Faculty of Computer Science and Informatics

Cybersecurity Department

Study Plan of Bachelor's Degree in Cybersecurity

Academic Year: 2021/2022

Department Vision

A pioneer department at the regional level in delivering graduates specializing in cybersecurity.

Department Mission

Preparing qualified student in the field of Cybersecurity that meet the needs of the labor market locally and regionally, capable of carrying out distinguished scientific and practical projects that contribute to the development of technical infrastructure and the promotion of the knowledge economy and the development and improvement of performance in local community institutions.

Department Objectives

1. Possess the necessary theoretical and applied skills and knowledge in the field of cybersecurity.
2. Provides professional competencies and practicing their profession with confidence and ability to compete locally and regionally.
3. Continue learning and professional development amid technical changes.
4. Work effectively within teams, bearing ethical and professional responsibilities, and know the needs of the community.

Learning Outcomes

Graduates of the program will have an ability to:
1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply security principles and practices to maintain operations in the presence of risks and threats [CY].

Contents of the Study Plan

The bachelor's degree program in Computer Information Systems consists of 132 credit hours distributed as follows:

No	Requirement Type	Credited Hours	Percentage
First	University Requirements	27	20%
Second	College Requirements	23	17%
Third	Program Requirements	82	63%
Total		**132**	**100%**

University Coding System

4		0	5		–		Year	Term		–	–
College Code		**Department Code**			**Knowledge Area**		**Course Level**			**Course Sequence**	

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0 1 Masters in Computer Science
0 2 Computer Information System
0 3 Software Engineering
0 4 Mobile Computing
0 5 Cybersecurity

Knowledge Areas

No	Knowledge Area	Credit Hours in the Study Plan
01	**Computer Science and Algorithms:** Discrete Mathematics, Data Structures, Algorithms, Operating Systems.	12
02	**Programming:** Advanced Programming, Web Application Programming.	6
03	**Fundamentals of Cybersecurity:** Fundamentals of Cybersecurity, Computer Networks, Data and Programming Security (Application), Network Security, Infrastructure Security Using Linux.	15
04	**Cybersecurity:** Data Analytics, Fundamentals of Artificial Intelligence, Cryptography, Digital Forensics, Data Integrity and authentication, Secure communication protocols.	15
05	**Supporting Knowledge Areas:** Statistics, Numerical Analysis, Linear Algebra.	6
06	**Elective Courses:** Several courses within the sub-field of the program.	9
–	**Field training**: 3 hours after passing a minimum of 90 credit hours.	3
–	**Graduation Project:** 3 credit hours after passing 90 credit hours.	3

First: University Requirements: 27 Credit Hours
A. University Core: 15 Credit Hours

Code	Course Name	Credit Hours	Prerequisite
50511102	Arabic Language 1	3	50511108
50511103	English Language 1	3	50511109
50511108	Arabic Language Basics	0	
50511109	English Language Basics	0	
50511110	Computer Basics	0	
50511206	National Education	3	
50511308	Military Sciences	3	
50541103	Computer Skills	3	50511110
Total		15	

B. University Elective: choose 12 Credit Hours from the following courses

Code	Course Name	Credit Hours	Prerequisite
50511204	Life Skills	3	
50511306	Entrepreneurship and Innovation	3	
50521101	Arabic Language 2	3	50511102
50521102	English Language 2	3	50511103
50521203	Principles of Psychology	3	
50521204	Human Rights	3	
50531101	Islamic Culture	3	
50531205	Jerusalem and the Hashemite Guardianship	3	
50541203	Environment and Society	3	
50541206	Health and Society	3	
50541307	Communication and Internet	3	
50541308	Foreign Language	3	

Second: College Core Requirements: 23 Credit Hours

Code	Course Name	CH	Th	Lab	Prerequisite
40212101	Data Structures	3	3	0	40421211
40241101	Fundamentals of Information Technology	3	3	0	
40241202	Databases	3	3	0	40241101
40241203	Laboratory of Databases	1	0	3	40241202 (co)
40312101	Discrete Mathematics	3	3	0	50551105
40322101	Websites Design	3	3	0	40241101
40421108	Introduction to Programming	3	3	0	
40421109	Laboratory of Introduction to Programming	1	0	3	40421108 (co)
40264401	Communication and Writing Skills	3	3	0	
Total		**23**	**21**	**6**	

