

	Irbid National University	Logo of Faculty
	Faculty of Science & Information Technology	
	Department: Cybersecurity	

This form is just for the major requirement courses

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401102	3	Introduction to Information Technology	

This course presents an introductory survey of computer science. It explores the breadth of the subject while including enough depth of the topics involved. The goal of this course is to introduce the student to key terminology and components of computer hardware, software, and operating systems. Discuss the functions and uses of computers in our society, Describe the information processing cycle, and Identify the major components of computer hardware and there functions. This course is an introduction to problem solving by using Pseudo code, and flowcharting.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401112	3	Computer Skills (2) (for science students) (C++)	401102

This course introduces programming concepts and prepares students to understand the more complicated and powerful programming tools and concepts in the following courses. It contains an introduction to programming language history, basic hardware and software concepts, basic problem-solving techniques, and the different types of programming languages. It uses C++ programming language to give students a good understanding of a typical program development environment, control statements, functions, arrays, pointers and pointer-based strings.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401211	3	Programming Language (1) (C++/OOP)	401112

This course gains knowledge about basic C++ language syntax and semantics to write C++ programs and use concepts such as variables, conditional and iterative execution methods etc. Beside; understanding the fundamentals of object-oriented programming in C++, including defining classes, objects, invoking methods, in addition to the main principles in OOP that talks about “Encapsulation”, “Inheritance”, ”Polymorphism” and “Interface”.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
404101	3	Calculus (1)	

This course is designed to introduce the student to a number of numerical methods as well as to teach the student how to do some error analysis. These include methods to approximate roots of functions, to interpolate data points with polynomials and to solve linear system.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
404131	3	Statistics and Probability (1)	

Introduction to Statistics, populations and samples, Frequency distributions, Measures of central tendency, Measures of dispersion, Measures of skewness and kurtosis, correlation and regression, principles of probability, Rules of probability, Bayes, Theorem. The Random, Variables, discrete and continuous distributions expectation.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
404241	3	Linear Algebra 1	404101

The course is an introduction to linear algebra. This includes matrices, systems of linear equations and their solutions, linear vector spaces, linear transformations, eigenvalues and eigenvectors.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401353	3	Simulation and Modeling	404131
Concepts of computer simulation. Simulation methodology: Analysis, formulation, solution strategy, verification and validation. Discrete simulation. Collection and analysis of results. Simulation languages. Applications..			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401452	3	Programming Languages Design and Implementation	401211
This course is designed to provide the students of the basic concepts related to PLD. Theoretical concepts such as virtual computer, firmware, syntax, semantic, Grammar description method are fully described. The main issues related to design and implementation of programming language such as data type, sequence control, data control, run time environment are covered in details.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
404341	3	Linear Algebra (2)	404241
The course introduces students to structural components of linear algebra through the use of special matrices and relates these to several essential topics in advanced mathematics, including canonical form, Hermitian and normal matrices, positive-definite and non-negative matrices.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
404463	3	Graph theory	404241
This course will cover the fundamental concepts of Graph Theory: simple graphs, digraphs, Eulerian and Hamiltonian graphs, trees, matchings, networks, paths and cycles, graph colorings, and planar graphs.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
404152	3	Discrete Mathematics	401102
This course will cover the following topics and specific applications in computer science. Numbers and Exponents, Errors (absolute and relative), Propositions Logic, Predicates and Quantifiers, Quantifiers and logical operators, Logical Inference, Methods of Proof , Sets , Relations and Functions.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401453	3	Basic of Artificial Intelligence	401115
This course introduces the basic principles in artificial intelligence. It covers simple representation schemes, problem solving paradigms, constraint propagation, and search strategies. Areas of application such as knowledge representation, natural language processing, expert systems, vision and robotics are explored.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407302	3	Data Analytics	406252
This course presents an introductory survey of data science. The goal of this course is to introduce the student to key terminology and components of data science, data analysis, and the value of data. Through this course the students will know the tools and applications used with data analytics.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
406252	3	Database	401251
This course provides a comprehensive concepts of the relational database design and SQL			

(implemented in Oracle) used with relational databases. The presentation stresses at relational data model; relational algebra; SQL; database analysis and design; ER and enhanced modeling; data normalization.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401251	3	Data Structures	401112

Principles of data design. Data types and structures. Abstract data types (ADTs) and encapsulation. Unsorted List and Sorted List ADTs. Stack and Queue ADTs. Linked structures. Implementing Unsorted Lists, Sorted Lists, Stacks and Queues as linked structures. Programming with recursion. Binary Search Trees.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
406358	3	Visual Programming	401211

