CEC Undergraduate Programs

Bachelor of Science in Cybersecurity

The Bachelor of Science in Cybersecurity is a 4-year undergraduate curriculum that ensures academic success and preparation for a productive career in cybersecurity. The program aims to equip students with the skills and knowledge necessary to secure computer systems, networks, and data from various cyber threats.

The objectives of the program are:

1. To provide students with a solid foundation in computer science principles and practices, as well as specialized knowledge in the field of cybersecurity.
2. To equip students with the knowledge and skills necessary to identify, assess, and mitigate cybersecurity risks and threats.
3. To train students in the design, implementation, and management of secure computer systems and networks.
4. To educate students on legal, ethical, social, and economic issues related to cybersecurity, including privacy, data protection, and cybercrime.
5. To provide students with the intellectual skills necessary for continuous learning in order to keep up with the constantly evolving industry.
6. To prepare students for a successful career in the field of cybersecurity and for advanced study in computer science and cybersecurity at the graduate level.

Program Learning Outcomes (PLOs)

The Program Learning Outcomes (PLOs) are:

- ✓ Demonstrate critical knowledge and understanding of mathematics and current technical concepts and practices in the core of computing and cybersecurity.
- ✓ Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- ✓ Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- ✓ Communicate effectively in a variety of professional contexts.
- ✓ Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- ✓ Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- ✓ Apply security principles and practices to maintain operations in the presence of risks and threats. [CY]

Program Structure

All students pursuing the Bachelor of Science in Cybersecurity must complete a minimum of 130 credits with a cumulative GPA of 2.0 or better. Specifically, the requirements are as follows:

- A minimum of (39) credits of General Education Requirements
- A minimum of (6) credits of Professional Elective Options
- A minimum of (40) credits of Computing Requirements
- A minimum of (36) credits of Major Requirements
- A minimum of (9) credits of Major Electives
- Graduate Portfolio

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Curriculum Plan – BSc in Cybersecurity

Course Code	Course Title	CH	Pre-requisites
General Education Requirements	Total Credits	39	
National Requirements	Total Credits	7	
ARHG 104/ARHG 101	Arabic for Arabic Speakers/Arabic for Non-Arabic Speakers	3	
ARHG 106	Modern History of Bahrain	2	
ARHG 107	Human Rights	2	
English Requirements	Total Credits	6	
ENGL 101	Composition I	3	
ENGL 102	Composition II	3	ENGL 101
Mathematics Requirements	Total Credits	8	
MATH 153	Calculus I	4	
MATH 154	Calculus II	4	MATH 153
ICT Requirements	Total Credits	3	
COSC 101	Introduction to Computing	3	
Lifelong Learning Requirements	Total Credits	1	
UNSS 101	University Success	1	
Natural Science Requirements	Total Credits	8	
Students should complete a minimum of 4 credits, including at least 1 credit lab from the Natural Science list of the general Education tabulated below.			
Arts and Humanities Requirements	Total Credits	3	
Students should complete a minimum of 3 credits from the Arts and Humanities list of the general Education tabulated below			
Social and Behavioral Science Requirements	Total Credits	3	
Students should complete a minimum of 3 credits, from the Social and Behavioral Science list of the general Education tabulated below.			
Arts and Humanities List			
TURK 101	Turkish for Beginners	3	
CCHN 101	Spoken Mandarin	3	
PHIL 101	Introduction to Philosophy	3	
ANTH 152	Introduction to Cultural Anthropology	3	
HUMS 101	Forms and Ideas in the Humanities	3	
HIST 201	World History	3	
ENGL 103	Public Speaking	3	
COMS 356	Intercultural Communication	3	ENGL 101
PHIL 201	Oriental and Islamic Philosophy	3	
Natural Sciences List			
CHEM 101	Introductory Chemistry	3	co-requisite of CHEM 101L
CHEM 101L	Introductory Chemistry Laboratory	1	co-requisite of CHEM 101
PHYS 101	Principles of Physics I	3	co-requisite of PHYS 101L
PHYS 101L	Principles of Physics I Laboratory	1	co-requisite of PHYS 101
PHYS 102	Principles of Physics II	3	PHYS 101, PHYS 101L, MATH 153, co-requisite: PHYS 102L
PHYS 102L	Principles of Physics II Laboratory	1	PHYS 101, PHYS 101L, MATH 153, co-requisite: PHYS 102
BIOL 101	Principles of Biology I	3	co-requisite BIOL 101L
BIOL 101L	Principles of Biology I Laboratory	1	co-requisite BIOL 101
ASTR 352	Current Developments in Astronomy	3	co-requisite of ASTR 352L
ASTR 352L	Current Developments in Astronomy Laboratory	1	co-requisite of ASTR 352
ENVS 201	Environmental Science	3	co-requisite of ENVS 201L
ENVS 201L	Environmental Science Laboratory	1	co-requisite of ENVS 201
Social and Behavioral Sciences List			
PSYC 101	Introduction to Psychology	3	
SOCS 101	Introduction to Sociology	3	
ENGL 205	Business Communication	3	
SUST 101	Principles of Sustainability	3	
POLS 321	Comparative Political Ideologies	3	
PSYC 202	Mind Matters: A Practical Exploration	3	