Third: Program Requirements: 82 Credit Hours

A. Program Core: 67 Credit Hours

Code	Course Name	CH	Th	Lab	Prerequisite
40421211	Object Oriented Programming	3	3	0	40421108
40421212	Laboratory of Object Oriented Programming	1	0	3	40421211 (co)
40213103	Algorithms Design and Analysis	3	3	0	40212101
40253205	Information Systems Security	3	3	0	40322202
40422207	Advanced Programming	3	3	0	40421211
40322202	Programming of Internet Applications	3	3	0	40241202+ 40322101
40433201	Computer Networks	3	3	0	40241101
40532201	Networks Operating Systems	3	3	0	40212101
40541201	Introduction to Cybersecurity	3	3	0	
40543204	Network Management and Security	3	3	0	40433201
40542102	Fundamentals of Encryption	3	3	0	40541201
40543201	System and Infrastructure Security	3	3	0	40253205
40543103	Information Security Protocols	3	3	0	40542102
40543205	Networks Monitoring and Certification	3	3	0	40433201

Code	Course Name	CH	Th	Lab	Prerequisite
40543206	Electronic Commerce Security	3	3	0	40253205
40544108	Ethical Hacking	3	3	0	40543204
40544109	Intrusion Detection and Prevention	3	3	0	40543204
40544110	Networks and Information Security Programming	3	3	0	40253205
40544213	Digital Forensics	3	3	0	40543204
40543202	Secure Systems Development and Design	3	3	0	40253205
40542201	Information Systems Risk Management	3	3	0	40541201
40584201	Field Training on Cybersecurity	3	3	0	Complete 90 CH
40594201	Applied Graduation Project (1)	1	1	0	Complete 90 CH
40594202	Applied Graduation Project (2)	2	2	0	Complete 90 CH
Total		67	66	3	

B. Program Elective: 9 Credit Hours, choose from one of the following Tracks

Code	Course Name	CH	Th	Lab	Prerequisite
40543207	Social Networks Security	3	3	0	40252201
40544112	Wireless Network Security	3	3	0	40433201
40544214	Internet of Things Security	3	3	0	40433201
40544215	Cloud Computing Security	3	3	0	40543103
40544216	Special Topics in Cybersecurity	3	3	0	Complete 60 CH
40544217	Advanced Digital Forensics	3	3	0	40544213
40544218	Penetration Testing	3	3	0	40253205

C. Fourth: Support Courses: 6 Credit Hours

Code	Course Name	CH	Th	Lab	Prerequisite
50223121	Numerical Analysis	3	3	0	50551105
50551105	Principles of Mathematics and Statistics	3	3	0	
Total		6	6	0	

Advisory Plan

Year 1				
1st Semester (Fall)				
Code	**Course Name**	**Credit Hours**	**Prerequisite**	**Corequisite**
40241101	Fundamentals of Information Technology	3		
40264401	Communication and Writing Skills	3		
40421108	Introduction to Programming	3		
40421109	Laboratory of Introduction to Programming	1		40421108
50551105	Principles of Mathematics and Statistics	3		
	University Core Requirement	3		
Total		16		

2nd Semester (Spring)				
Code	**Course Name**	**Credit Hours**	**Prerequisite**	**Corequisite**
40241202	Databases	3	40241101	
40241203	Laboratory of Databases	1		40241202
40312101	Discrete Mathematics	3	50551105	
40421211	Object Oriented Programming	3	40421108	
40421212	Laboratory of Object Oriented Programming	1		40421211
40541201	Introduction to Cybersecurity	3		
	University Elective Requirement	3		
Total		17		

Year 2				
1st Semester (Fall)				
Code	**Course Name**	**Credit Hours**	**Prerequisite**	**Corequisite**
40212101	Data Structures	3	40421211	
40433201	Computer Networks	3	40241101	
40322101	Websites Design	3	40241101	
40542102	Fundamentals of Encryption	3	40541201	
50223121	Numerical Analysis	3	50551105	
	University Core Requirement	3		
Total		18		

