



Ajloun National University

جامعة عجلون الوطنية

Faculty of Information Technology

Department of Cyber Security and Cloud Computing

**Study Plan for the Bachelor's Degree
in Cyber Security and Cloud Computing
Academic year 2023/2024**



Ajloun National University

جامعة عجلون الوطنية

Vision

Leading and excelling in academic and research endeavors, and delivering creativity and innovation in the application and development of information security and protection programs, by global standards.

Mission

To prepare distinguished professionals in cybersecurity and cloud computing capable of building and developing secure information systems, protecting digital systems and networks from threats, and advancing the curriculum based on market demands and the latest research in the field of cybersecurity and cloud computing.

Goals

1. Specialized workforce preparation: Aim to equip students with the necessary skills and knowledge to analyze and understand cybersecurity and cloud computing challenges and threats.
2. Security enhancement: Focus on preparing students to build and maintain secure information systems, protect digital systems, and networks from growing threats.
3. Expansion of scientific research: Promote scientific research in the areas of cybersecurity and cloud computing, contributing to the development of effective solutions for modern challenges.
4. Development of innovation and leadership skills: Encourage the development of students' skills in innovation and leadership to achieve progress and advancement in the fields of cybersecurity and cloud computing.
5. Interaction with job market needs: Aim to ensure that students' skills align with the needs of the job market in the fields of cybersecurity and cloud computing.
6. Encouragement of continuous learning: Foster a culture of continuous learning and provide opportunities for the development of professional skills in the fields of cybersecurity and cloud computing.
7. Awareness and responsibility promotion: Strive to enhance awareness of the importance of cybersecurity and promote responsibility in the safe and sustainable use of technology.



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Learning Outcomes

Knowledge

Knowledge of a broad and in-depth range of foundations, theories, principles and basic concepts in the field of cybersecurity.

Knowledge and understanding of the processes, tools, techniques, policies and practices used in cybersecurity.

Knowing, understanding and explaining the basic concepts of data networks, including components, layers, protocols, services, applications, and tools, and their relationship to cybersecurity.

Knowing and understanding the analysis of mathematical problems and methods of designing algorithms and evaluating their effectiveness and knowledge of the various data structures, uses, advantages and disadvantages.

A wide range of specialized knowledge related to current and emerging developments and advanced topics in the field of cybersecurity.

Skills

Analyze and evaluate various complex information in the field of cybersecurity.

Critically evaluate, select, and use cybersecurity techniques, methodologies, and tools to solve problems, reduce risks, and perform cybersecurity work.

Performing a wide range of tasks and actions using cybersecurity tools in various complex operations; Creativity and innovation in this aspect.

Using computational operations and quantitative methods to process data and information in various complex cybersecurity contexts.

Using study, investigation, and research methodologies in cybersecurity projects and activities.

Competencies

Independently manage tasks related to cyber security, work collaboratively and constructively, have the ability to lead, entrepreneur, and perform a wide range of tasks responsibly.

Make constructive decisions in situations that require self-reliance to work, learn and innovate independently, and adhere to the ethics and standards of the profession for cybersecurity

The student must produce and implement smart computer applications and have the ability to infer, deduce, analyze, extrapolate and interpret data.

Active participation in the development of cybersecurity specialization and community service.



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جامعة عجلون الوطنية

Contents of the Study Plan

The study plan for the bachelor's degree in Cyber Security and Cloud Computing of (132) credit hours distributed as follows:

Certified On Campus learning (1+1, An hour and a half of on campus learning + one half hour of campus learning).

Certified Electronic (1+1, An hour and a half synchronous Electronic + campus learning).

Certified Blended (1+1, An hour and a half synchronous Blended + campus learning).