This course focuses on providing the students the main skills for designing the GUI interface. In addition it focuses on teaching the students the programming skills by writing the necessary codes for designing the GUI interface. This course starts by defining the JFrames, and all controls which are placed on the frame such as JLabel, JTextField, JButtons, JoptionPane, JCheckBox, JRadioButton, JComboBox, JList, Events: Mouse events and Keyboard events, event Registration, Pixels, Color Class, Font Class, JTextArea, Java 2D and 3D Shapes, and Exception Handling.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401115	3	Introduction to Algorithms	401112

Solving summations and recurrences. Efficiency and complexity analysis. Tree terminology and algorithms. Binary trees. Hashing methods and solving collision in hashing. Heaps and heap sort. Insertion sort, merge sort and quicksort. Graph terminology, representation and algorithms. Algorithms of Prim, Kruskal, Dijkstra and Floyd. Breadth-first and depth-first search. The greedy, divide-and-conquer, and dynamic programming techniques.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407356	3	Web Applications Programming	406252

The course is designed to present the student with the required information and practice related to Web programming. This includes introduction to ASP.NET; Working with Controls; Using Rich Server Controls; Accessing Data; Configuration; Data Binding; Validating User Input; Themes and Master Pages; Site Navigation Controls; Displaying Data with the GridView Control; Tracing; Creating New Controls; Improving Performance with Output Caching; Advanced Caching; Using the DataList and Repeater Controls; and Creating and Consuming Web Services.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
401334	3	Data Encryption	407312

This course introduces the concepts and methodology of data encryption and decryption, a brief history of encryption and decryption, the importance of data, the algorithms used of encryption and decryption such as RSA, DES, etc., and protocols for data security.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407203	3	Information Security Programming Using Python	401211

This course gains knowledge about basic concepts of Programming and problem solving using Python, including how to create and run scripts, use threads, and handle exceptions. After that, a student will learn how to use the Python libraries for network scripting and develop basic scripts with network functionality. This course will also cover HTTP programming, security scripting, and forensic scripting. Finally, the student will learn about Twisted Python, including the Echo server and HTTP client, debugging and security testing using Python.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407312	3	Network Security and applications	401224
This course aims to the methods of computer network protection. And what are the types of attacks may occur on computer networks, and how to protect network against these attacks. What is firewall, and VPNs, and threats, snipping , and other concepts.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407322	3	Secure Communication Protocols	407312
The goal of this course is to introduce the threats and risks in Information technology and networks, and how to control and secure these systems in IT fields. The course examines the use of security protocols to provide security over networks and Internet. The topics will be covered are: network access control, cloud security, transport-level security, network security, internet Security, e-mail security, IP security, firewalls.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407101	3	Introduction to Cyber Security	401102
The goal of this course is to introduce the threats and risks in Information technology and networks, and how to control and secure these systems in IT fields, The topics will be covered are: software and operating system security, data and database security, network security, IP, firewalls, security management and computer crimes and ethical and legal issues in computer security.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407105	3	Electronic Commerce Security	401102
This course introduces current threats facing organizations that conduct business online and how to mitigate these challenges. It will cover cryptography review, certificates, secure credential services and role-based authorization, mobile code security, security of agent-based systems, secure electronic transactions, electronic payment systems, intellectual property protection, and issues on law and regulation.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407201	3	Risk Management and Analysis	407101
Students understand the principles and terminology related to risk management, including contingency elements and risk factors, risk mapping and standard mitigation factors (e.g. Insurance, hedging, limits, diversification, control...), Students can calculate and give appropriate interpretation of Value-at-Risk on individual instruments as well as on a whole portfolio, Students understand risk management's best practice in all its key areas, including financial risk management and business risk management			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407316	3	Network Control and Documentation	401224
The goal of this course is to introduce the management of network, users, guests and different roles access to the network and systems and what are their tasks, privileges and permissions, it also illustrate the authorization, authentication and log files management. Network and OS management and some protocols related to network control and documentation. The topics to be covered also is management of VPNs.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407324	3	Data Security and Privacy	407101
This course aims to introducing the main concepts of data, and its significance, the security and privacy			

issues for data, and sensitivity of data. It also includes the introduction to threats in Database and E-commerce and what are the policies and methods to treat these threats, and what are the hot topics in data security and privacy.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407410	3	Cyber Security Management Systems	407201