2nd Semester (Spring)				
Code	**Course Name**	**Credit Hours**	**Prerequisite**	**Corequisite**
40213103	Algorithms Design and Analysis	3	40212101	
40322202	Programming of Internet Applications	3	40241202+ 40322101	
40422207	Advanced Programming	3	40421211	
40543204	Network Management and Security	3	40433201	
40543103	Information Security Protocols	3	40542102	
	University Core Requirement	3		
Total		18		

Year 3				
1st Semester (Fall)				
Code	**Course Name**	**Credit Hours**	**Prerequisite**	**Corequisite**
40253205	Information Systems Security	3	40322202	
40532201	Networks Operating Systems	3	40212101	
40543205	Networks Monitoring and Certification	3	40433201	
40542201	Information Systems Risk Management	3	40541201	
	Program Elective Requirement	3		
	University Elective Requirement	3		
	Total	18		

2nd Semester (Spring)				
Code	**Course Name**	**Credit Hours**	**Prerequisite**	**Corequisite**
40543201	System and Infrastructure Security	3	40253205	
40543206	Electronic Commerce Security	3	40253205	
40544110	Networks and Information Security Programming	3	40253205	
40544213	Digital Forensics	3	40543204	
	Program Elective Requirement	3		
	University Core Requirement	3		
	Total	18		

Year 4				
1ˢᵗ Semester (Fall)				
Code	**Course Name**	**Credit Hours**	**Prerequisite**	**Corequisite**
40543202	Secure Systems Development and Design	3	40253205	
40544109	Intrusion Detection and Prevention	3	40543204	
40594201	Applied Graduation Project (1)	1	Complete 90 CH	
	University Core Requirement	3		
	University Elective Requirement	3		
Total		13		

2ⁿᵈ Semester (Spring)				
Code	**Course Name**	**Credit Hours**	**Prerequisite**	**Corequisite**
40544108	Ethical Hacking	3	40543204	
40594202	Applied Graduation Project (2)	2	Complete 90 CH	
40584201	Field Training on Cybersecurity	3	Complete 90 CH	
	University Elective Requirement	3		
	Program Elective Requirement	3		
Total		14		

40212101 Data Structures
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40421211 Object Oriented Programming)
Basic concepts of data structure and algorithm. The topics that will be covered in this course concerning Data type and structures; Abstract data types and encapsulation; Stacks; Queues; Recursion; Linked Lists; Binary trees; General trees; File organization: sequential and indexed files; Graphs: representation, traversing, shortest path; Sorting: exchange, insertion, quick sort, heap and others; Searching. At the end of this course, students will be able to select the proper data structure and algorithm to solve a specific software problem, the course includes complete a practical project or research by the students.

40241101 Fundamentals of Information Technology
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: -)
Knowledge of the terminology, information systems environment, processes, and components associated with information technology, information systems concepts, components, tools, and applications. It will provide an introductory understanding of computer hardware, numbering system and knowledge of how data is prepared for computer, instruction processed at a basic machine level, and software (operating systems, database, and web development and applications). It also introduces the networking, Internet, and the basics of the information security, web searching, in addition to algorithms and problem solving, the course includes complete a practical project or research by the students.

40241202 Databases
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40241101 Fundamentals of Information Technology)
Basic concepts of databases and the main topics such as: database definition, database system; overview of database management, database system architecture, introduction to relational model, database algebra, database design, database integrity, an introduction to structured query language (SQL), mapping between ER- and EER-to-Relational, the course includes complete a practical project or research by the students.

40241203 Laboratory of Database
(1 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 40241202)
A practical laboratory in databases, covering practical exercises in database system and database management (relational database systems RDBMS, structured query language (SQL), and schema design techniques), the course includes complete a practical project or research by the students.

40312101 Discrete Mathematics
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 50551105 Principles of Mathematics and Statistics)
Fundamental aspects of discrete mathematics used in computer science starting with propositions, logical operations, truth tables, set theory, relations and functions, and methods of proofs. The course also introduces the concepts of sequences, matrices, lattices, graph theory, and trees (rooted tree, subtree), the course includes complete a practical project or research by the students.

