.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate a comprehensive understanding of the concepts, theories, and principles of rights and democracy. 2. Analyze and evaluate the relationship between rights and democracy, and understand how they mutually reinforce each other. 3. Critically assess the challenges and threats to rights and democracy in contemporary society. 4. Examine the role of institutions and mechanisms in safeguarding and promoting rights and democracy. 5. Recognize the intersectionality of rights and understand how different rights intersect with democratic processes. 6. Analyze the role of media and information in the context of rights and democracy, including the opportunities and challenges presented by digital

	technologies.
Indicative Contents المحتويات الإرشادية	1. Introduction to Rights and Democracy: • Overview of the concepts of rights and democracy • Historical development and evolution of rights and democracy 2. Theoretical Foundations: • Theories of democracy and its various forms • Theories of human rights and their philosophical underpinnings 3. International Human Rights Framework: • Universal Declaration of Human Rights and international human rights treaties • Role of international organizations and institutions in promoting and protecting human rights 4. Democratic Institutions and Processes: • Separation of powers and the rule of law • Electoral systems and democratic governance • Civil society and its role in democratic processes 5. Rights and Democracy in Practice: • Rights-based approaches to development • Freedom of expression, assembly, and association • Equality and non-discrimination

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures Case Studies Group Discussions

Student Workload (SWL) الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	84	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5,10	LO #1,2, 3 and 5
	Assignments	2	10% (10)	2,12	LO # 3, 4 and 5
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5,8 and l0
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Definition of rights
Week 2	types of human rights
Week 3	Fundamental and non-fundamental rights
Week 4	Civil rights
Week 5	political rights
Week 6	Economic, social and cultural rights
Week 7	The concept of democracy
Week 8	Advantages of democracy
Week 9	Types of democracy
Week 10	direct democracy
Week 11	Representative democracy

Week 12	semi-direct democracy
Week 13	indirect democracy
Week 14	Freedom, human dignity
Week 15	Equality and justice, political participation
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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