Number	Type of Requirement	Credit Hours	percentage%
First	University Requirements	27	20.45%
Second	Faculty Requirements	18	13.64 %
Third	Supportive Requirements	06	04.55 %
Fourth	Department Compulsory Requirements	69	52.27 %
	Department Elective Requirements	09	06.82 %
Fifth	Elective Free Requirements	03	02.27%
Total		132	100%

University Coding System

Faculty Code Department Code (Level Year) Knowledge Area Course sequence

3

14

0 Remedial
1 First
2 Second
3 Third
4 Fourth



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جامعة عجلون الوطنية

Knowledge Area

Knowledge Number	Knowledge Area	Number of Credit Hours
0	Programming	15
1	Computer Science and algorithms	12
2	Fundamentals of cybersecurity	15
3	Fundamentals of cloud computing	9
4	Special topics in Cyber Security and Cloud Computing	18
5	Graduation Project	3
6	Field Training	3



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جامعة عجلون الوطنية

First: University Requirements (27) Credit Hours

A. University Compulsory Requirement (12) Credit Hours

Course code	Course Name	Credit Hour	Prerequisite	Learning Type		
				Electronic	Blended	On Campus
704107	Entrepreneurship and Innovation	1			√	
704109	Leadership and Social Responsibility	1			√	
704116	Life Skills	1			√	
704117	English Language Skills (1)	2	714099	√		
704118	Arabic Language Skills (1)	2	704099		√	
704119	National Education	2	-		√	
704200	Military Sciences	3	-	√		

B. University Elective Requirements (15) Credit Hours

Course code	Course Name	Credit Hour	Prerequisite	Learning Type		
				Electronic	Blended	On Campus
201101	The Law in our Lives	3			√	
202132	Human Rights	3			√	
401100	Principles of Administration	3			√	
701140	Arab Library and Lexicography	3	-	√		
704103	International and Arab Contemporary Issues	3				√
704104	Islamic Culture	3	-	√		
704108	Integrity and Transparency	3			√	
704110	Digital Culture	3			√	
704112	Arabic Language Skills (2)	3	704118		√	
704113	Art of Rhetoric and Dialogue	3				√
704115	Development and Family Planning in Islam	3			√	
704141	History of Jerusalem	3			√	
704151	Computer Skills (1)	3	724099		√	
704152	Computer Skills (2)	3	704151		√	
704163	Foreign Language other than English	3			√	
704172	Sports and Health	3				√



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جامعة عجلون الوطنية

Second: Faculty Requirements (18) Credit Hours

A. Faculty Compulsory Requirements (18) Credit Hours

Course code	Course Name	Credit Hour	Prerequisite	Learning Type		
				Electronic	Blended	On Campus
311100	Introduction to Computer Programming	3	-	√		
311101	Programming Language 1	3	311100			√
311202	Object-Oriented Programming	3	311101			√
311210	Discrete Mathematics for (I T)	3	601101			√
313160	Introduction to Software Engineering	3	-		√	
601101	Calculus 1	3	-		√	

Third: Supportive Requirements (6) Credit Hours

Course code	Course Name	Credit Hour	Prerequisite	Learning Type		
				Electronic	Blended	On Campus
601131	Principles of Statistics	3	-		√	
601372	Numerical Analysis 1	3	601101		√	



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جامعة عجلون الوطنية

Fourth: Department Requirements (78) Credit Hours

A. Department Compulsory Requirements (69) Credit Hours

Course code	Course Name	Credit Hour	Prerequisite	Learning Type		
				Electronic	Blended	On Campus
311213	Data Structures	3	311202			√
311220	Digital Logic Design	3	311100			√
314121	Introduction to cyber security	3	-	√		
314130	Principles of cloud computing	3	314121	√		
314209	Programming for cyber security	3	311213			√
314211	Databases and their applications	3	311100		√	
314220	Data Communications and Computer Networks	3	311220		√	
314223	Data and Software Security	3	314121			√
314242	Encryption	3	314121			√
314243	data Analysis in Cyber Security and Cloud Computing	3	314211		√	
314304	Web Application Programming	3	311202			√
314315	Analysis of Algorithms	3	311213			√
314316	Operating Systems for cyber security	3	314315		√	
314320	Infrastructure Security using Linux	3	314316			√
314331	Advance Cloud computing	3	314220		√	
314340	Ethical hacking	3	311202		√	
314341	Artificial Intelligence in Cyber Security and Cloud Computing	3	314315		√	
314342	Secure communication protocols	3	314220		√	
314420	Network Security	3	314320			√
314430	Cloud computing security	3	314320		√	√
314440	digital forensics	3	314342		√	
314450	Graduation Project	3	Pass 90 hours	√		
314460	Field Training	3	Pass 90 hours	√		