40322101 Websites Design
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40241101 Fundamentals of Information Technology)
Basic concepts of the World Wide Web, internet technology, current Web protocols, and client-server programming for desktop computers and smart phones. Students will learn standard Hypertext Markup Language (HTML) for create the web pages, basics of Cascading Style Sheets (CSS) for design and layout the web pages, as well as JavaScript, together with XML and JSON for data-interchange and Ajax technology for building rich internet applications for desktop computers and smart phones. Students will apply their gained knowledge in a series of practical assignments. At the end of this course, students will create and maintain a small web page project on a live web server for desktop computers and mobile devices.

40421108 Introduction to Programming
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: -)
The fundamental concepts of programming using selected language. It covers basic structures of programming concepts such as variables, data types, control structures, arrays, functions, and pointers. A brief introduction to classes and objects is also given. Students will apply their gained knowledge in a series of assignments. Practical work for three hours weekly is included. The course includes complete a practical project or research by the students.

40421109 Laboratory of Introduction to Programming
(1 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 40421108)
A practical laboratory in programming using selected language, where it covers practical exercises in the basics of programming such as variables, data types, control statements, matrices, functions and indicators. In this course, students apply their knowledge through a series of practical assignments in the laboratory.

40264401 Communication and Writing Skills
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: -)
Concepts of administrative communication and to develop some of the skills he needs in his private life and career, in addition to his definition of the basic concepts of communication as a core and vital in the life of business organizations. To achieve this, the course will deal with the following topics: the nature, importance and objectives of the communication process, trends, elements and channels of communication, obstacles to effective communication, the basis of successful correspondence writing. In addition to the recognition of listening skills and teamwork and the management of meetings and interviews, the course includes complete a practical project or research by the students.

40421211 Object Oriented Programming
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40421108 Introduction to Programming (C++))
Object-oriented concepts (encapsulation, data abstraction, inheritance, and polymorphism) along with OO design using UML (unified modeling language). The OOP concepts covered using JAVA programming language. The course emphasizes on the concepts of classes, templates, friend classes, inheritance, abstract class and virtual functions, exceptions, and generic programming. Upon completion, students should be able to use an object-oriented language to develop rather complex programs, the course includes complete a practical project or research by the students.

40421212 Laboratory of Object Oriented Programming
(1 Credit Hours, Lecture: 0, Lab: 3, Corequisite: 40421211)
A practical laboratory in object-oriented programming, covering practical exercises in object-oriented programming (encapsulation, data abstraction, inheritance, polymorphism). The course is concerned with applying concepts of classes (classes and templates, friendly classes, inheritance, abstract layer and virtual functions, exceptions and general programming in a practical way). Students will apply their knowledge through a series of practical assignments in the laboratory.

40213103 Algorithms Design and Analysis
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40212101 Data Structures)
Basic concepts of designing and analyzing algorithms. Topics covered: review of abstract data types and data structures, definition of algorithms, classifying functions and computational complexities of algorithms, algorithms analysis & design techniques including: divide and conquer greedy methods, searching and sorting, trees, graphs, hashing, combinatorial algorithms and P/NP problems, the course includes complete a practical project or research by the students.

40253205 Information Systems Security
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40322202 Programming of Internet Applications)
Information systems security and contemporary issues in information security and confidentiality problems, confidentiality models, methods to reduce risks and losses, information systems security within organizations, cryptography, information security control, information security programs, safe and reliable systems, user identification, network security case study. As you search on computer virus topics and methods of prevention, the course includes the implementation of an applied project or research by students.

40422207 Advanced Programming
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40421211 Object Oriented Programming)
Advanced Programming with python provides students concepts in Programming with Python. It assumes basic knowledge of Python control constructs, functions, files, data structures, and the numpy library. The course will cover gathering data from various sources including web scraping, web API's, CSV and other structured data files, and databases; data cleansing; using the pandas library for data analysis; regular expressions and other string processing methods; classes and object-oriented programming; and building real-world software applications.