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Program Core Requirments	Total Credits	40	
COSC 102	Object-Oriented Programming	3	COSC 101
COSC 125	Data Structure and Programming Techniques	3	COSC 102
MATH 203	Discrete Mathematics	3	MATH 153
CMPE 215	Communication Networks	3	COSC 125
ENGR 205	Multidisciplinary Research Methods	2	ENGL 102
MATH 255	Introduction to Linear Algebra	3	MATH 153
MATH 260	Probability and Statistics	4	MATH 154
CMPE 270	Digital Systems	3	MATH 153
CMPE 270L	Digital Systems Laboratory	1	Corequisite CMPE 270
CMPE 271	Computer Organization	3	COSC 102, CMPE 270
COSC 312	Design and Usage of Databases	3	MATH 203, COSC 125
COSC 372	Operating Systems	3	CMPE271
COSC 372L	Operating Systems Laboratory	1	Co-requisite COSC 372
SWEN 360	Software Design and Engineering	3	COSC 125
ENGR 401	Entrepreneurship for Engineers	2	ENGR 205
Program Major Requirements	**Total Credits**	**36**	
COSC 248	Algorithms and Complexity	3	MATH 203, COSC 125
SWEN 360L	Software Design and Engineering Laboratory	1	Co-requisite SWEN 360
CYBR 310	Introduction to Cybersecurity	3	CMPE 215
CYBR 362	Security Vulnerabilities and Threats	3	CYBR 310
CYBR 460	Secure Software Design and Engineering	3	SWEN 360
CYBR 315	Network Security and Forensics Analysis	3	CMPE 215
CYBR 375	Cybercrime	3	CYBR 310
CYBR 462	Information System Risk Management	3	CYBR 362
CYBR 470	Cryptography	3	MATH 203
CYBR 480	Security Standards and Audits	3	CYBR 362
CYBR 410L	Cybersecurity Professional Certificate	1	Senior Level (90 Credits)
CYBR 405	Cybersecurity Internship	3	86 credits, CGPA 2.0.
CYBR 495A	Cybersecurity Design Project A	1	Senior Level (90 Credits), CGPA 2.0, SWEN 360/L
CYBR 495B	Cybersecurity Design Project B	3	CYBR 495A
Program Major Electives Options	**Total Credits**	**9**	
Students pursuing the Bachelor of Science in Cybersecurity must complete a minimum of 9 elective credits from the following list or any other course approved by the College of Engineering and Computing:			
CYBR 415	Cloud Security and Privacy	3	CMPE 215
CYBR 465	Web application Security	3	COSC 312, CYBR 310
CYBR 467	Ethical Hacking	3	CYBR 362
CYBR 482	Information Technology Audit and Control	3	CYBR 310
CYBR 487	Cybersecurity Framework and Management	3	CYBR 310
CYBR 475	Cyber Incident Handling and Response	3	CYBR 310
Professional Elective Options	**Total Credits**	**6**	
Students pursuing the Bachelor of Science in Cybersecurity must complete a minimum of 6 elective credits from general education course or any other programs at 200 level or above.			
Internship	**Total Credits**	**3**	
To qualify for the Bachelor of Science in Cybersecurity a student must fulfill the internship requirements prior to graduation. The purpose of the internship is to expose students to the profession and give them an opportunity to apply their academic knowledge in a practical setting. The internship consists of a minimum of 280 work hours (8 weeks) with an approved employer. Internships are evaluated by the internship coordinator with a pass/fail grade.			
Program Total Credits		**130**	