Ajloun National University

جامعة عجلون الوطنية

B. Department Elective Requirements (9) Credit Hours

Course code	Course Name	Credit Hour	Prerequisite	Learning Type		
				Electronic	Blended	On Campus
314244	Privacy Issues in Cloud Computing	3	314130		√	
314332	Cloud computing and virtual technology	3	314130			√
314343	Electronic crimes	3	314121		√	
314344	Crypt analysis	3	314242			√
314345	Confidentiality and privacy of data	3	314130		√	
314402	Secure network programming	3	314220			√
314431	Secure software engineering	3	313160		√	
314432	Internet of things security	3	314121			√
314433	Special Topics in Cloud Computing	3	Pass 60 hours		√	
314434	Artificial Intelligence in Cyber Security and Advance Cloud Computing	3	314341		√	
314446	Special Topics in Cyber Security	3	Pass 60 hours		√	

Fifth: Free Elective Requirements (03) Credit Hours

The students studies a free course offered by the university with (3) credit hours



Ajloun National University

جامعة عجلون الوطنية

Advisement Plan for obtaining a bachelor's degree in Cyber Security and Cloud Computing

First Year

First Semester

Course Number	Course Name	Credit Hours	Prerequisite
311100	Introduction to Computer Programming	3	-
313160	Introduction to Software Engineering	3	-
314121	Introduction to cyber security	3	-
601101	Calculus 1	3	-
-	Compulsory University Requirement	1	-
-	Compulsory University Requirement	2	-
Total		15	

Second Semester

Course Number	Course Name	Credit Hours	Prerequisite
311101	Programming Language 1	3	311100
311220	Digital Logic Design	3	311100
314130	Principles of cloud computing	3	314121
314211	Databases and their applications	3	311100
601131	Principles of Statistics	3	-
-	University Compulsory Requirement	1	-
-	University Compulsory Requirement	2	-
Total		18	



Ajloun National University

جامعة عجلون الوطنية

Second Year

First Semester

Course Number	Course Name	Credit Hours	Prerequisite
311202	Object-Oriented Programming	3	311101
314220	Data Communications and Computer Networks	3	311220
314242	Encryption	3	314121
314243	data Analysis in Cyber Security and Cloud Computing	3	314211
-	University Elective requirement	3	-
-	University Compulsory Requirement	1	-
-	University Compulsory Requirement	2	-
Total		18	

Second Semester

Course Number	Course Name	Credit Hours	Prerequisite
311210	Discrete Mathematics for Information Technology Students	3	601101
311213	Data Structures	3	311202
314209	Programming for cyber security	3	311213
314223	Data and Software Security	3	314121
-	Free Requirement	3	-
-	University Elective requirement	3	-
Total		18	



Ajloun National University

جامعة عجلون الوطنية

Third Year

First Semester

Course Number	Course Name	Credit Hours	Prerequisite
314304	Web Application Programming	3	311202
314315	Analysis of Algorithms	3	311213
314316	Operating Systems for cyber security	3	314315
314320	InFrastructure Security using Linux	3	314316
314342	Secure communication protocols	3	314220
-	Department eletive requirement	3	-
Total		18	

Second Semester

Course Number	Course Name	Credit Hours	Prerequisite
314331	Advance Cloud computing	3	314220
314340	Ethical hacking	3	311202
314341	Artificial Intelligence in Cyber Security and Cloud Computing	3	314315
601372	Numerical Analysis 1	3	601101
-	Department eletive requirement	3	-
-	University Elective requirement	3	-
Total		18	