40322202 Programming of Internet Applications
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40322101 Websites Design + 40241202 Databases)
The knowledge and the tools to design and implement internet web applications for desktop computers and smartphones using PHP language as a server-side language. Initially, the course will introduce HTML language and web applications. Students will learn about concepts of PHP, functionality of web server, install and configure Apache HTTP server or Microsoft IIS. This course goes over the syntax and usage of PHP language such as data types, operators, arrays, control statements, expressions, sessions, cookies, as well as create programs that interact with MySQL databases. At the end of this course, students will create and maintain a small web application project on a live web server for desktop computers and smartphones. The course includes complete a practical project or research by the students.

40433201 Computer Networks
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40241101 Fundamentals of Information Technology)
Key Concepts of Computer Networks; Broad Range of Topics in Networking (e.g. Networks Applications, Network Classifications and Topologies, Network Layers, Channel Performance Measures, Transmission Media, Communication Network Protocols and Architecture); Data Link Layer (e.g. Framing, Error Detection and Correction, CSMA/CD, LAN IEEE Standards); Network Layer (e.g. IP service model, IP Addressing, Sub-netting, Host Configuration DHCP, ARP Protocol, ICMP protocol); Transport Layer (e.g. UDP Protocol, TCP Protocol, TCP Reliable Transfer and Sliding Window, TCP Flow and Congestion Control); Application Layer (e.g. DNS Protocol, NAT Protocol, HTTP Protocol, Persistent and Non-Persistent HTTP Connection) , the course includes complete a practical project or research by the students.

40532201 Networks operating Systems
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40212101 Data Structures)
Introduces to Linux operating system concepts, including installation and maintenance. Focus on operating system concepts, management, maintenance, required resources, operating system concepts, installation, management, maintenance, use of Linux operating systems. Basic Linux commands and software, and standard software development tools, such as Emacs, Compilers, Debuggers, Facility Make, and automated shared system tasks by using Shell scripts, and basic system management.

40541201 Introduction to Cybersecurity
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: -)
Information security evolution into cybersecurity, theory of cybersecurity, and the relationship of cybersecurity to countries, companies, society and people. Students will learn about cybersecurity techniques, processes, and procedures in which they learn how to analyze the threats, vulnerabilities, and risks present in these environments, and develop appropriate strategies to mitigate potential Cybersecurity problems.

40543204 Network Management and Security
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40433201 Computer Networks)
An analytical and practical capabilities for computer networks' design, deployment, management and security. Basic foundations of network management, the Simple Network Management Protocol in its different versions (SNMPv1, SNMPv2, and SNMPv3), Remote network Monitoring. In addition, it focuses on Telecommunications Management Network, management tools and statistics measurement, management applications including: configuration, performance, event correlation, security, reports and service levels, the course includes complete a practical project or research by the students.

40542102 Fundamentals of Encryption
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40541201 Introduction to Cybersecurity)
Information systems security and contemporary issues in information security and confidentiality problems, confidentiality models, in addition to dealing with methods to reduce risks and losses, information systems security within institutions, cryptography, coding basics, symmetric and asymmetric public key, hash functions, message authentication, RSA, Diffie -Hellman, CAs, digital signatures, generating false random numbers, basic protocols and their computational complexity requirements to elliptic curve coding. The course includes the implementation of an application or research project by students.

40543201 System and Infrastructure Security
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40253205 Information Systems Security)
Physical and logical security over datacenters, buildings, and offices. It also defines a management program that protects assets across all levels of technology and the core components that support that technology. In addition, it targets to analyzes hacking methodology and how to create a functioning IT Infrastructure program for businesses, whether large or small, and includes change management scenarios and how to approach daily business security issues from cybersecurity perspective.

40543103 Information Security Protocols
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40542102 Fundamentals of Encryption)

Contemporary security protocols and their features, including confidentiality, authentication, group security, privacy, and anonymity. It covers encryption primitive, as well as measuring models and formal tools used for mechanical validation of secure systems, including model checking, resolving constraints, algebra operation, protocol logic, and game theory.

40543205 Networks Monitoring and Certification
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40433201 Computer Networks)

Concept of packet capture and its work mechanism, in addition to the concepts of packet / traffic analysis and protocol coordination. This course covers dealing with network devices specialized in network monitoring tasks, followed by conducting network monitoring in all sizes of networks, small or medium or enterprise.