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Proposed Study Plan (CYBR) - AY 2025 - 2026

First Year

1st Semester

Course Code	Course Title	CH	Pre-requisites
ENGL 101	Composition I	3	
UNSS 101	University Success	1	
COSC 101	Introduction to Computing	3	
MATH 153	Calculus I	4	
XXXX	Science Requirement	3	
XXXX	Science Lab Requirement	1	
TOTAL		15	

2nd Semester

Course Code	Course Title	CH	Pre-requisites
ENGL 102	Composition II	3	ENGL 101
ARHG 104/ARHG 101	Arabic for Arabic Speakers/Arabic for Non-Arabic Speakers	3	
MATH 154	Calculus II	4	MATH 153
COSC 102	Object-Oriented Programming	3	COSC 101
XXXX	Science Requirement	3	
XXXX	Science Lab Requirement	1	
TOTAL		17	

Second Year

3rd Semester

Course Code	Course Title	CH	Pre-requisites
COSC 125	Data Structure and Programming Techniques	3	COSC 102
MATH 203	Discrete Mathematics	3	MATH 153
CMPE 270	Digital Systems	3	MATH 153
CMPE 270L	Digital Systems Laboratory	1	Corequisite CMPE 270
MATH 255	Introduction to Linear Algebra	3	MATH 153
XXXX	Social Science Requirements	3	
TOTAL		16	

4th Semester

Course Code	Course Title	CH	Pre-requisites
MATH 260	Probability and Statistics	4	MATH 154
CMPE 215	Communication Networks	3	COSC 125
CMPE 271	Computer Organization	3	COSC 102, CMPE 270
ENGR 205	Multidisciplinary Research Methods	2	ENGL 102
COSC 248	Algorithms and Complexity	3	MATH 203, COSC 125
ARHG 106	Modern History of Bahrain	2	
TOTAL		17	

Third Year

5th Semester

Course Code	Course Title	CH	Pre-requisites
CYBR 310	Introduction to Cybersecurity	3	CMPE 215
SWEN 360L	Software Design and Engineering Laboratory	1	Co-requisite SWEN 360
COSC 372	Operating Systems	3	CMPE271
COSC 372L	Operating Systems Laboratory	1	Co-requisite COSC 372
COSC 312	Design and Usage of Databases	3	MATH 203 and COSC 125
SWEN 360	Software Design and Engineering	3	COSC 125
ENGR 401	Entrepreneurship for Engineers	2	ENGR 205
TOTAL		16	

6th Semester

Course Code	Course Title	CH	Pre-requisites
CYBR 362	Security Vulnerabilities and Threats	3	CYBR 310
CYBR 315	Network Security and Forensics Analysis	3	CMPE 215
CYBR 375	Cybercrime	3	CYBR 310
XXXX	Arts and Humanities Requirements	3	
ARHG 107	Human Rights	2	
XXXX	Major Electives 1	3	
TOTAL		17	

Summer Semester

Course Code	Course Title	CH	Pre-requisites
CYBR 405	Cybersecurity Internship	3	86 credits, CGPA 2.0.
TOTAL		3	

Fourth Year

7th Semester

Course Code	Course Title	CH	Pre-requisites
CYBR 460	Secure Software Design and Engineering	3	SWEN 360
CYBR 462	Information System Risk Management	3	CYBR 362
CYBR 470	Cryptography	3	MATH 203
CYBR 495A	Cybersecurity Design Project A	1	Senior Level (90 Credits), CGPA 2.0, SWEN 360/L
XXXX	Professional Elective 1	3	
XXXX	Major Elective 2	3	
TOTAL		16	

8th Semester

Course Code	Course Title	CH	Pre-requisites
CYBR 480	Security Standards and Audits	3	CYBR 362
CYBR 410L	Social and Behaviroal Science Requiremetns	1	Senior Level (90 Credits)
CYBR 495B	Cybersecurity Design Project B	3	CYBR 495A
XXXX	Professional Elective 2	3	
XXXX	Major Elective 3	3	
TOTAL		13	