Ajloun National University

جامعة عجلون الوطنية

Fourth Year

First Semester

Course Number	Course Name	Credit Hours	Prerequisite
314420	Network Security	3	314320
314430	Cloud computing security	3	314320
314440	digital forensics	3	314342
-	University Elective requirement	3	-
-	Department elective requirement	3	-
Total		15	

Second Semester

Course Number	Course Name	Credit Hours	Prerequisite
314450	Graduation Project	3	Pass 90 hours
314460	Field Training	3	Pass 90 hours
-	University Compulsory Requirement	3	-
-	University Elective requirement	3	-
Total		12	



Ajloun National University

جامعة عجلون الوطنية

Courses Description

Faculty Compulsory Requirements (18 Credit Hours)

Course Number : 311100
Course Title : Introduction to Computer Programming
Credit Hours : 3
Prerequisites : -

General concepts of problem-solving, program concepts, program flowcharts, variables and constants, data types, arithmetic and logical operations, solving problems using decision-making statements, solving problems using repetition statements, solving problems using logical case statements, programming functions, lists and arrays, linked sequences, sorting lists.

Course Number : 311101
Course Title : Programming Language 1
Credit Hours : 3
Prerequisites : 311100

Fundamentals of programming, introduction to programming languages and their evolution, principles of programming in C++, variables and naming conventions, data types, arithmetic and logical operations, control statements, repetition statements, functions, arrays, introduction to object-oriented programming.

Course Number : 311202
Course Title : Object-Oriented Programming
Credit Hours : 3
Prerequisites : 311101

Object-oriented programming concepts and models, a review of control structures, data types, functions, arrays, and pointers, data abstraction, encapsulation and information hiding, class properties and associated operations, inheritance, and polymorphism, templates.



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Course Number : 311210
Course Title : Discrete Mathematics for Information Technology Students
Credit Hours : 3
Prerequisites : 601101

Introduction to logic, propositional logic, conventional and unconventional proofs, sets, set operations, functions, countable and uncountable sets, integers and remainder arithmetic, sequences, series, mathematical induction, recursion, counting, permutations, combinations, probabilities, relations, graph theory, trees.

Course Number : 313160
Course Title : Introduction To Software Engineering
Credit Hours : 3
Prerequisites : -

Basic principles of systems engineering and software engineering, software development, planning and managing software projects, software requirements specification and processes, system modelling, preliminary software modelling, system architecture design, various methods of system and software design such as object-oriented design and distributed design, CASE tools for software engineering.

Course Number : 601101
Course Title : Calculus 1
Credit Hours : 3
Prerequisites : -

Functions, exponential and logarithmic functions, limits and continuity, differentiation, rules of differentiation, tangents and normals, the Mean Value Theorem and its applications, indeterminate forms $(0/0, \infty/\infty)$, horizontal and vertical asymptotes, local extreme values, concavity, graphing curves, definite integrals, the Fundamental Theorem of Calculus, indefinite integrals, integration by substitution, applications of definite integrals (area, volumes, volumes of revolution).



Ajloun National University

جامعة عجلون الوطنية

Supportive Requirements (6 Credit Hours):

Course Number	: 601131
Course Title	: Principles of Statistics
Credit Hours	: 3
Prerequisites	: -

Definition and uses of statistics, types of data and its collection methods, descriptive statistics: organizing and presenting data, summarizing data with tables, graphs, and numerical measures, measures of central tendency (mean, median, mode), measures of dispersion (range, quartiles and interquartile range, percentiles and percentile range, variance, and standard deviation), outliers, standard scores, Chebyshev's rule and the empirical rule, linear transformations in preparing descriptive statistics, definition of probability and its uses, elements of probability, counting methods, conditional probability, random variables, expectation and variance, computing probabilities and areas under the curves of discrete random distributions (binomial distribution) and continuous random distributions (normal distribution), Central Limit Theorem.