40543206 Electronic Commerce Security
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40253205 Information Systems Security)

E-commerce principles, business and technology topics overview, business models, and virtual value chains. Some of the major issues related to e-commerce - security, privacy, intellectual property rights, authentication, encryption, fair use policies and legal obligations, client-side vulnerabilities (browsers) associated with web browsing, system penetration, information infringement and identity threats. SSL data flow encryption, data confidentiality and integrity using third-party transaction protocols such as SET, PCI DSS Standard, server-side security: CGI Security, Server Configuration, Access Control, Operating System Security, Malicious E-mail Messages, Web Scripts, Cookies, Web Bug Spyware, Web Server Architecture, Web Application Piracy, Infrastructure Mapping and Profiling, Web Authentication and Licensing , Hacking Scripts and Defensive Coding, Securing and Accessing Databases, Denying Buffer Overflow Attacks, Client Security, and Threats Modeling.

40544108 Ethical Hacking
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40543204 Network Management and Security)
Principles and techniques for using hacking skills for defensive purposes, planning, investigating, surveying, exploiting, post-exploiting, reporting on results, and possibility of exploiting system weaknesses and how to overcome these problems.

40544109 Intrusion Detection and Prevention
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40543204 Network Management and Security)
Methods of the intrusion detection, statistical approaches, and machine learning to detect computer attacks, network monitoring and analysis, and estimate the number and severity of attacks represented by investigations and denial of service attacks. Host-based attacks are buffer overruns. Malicious code represented by viruses and worms, in addition to identifying statistical patterns for detecting and classifying attacks. Network data visualization.

40544110 Networks and Information Security Programming
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40253205 Information Systems Security)
Analyze and design secure networks and server systems, develop a secure software with encryption, the Crypto API, Windows encryption service provider, piracy and debugging web applications, intrusion testing, and secure network systems with a firewall and its identities as the main tasks of a cyber-security engineer and IT security programmer, and cybersecurity analyst.

40544213 Digital Forensics
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40543204 Network Management and Security)
Basics of digital crime and network forensics, forensic modeling, forensic duplication and analysis, network monitoring, intrusion detection and prevention, incident response and backtracking. Signature and anomaly-based intrusion detection, pattern matching algorithms, viruses, trojans, worm detection, fingerprint multitasking, anonymity and aliases. In addition to privacy protection technologies, Internet law, computer security policies and guidelines, court witnesses and reporting, and case studies.

40543202 Secure Systems Development and Design
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40253205 Information Systems Security)
The development of high-assurance software systems is a growing challenge in emerging complex systems. Secure by design is emerging as a basic principle for trustworthy computing and as a preferred way to ensure the security of networked information systems and infrastructures. It focuses on this issue and fosters the design, implementation as well as verification/validation of secure software systems and architectures. A key coverage will include principles and practices of secure and high assurance software development process, including security development lifecycle models, and design/verification/validation using languages and tools such as UML. Tools and techniques for code analysis and testing, and evaluation and certification of software will also be emphasized. It covers secure programming principles using different languages, with particular focus in secure software development. This course covers the security and safety analysis in software design and development. It defines and identifies vulnerability detection and avoidance. Topics include threat modeling, and the interaction between security and usability authentication, principle of least privilege, buffer overflows, race conditions, time-of-check vs. time-of-use, trust management, access control, and other security relevant issues.

40542201 Information Systems Risk Management
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40541201 Introduction to Cybersecurity)
Introduction to Risk Management. The Risk Management Lifecycle. Risk Assessment and Analysis Techniques. Risk Exposure Factors. Security Controls and Services. Risk Evaluation and Mitigation Strategies. Reports and Consulting and Threat and Vulnerability Management.

40584201 Field Training on Cybersecurity
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: Complete 90 CH)
Training is required for each student in one of organizations for not less than 8 weeks and 200 hours of training, the practice regulations are according to the training regulations issued and approved by the department, collage and dean's council of the university.

40594201 Applied Graduation Project (1)
(1 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: Complete 90 Credit Hours)
Phase 1 (Analysis and Design), Applied project includes theoretical and practical practices related to the current problems and applications in Cybersecurity, applied research oriented, technical report, and presentation.