The purpose of this course is to provide students with an overview of Cybersecurity, and specifically, Cybersecurity applied to Business and commercial Systems in IT fields. The main methodologies, standards, legislation, threats, and vulnerabilities will be studied. Further emphasis will be placed on technologies that help to prevent, detect, and respond to cybersecurity incidents.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407326	3	Network and Data Communication	406252

This is a first class on the fundamentals of data communication networks, their architecture and network layers, principles of operations, protocols of transmission and performance analyses. One goal will be to give some insight into the rationale of why networks are structured the way they are today and to understand the issues facing the designers of next-generation data networks. Much of the class will focus on network algorithms and their performance.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407401	3	Infrastructure Security Using Linux	407201

An introduction to Linux operating system concepts, including installation and maintenance. Emphasis is placed on the concepts of operating system, management, maintenance, and required resources. At the end of this course, students will understand the concepts of operating system, installation, management, maintenance, and use of Linux operating systems. Basic Linux commands and programs, standard software development tools, such as Emacs, Compilers, Debuggers, Make Facility, and common system tasks common to using Shell scripts and platform management.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407210	3	Security of Data and Software	407203

The goal of this course is to introduce the security issues of software and applications on the levels of design and programming. What are the main vulnerabilities in software and programming, and what are the attacks that attacks the software systems, such as XSS , SQL Injection, DoS, CAPTCHA,

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407325	3	Ethical Hacking	407322

Students will scan, test, hack and secure systems. Implement perimeter defenses, scan and attack virtual networks. Other topics include intrusion detection, social engineering, footprinting, DDoS attacks, buffer overflows, SQL injection, privilege escalation, trojans, backdoors and wireless hacking. Legal restrictions and ethical guidelines emphasized. This course also helps prepare students to pass the Certified Ethical Hacker (C|EH) exam.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407310	3	Introduction to Digital Forensic Evidence	401334

The Students will learn and practice the methods and techniques used in computer forensics, forensic modeling, the forensics analysis and the e-evidences, following up the new methods for digital investigation and evidences. The computer crimes, its details and its occurrence. Privacy protection techniques, computer security policies and guidelines.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
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407214	3	Cyber Security Systems	407101
The goal of this course is to introduce the systems that need to be protected and secured, and what are the main topics and issues for different systems, platforms and infrastructure. Students will explore various techniques for eliminating security vulnerabilities, defining security specifications / plans, and incorporating countermeasures in order to achieve overall system assurance.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407425	3	Wireless network security	407312
This course covers security and privacy issues in wireless networks and systems, such as cellular networks, wireless LANs, wireless PANs, mobile ad hoc networks, vehicular networks, satellite networks, wireless mesh networks, sensor networks and RFID systems. Security problems of MAC and especially upper layers will be emphasized. Attacks and proposed solutions at several layers, authentication, key distribution and key management, secure routing, selfish and malicious behaviors, and secure group communication are analyzed for applicable wireless network types.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407426	3	Cyber Security Management and Hierarchy	407410
The goal of this course is to introduce the management system of cyber security. The infrastructure and platforms for different types of systems.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407412	3	Penetration Testing	407325
The goal of this course is to teach students the underlying principles and many techniques associated with the cybersecurity practice known as penetration testing and protection. It introduces students to penetration testing and vulnerability analysis. It will cover in-depth methodologies, techniques, and tools to identify vulnerabilities, exploit, and assess security risk to networks, operating systems, and applications. Student discovers how system vulnerabilities can be exploited and learns to avoid such problems.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407202	3	Internet of Things Security	407101
This course aims to introduce the concept of the Internet of Things, understand the structure and components of the Internet of Things. An introduction to IOT security, IOT ethics and privacy. Building Automation and Security. The use of IOT in different areas: energy and environment, healthcare infrastructure and consumer electronics. From this course, students will become familiar with the cybersecurity issues raised by the Internet of Things and gain knowledge of related security technologies.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407338	3	Security of Distributed Computing	407101
This course aims to define the basic concepts and principles in the field of distributed computing. Cryptographic techniques form the basis for securing distributed systems. This course focuses on security in networks and distributed systems and gives a short introduction to encryption. Threats against distributed systems are covered, in addition to the methods, techniques, and standards in place to protect against these threats.			
Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407327	3	Selected Topics in Cyber Security (1)	
This course covers selected topics in current research and advancements in various Cyber Security			

fields.

Course number	Credit hours	Title of the course	Prerequisite-co-requisite
407427	3	Selected Topics in Cyber Security (2)	
This course covers selected topics in current research and advancements in various Cyber Security (Advanced Encryption) fields.			

Approved by department council		Date of approval	
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