Course Number	: 601372
Course Title	: Numerical Analysis 1
Credit Hours	: 3
Prerequisites	: 601101

Mathematical preliminaries and error analysis, numerical methods for solving single-variable equations, numerical solutions for differentiation and integration, direct numerical methods for linear systems.



Ajloun National University

جامعة عجلون الوطنية

Compulsory Department Requirements (78 Credit Hours):

Course Number : 311213
Course Title : **Data Structures**
Credit Hours : 3
Prerequisites : 311202

Fundamental concepts, algorithm analysis and data representation methods, pointers and strings, queues, stacks, the structure of circularly linked lists, the structure of linearly linked lists, the structure of multiply linked lists, tree structures, sorting and searching algorithms.

Course Number : 311220
Course Title : **Digital Logic Design**
Credit Hours : 3
Prerequisites : 311100

Digital Logic Design: Number systems, the binary system, Boolean algebra and basic logic gates, complex circuits, simplification of logic circuits, sequential circuits, flip-flops, registers, counters, memory, logic for information transfer between registers.

Course Number : 314121
Course Title : **Introduction to cybersecurity**
Credit Hours : 3
Prerequisites : -

A comprehensive study of the principles and practices of information systems security. topics include security threats, vulnerabilities and countermeasures, attacks and security services (confidentiality, integrity, availability, non-repudiation, and accountability), symmetric and asymmetric encryption, user authentication, access control, social engineering, security in operating systems and web security: SSL and TLS, email security (PGP, MIME), malware, and firewalls. Application of these concepts to protect computing infrastructure from cybersecurity threats and attacks.



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Course Number : 314130
Course Title : Principles of Cloud Computing
Credit Hours : 3
Prerequisites : 314121

Fundamentals of cloud computing technologies, topics such as virtualization, containers, orchestration, cloud resource management, cloud storage; common cloud frameworks covering batch processing and data streaming; solutions to problems related to load management and fault tolerance, distributed systems, and security in the cloud. Weekly practical exercises using one or more cloud infrastructure technologies.

Course Number : 314209
Course Title : Programming for Cybersecurity
Credit Hours : 3
Prerequisites : 311213

Fundamentals of the Python language, creating and running programs, using threads, handling exceptions, utilizing network programming libraries, developing basic network functionalities, HTTP programming, secure programming, and forensic programming. The focus is on Twisted Python, Echo server, HTTP client, debugging, and security testing using Python, and writing programs in Python.

Course Number : 314211
Course Title : Databases and Their Applications
Credit Hours : 3
Prerequisites : 311100

Databases and Their Applications: Basic concepts and terminologies related to databases, components of Database Management Systems (DBMS) and their applications, roles and responsibilities of a database administrator, characteristics and methodologies of databases, three-tier architecture of data schema, the entity-relationship model for describing databases and their applications, symbols, concepts, constraints, and operations related to the relational model, query languages, dependencies, normalization of schema design and redundancy removal, relational algebra, building a database from entity-relationship models, introduction to SQL, functional dependencies, simplification of database designs.



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Course Number : 314220
Course Title : **Communications and Computer Networks**
Credit Hours : 3
Prerequisites : 311220

Introduction to the basic principles of data communication and computer networks, the fundamental principles of designing and operating computer networks, network reference models, interfaces and services, protocols, communication services, synchronization, flow control, error control, routing algorithms, network layer, transport layer, application layer protocols, description of the layered architecture of typical networks, and identification of different types of complexity in networks.

Course Number : 314223
Course Title : **Data and Software Security**
Credit Hours : 3
Prerequisites : 314121

This course we will explore the foundations of software security. The course will consider important software vulnerabilities and attacks that exploit them, such as buffer overflows, SQL injection, and session hijacking. In addition, the course will consider defenses that prevent or mitigate these attacks, including advanced testing and program analysis techniques. Importantly, we take a "build security in" mentality, considering techniques at each phase of the development cycle that can be used to strengthen the security of software systems.