40594202 Applied Graduation Project (2)
(2 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40594201 Applied Graduation Project (1))
Phase 2 (Implementation), Applied project includes theoretical and practical practices related to the current problems and applications in Cybersecurity, applied research oriented, technical report, and presentation.

40543207 Social Networks Security
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40541201 Introduction to Cybersecurity)
Basics of secure use of social media. Information security awareness training on the dangers of social networks. Two-factor authentication on Facebook, Twitter and Google. Dealing with a password-selection mechanism that is difficult to crack and easy to save. Detect malware threats, phishing attacks and social engineering scams. The risks of installing third-party applications in social networking accounts.

40544112 Wireless Network Security
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40433201 Computer Networks)
Advanced topics on security and privacy for wireless communication systems, including cellular and wireless networks such wireless body area networks, personal area networks and area local networks. It will discuss current security threats in wireless and mobile networks. It will cover recent technologies used to protect network security and discuss the design and operation of security protocols designated for wireless networks.

40544214 IoT Security
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40533202 Wireless Networks)
The basic concepts of the Internet of Things and its future directions. The evolution of the Internet of Things, its technology and its commercial drivers and future. Giving an overview of the transition from machine-to-machine (M2M) solutions to IoT, as well as market incentives and industrial structures, IoT architecture and general design principles for different architectures, technological basics for building and implementing M2M and IoT solutions. A view of IoT security, IoT ethics and privacy. In addition to building automation and security, relevant case studies of vulnerabilities and security attacks on the Internet of Things, mitigation controls, and IoT applications represented by asset management, industrial automation, commercial building automation, smart cities, and participatory sensing, the course includes the completion of an application or research project by students.

40544215 Cloud Computing Security
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40543103 Information Security Protocols)
Concepts of cloud computing and architectural principles, design techniques and patterns and best practices in the real world applied to cloud service providers and consumers and providing secure cloud-based services, as well as cloud security architecture and exploration of guiding security design principles, design patterns, industry standards, and application technologies and addressing regulatory compliance requirements of critical importance to design, implement and manage cloud-based services.

40544216 Special Topics on Cybersecurity
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: Complete 60 CH)
Special topics of current trends in Cybersecurity, the course includes complete a practical project or research by the students.

40544217 Advanced Digital Forensics
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40544213 Digital Forensics)
The methodology and procedures associated with digital forensic analysis of incidents that involve internet, computer, network and mobile forensic. Topics including configuring a secure OS using command line and graphical utilities. OS file systems architectures, security vulnerabilities, user security, hardening, data and file recovery. network data acquisition, network forensics analysis, network logs and traffic acquisition and analysis, managing Intrusion Detection/ Prevention Systems (IDS/IPS), Managing Security Incident and Event Management (SIEM) systems, etc. mobile technology, mobile devices, and cellular networks then to the processes, methods, and techniques of mobile forensics. Students will learn about the importance of network forensic principles, legal considerations, digital evidence controls, and documentation of forensic procedures. They will be required to take on the role of problem solvers and apply the concepts presented to situations that might occur on any computer.

40544218 Penetration Testing
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 40253205 Information Systems Security)
Learn how hackers compromise operating systems and evade antivirus software. This course will learn the student how to discover the weaknesses in the network by using the same mindset and methods as hackers. The students will acquire the skills to test and exploit your defenses and implement countermeasures to reduce risk in your enterprise. This course will cover the stages of penetration testing include reconnaissance, scanning, gaining access, maintaining access, covering tracks and types of attacks.

50551105 Principles of Mathematics and Statistics
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: -)
Introduction to functions, limits and continuity, derivatives and rules, techniques of differentiation. It also introduces also the science of statistics and statistical research methods, sampling and sample data collection and classification. It covers various topics in descriptive statistics, correlation and regression analysis, time series, index numbers, the course includes complete a practical project or research by the students.

50223121 Numerical Analysis
(3 Credit Hours, Lecture: 3, Lab: 0, Prerequisite: 50551105 Principles of Mathematics and Statistics)
Introduction to the numerical analysis, and its primary objective is to develop the basic understanding of numerical algorithms and required skills to implement algorithms to solve mathematical problems, the course includes complete a practical project or research by the students.