Course Number : 314242
Course Title : **Encryption**
Credit Hours : 3
Prerequisites : 314121

An overview of modern cryptography, focusing on the fundamentals of basic cryptography for symmetric and asymmetric key encryption, hash functions, message authentication, RSA, Diffie-Hellman, certification authorities, digital signatures, generating pseudorandom numbers, and the basic protocols and their computational complexity requirements. Introduction to elliptic curve cryptography.



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جامعة عجلون الوطنية

Course Number : 314243
Course Title : **Data Analysis in Cybersecurity and Cloud Computing**
Credit Hours : 3
Prerequisites : 314211

Combining the potential of big data with risks, this course covers the detection, analysis, and mitigation of internal risks, as well as targeted attacks from malicious external entities and ongoing cybersecurity threats. It includes several areas of information technology and cloud computing, such as statistical methods for identifying patterns in data and making inferences. Data analysis for cybersecurity and cloud computing provides users with machine learning techniques for cybersecurity and cloud computing, and the most common approaches to the standard process of data analysis. It also covers data analysis techniques in the field of cybersecurity and cloud computing, identifying security risks and vulnerabilities in computer systems and networks of companies and government institutions.

Course Number : 314304
Course Title : **Web Application Programming**
Credit Hours : 3
Prerequisites : 311202

Introduction to the concepts of the PHP language, designing and implementing web applications on the Internet for desktop computers and smartphones using PHP as the server programming language. It covers web server functions, the use of multimedia, designing and creating websites using HTML, practical experience in creating dynamic web applications that interact with a database using client-side scripts, server-side scripts, and server program execution. The course also addresses security, access rights, financial transactions, legal issues, application of theoretical concepts, and requires the submission of a project.

Course Number : 314315
Course Title : **Analysis of Algorithms**
Credit Hours : 3
Prerequisites : 311213

An introduction to algorithms, design, construction, and analysis of computer algorithms, growth of function values, execution time and efficiency of algorithms, solutions to recurrence relations, design and analysis of various sorting algorithms (insertion, merge, quicksort, heap sort), search algorithms in structures (breadth-first search and depth-first search), minimum spanning trees in structures.



Ajloun National University

جامعة عجلون الوطنية

Course Number : 314316
Course Title : **Operating Systems for cyber security**
Credit Hours : 3
Prerequisites : 314315

Definition of an operating system, the history of operating system development, types of operating systems, structure and functions of operating systems, processor scheduling, scheduling metrics, process management, threads, memory management, synchronization, critical section problem, deadlock situations, scheduling of multipurpose processors, management of input/output units, file management.

Course Number : 314320
Course Title : **InFrastructure Security using Linux**
Credit Hours : 3
Prerequisites : 314316

The course presents an introduction to Linux operating system concepts, including installation and maintenance. Emphasis is placed on operating system concepts, management, maintenance, and required resources. At the end of this course, students will be introduced to operating system concepts, installation, management, maintenance, and use of Linux operating systems, core Linux commands and programs, standard software development tools, such as Emacs, Compilers, Debuggers, the Make facility, and common system tasks using shell scripts and system administration. basic. The course also presents techniques for offensive or defensive targets in network, computer systems, and applications in order to discover potential vulnerabilities and suggest appropriate countermeasures. Topics covered include system memory regulators, CPU registers, assembly language basics, developing local and remote Linux exploits, writing Linux shell code, performing daemon attacks, network and wireless penetration techniques, and the ethical and legal implications of cyber-attacks.

Course Number : 314331
Course Title : **Advanced Cloud Computing**
Credit Hours : 3
Prerequisites : 314220

Exploration of cloud computing, establishment of cloud computing, exploring cloud computing services, their applications, and use cases, cloud computing practices, understanding how cloud computing assists users, developing infrastructure to support widespread use cases with development, innovation, and also innovative technologies.



Ajloun National University

جامعة عجلون الوطنية

Course Number : 314340
Course Title : **Ethical Hacking**
Credit Hours : 3
Prerequisites : 311202

Principles and techniques associated with the cybersecurity practice known as penetration testing or ethical hacking. Techniques used by hackers for breaching and the necessary tools for adopting a hacker's mindset to protect the network from future attacks. The differences between ethical and unethical penetration testing, phases of penetration testing including reconnaissance, scanning, enumeration, vulnerability assessment, exploitation, and covering tracks. Application of various tools and methods to conduct penetration tests to discover how to exploit system security vulnerabilities and potential countermeasures.

Course Number : 314341
Course Title : **Artificial Intelligence in Cybersecurity and Cloud Computing**
Credit Hours : 3
Prerequisites : 314315

AI cybersecurity, system configuration management, human efficiency as another vulnerability in the cybersecurity industry, institutional peripheral devices, response time to threats, cyber-attacks, identifying and predicting new threats, interpreting patterns identified by machine learning algorithms, data classification, data aggregation, synthesizing probabilities, machine learning, deep learning.

Course Number : 314342
Course Title : **Secure Communication Protocols**
Credit Hours : 3
Prerequisites : 314220

Fundamental security aspects in computer networks and wireless communications, security protocols for network access control and transport level security, wireless network security protocols, privacy and anonymity, applications of email security and IP security, and Internet authentication.



Ajloun National University

جامعة عجلون الوطنية

Course Number : 314420
Course Title : Network Security
Credit Hours : 3
Prerequisites : 314320

Concepts, mechanisms, and applications of information and network security, attack methods and defense, and designing systems that resist these attacks. It covers various topics such as principles of cryptography, security protocols, information and network security, and other related subjects like physical security.

Course Number : 314430
Course Title : Cloud Computing Security
Credit Hours : 3
Prerequisites : 314320

The concept of securing the cloud ecosystem. Concepts and principles in bridging the gap between traditional and cloud architectures, considering the changing mindsets involved in enterprise risk management. Understanding standard cloud security network designs and architectural models, the complexity of cloud threat actors, technologies used to attack cloud computing infrastructure, the requirements necessary for securing data in the cloud, and the challenges in meeting those requirements.

Course Number : 314440
Course Title : Digital Forensics Investigations
Credit Hours : 3
Prerequisites : 314342

A general introduction to the field of digital forensic analysis, key topics in digital forensics, an overview of computers and digital media and storage formats, techniques for data acquisition and verification, forensic analysis methodologies, network traffic analysis, legal issues surrounding forensic investigations, professional competence and ethics, future developments in the field, and practices and standards related to incident response



Ajloun National University

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Course Number : 314450
Course Title : Graduation project
Credit Hours : 3
Prerequisites : Pass 90 credit hours

The project aims to develop real-world problem-solving skills, identify and analyze a problem, and implement the necessary programs. The project is carried out by a group of students under the supervision of a faculty member. Students are required to develop and implement the entire project object.

Course Number : 314460
Course Title : Field Training
Credit Hours : 3
Prerequisites : Pass 90 credit hours

The student undergoes training in a government or private institution under the supervision of an academic advisor, where they practically apply what they have learned during their university studies. The institution where the student is training fills out a pre-prepared report by the department to which the trainee student belongs, which is later evaluated.



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جامعة عجلون الوطنية

Elective Department Requirements (9 Credit Hours):

Course Number : 314244
Course Title : Privacy Issues in Cloud Computing
Credit Hours : 3
Prerequisites : 314130

Cloud computing from a privacy perspective, assessing risks related to information security and privacy, ethical and legal viewpoints on information privacy in cloud computing, technical and administrative solutions for privacy and information security issues in cloud computing.

Course Number : 314332
Course Title : Cloud Computing and Virtualization Technology
Credit Hours : 3
Prerequisites : 314130

A deep understanding of the internal elements of virtualization, understanding cloud computing and related technologies, the history of computing, virtualization of resources and scheduling, virtualization within the operating system, how virtualization works, hardware trends: Moore's Law, and the economics of virtualization.

Course Number : 314343
Course Title : Electronic crimes
Credit Hours : 3
Prerequisites : 314121

Concepts of technical, legal, and social issues related to cybercrimes, different types of cybercrimes, identifying cybercrime activities and responding to these problems from both private and public sectors, accurately describing and identifying cybercrime activities and choosing the appropriate response to deal with the problem.



Ajloun National University

جامعة عجلون الوطنية

Course Number : 314344
Course Title : **Cryptanalysis**
Credit Hours : 3
Prerequisites : 314242

Basic concepts in cryptography such as encryption and decryption, sender verification, data reliability, non-repudiation, classification of attacks (cipher text-only, known plaintext, chosen plaintext, chosen cipher text), symmetric encryption (DES and AES algorithms), asymmetric encryption (RSA algorithm), information theory-based security (one-time pad, Shannon's theory), key exchange, and digital signatures.

Course Number : 314345
Course Title : **Confidentiality and Privacy of Data**
Credit Hours : 3
Prerequisites : 314130

An overview of data security concepts and technologies, discussing new trends in data security in the context of internet information management, data application security models, privileges, passwords, roles, secure data auditing, XML access control, trust management and privacy protection, secure multi-level relational model and polyinstantiation, auditing in relational databases, advanced topics such as SQL injection, database management security issues like securing the Database Management System (DBMS), enforcing access control mechanisms, and related issues.

Course Number : 314402
Course Title : **Secure Network Programming**
Credit Hours : 3
Prerequisites : 314220

Introduction to network programming, transport layer protocols, TCP, UDP, and SCTP, client-server model, TCP sockets, UDP sockets, SCTP sockets, multiplexing I/O, DNS resolution and address translation, thread programming, RPC, database connectivity, distributed programming, network security. One or more internet application protocols: TELNET, HTTP, SMTP, POP, IMAP, FTP, and web programming (CGI, Servlets, XML).



Ajloun National University

جامعة عجلون الوطنية

Course Number : 314431
Course Title : Secure Software Engineering
Credit Hours : 3
Prerequisites : 313160

Security and safety in software development throughout all stages of the software lifecycle: analysis, design, coding, testing, and maintenance. Key security principles to follow in software development, threat modeling, defensive programming, web security, database security, and related security issues.

Course Number : 314432
Course Title : Internet of Things (IoT) Security
Credit Hours : 3
Prerequisites : 314121

Fundamental theoretical and practical concepts in IoT, hardware platforms, embedded programming and debugging, IoT network models, secure operation, cloud integration, and basic data analytics, fundamentals of protecting devices and networks connected in IoT, basics of integrating security aspects into the design of IoT networks.

Course Number : 314433
Course Title : Special Topics in Cloud Computing
Credit Hours : 3
Prerequisites : Pass 60 credit hours

Providing a foundation in cloud computing and programming experience using virtual resources. This course will introduce cloud computing concepts. It will cover cloud computing models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).



Ajloun National University

جامعة عجلون الوطنية

Course Number : 314434
Course Title : Artificial Intelligence in Advanced Cloud Computing
Credit Hours : 3
Prerequisites : 314341

Principles of advanced cloud computing, an introduction to advanced cloud computing for Artificial Intelligence and DevOps, types of clouds: private, public, multi, and hybrid. Cloud data management (cloud storage services), the role of Artificial Intelligence in Advanced cloud computing | Nutanix, infrastructure to assist in automating routine processes and simplifying workload burdens. Using AI tools to monitor, manage, and self-repair components in both public and private cloud environments.

Course Number : 314446
Course Title : Special Topics in Cybersecurity
Credit Hours : 3
Prerequisites : Pass 60 credit hours

Introducing new topics in the fields of cybersecurity and cloud computing, a series of advanced topics in cybersecurity and cloud computing, diverse subjects covering technological updates related to a specific pathway in cybersecurity and cloud computing, in-depth study of topics covered in other courses, and an introduction to advanced concepts. The department is responsible for determining the content of this course.