Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation

Academic Program Specification form

University: Northern Technical University
College: Technical Engineering College of Mosul
Department: Cybersecurity and Cloud Computing Techniques Engineering
Date of form completion: 10-1-2024

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Dean`s Name
Date :
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Date: 10 .—1-2024
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Dr. Razan Abdulhammed
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Ministry of Higher Education, Scientific Research,
Supervision, Evaluation, Scientific
Accreditation Department, Academic

Academic Program and Course Description Guide

2024

Introduction:

The educational program is a coordinated and organized package of courses that include procedures and experiences organized in the form of academic vocabulary whose main purpose is to build and refine the skills of graduates, making them qualified to meet the requirements of the labor market, which is reviewed and evaluated annually through internal or external audit procedures and programs such as the external examiner program.   The description of the academic program provides a brief summary of the main features of the program and its courses, indicating the skills that are being worked on to acquire for students based on the objectives of the academic program, and the importance of this description is evident because it represents the cornerstone in obtaining program accreditation and is written jointly by the teaching staff under the supervision of the scientific committees in the scientific departments.   This guide in its second version includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the developments and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly) system, as well as the adoption of the description of the academic program circulated according to the book of the Department of Studies T3/2906 on 3/5/2023 regarding programs that adopt the Polo path.

In this regard, we can only emphasize the importance of writing a description of academic programs and courses to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The description of the academic program provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies. Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available learning opportunities. It is derived from the description of the program. Program Vision: An ambitious picture for the future of the academic program to be a sophisticated, inspiring, stimulating, realistic and applicable program. Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions. Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable. Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (semester, yearly, Bologna track) whether it is a requirement (ministry, university, college and scientific department) with the number of study units. Learning Outcomes: A compatible set of knowledge, skills and

Learning Outcomes:

A compatible set of knowledge, skills and values acquired by the student after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program. Teaching and learning strategies: They are the strategies used by the faculty member to develop the student's teaching and learning, and they are plans that are followed to reach the learning goals. That is, describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Program Description Form

Northern Technical University

Technical Engineering College of Mosul

Cybersecurity and Cloud Computing Department

Bachelor Degree of Engineering in Cybersecurity and Cloud Computing

Prologue Process

Date **7/3/2024**

Signature :

Scientific Affair Dean:

Date :

Signature :

Head of Department:

Date

File were checked by

Division of Quality Assurance and University Performance

Date:

Signature :

Dean of Technical Engineering college of Mosul

1. Program Vision

The vision of the Department of Cybersecurity and Cloud Computing Technology Engineering is a world where digital security is a top priority and cloud computing is used to its full potential. The department's vision recognizes the importance of both areas and their unique responsibilities. While Cybersecurity seriously protects against unauthorized access, cyber threats, and network and data compromise, cloud computing represents a transformative force, using the Internet to easily access scalable computing resources.

In this department, students are taught the importance of Cybersecurity and cloud computing and how to apply Cybersecurity and cloud computing techniques to solve Cybersecurity and cloud computing problems. And also how to analyze Cybersecurity and cloud computing and how to apply Cybersecurity techniques and cloud computing to solve Cybersecurity and cloud computing problems. Students can also learn how to develop and apply Cybersecurity and cloud computing techniques to help solve Cybersecurity and cloud computing problems.

Graduates of the department will be responsible for planning, implementing, updating and monitoring security measures to protect computer and information networks, assessing vulnerabilities in computer and electronic systems with regard to security risks, and proposing and implementing risk mitigation. They may ensure that appropriate security controls are in place that will protect digital files and vital information and respond to computer breaches and viruses. Cloud computing is a transformative force, using the Internet to easily access scalable computing resources.

2. Letter of the Program

The mission of the Department of Cybersecurity and Cloud Computing Technologies Engineering is one of the important messages in the field of Cybersecurity and cloud computing. This department aims to train students on the use of modern technologies to protect systems and data from cyber-attacks and security threats. The department includes the study of topics such as security analysis, encryption, virus protection, identity verification, access control,

network control,and cloud computing. These topics are taught using the latest technologies and software tools, giving students the skills to work in Cybersecurity and cloud computing. Thus, the mission of the Department of Cybersecurity and Cloud Computing Engineering is to train students to protect systems and data from cyber-attacks and security threats using modern technologies and software tools.

3. Program Objectives

1. Graduating engineering cadres capable of designing and implementing secure systems that protect against cyber threats and vulnerabilities. Develop and implement secure network solutions, design, engineer and convert reliable systems into secure systems, manage audit/intrusion and security technology systems, conduct assessments and penetration testing, understand successful cyber-attacks and their impacts on the operational mission of various digital systems, and build the Iraqi state's long-term resilience and work through cyber incidents.

2. Preparing engineering cadres with a high level of understanding, knowledge and academic and technical preparation that combine engineering perceptions, technical creativity, scientific skill and quality of implementation in the field of Cybersecurity and cloud computing engineering technologies.

3. Graduating engineering cadres who are responsible for building, designing and protecting information technology systems in institutions to prevent data breaches, keep them safe from hackers, viruses and other potential problems, supervise and build network infrastructure of various types and available systems, follow up the problems of network infrastructure devices and protection devices, and provide guidance and solutions regarding various problems.

4. Graduating engineering cadres with the scientific and technical skill that enables him to master dealing with cloud computing operations, using vulnerability examination tools to detect various technical problems, follow up on the failure and evaluation of security patches, mitigate security vulnerabilities, and provide assistance in security

documentation and disaster recovery solutions.

5. Preparing engineering cadres that possess the technical and scientific skill that enables him to analyze data records and conduct risk assessments in the event of security breaches to know which parts of the system have been breached and where the danger lies. Data breaches and secure systems to troubleshoot potential vulnerabilities in order to ensure the integrity of network systems.

4. Program Accreditation

None

5. Other Accreditation

None

6. Program Structure

Note*	Percentage	Credits	Number of Modules	Program Structure
Basic Module Type		20	9	University Requirement
			4	College Requirement
			43	Department Requirement
			Yes	Sumer training
				Other

.Notes may include whether the course is basic or optional *

Program Description

Level : 1

Semester : 1

Module Code	Module Name in English	Th.	Pr./ Tu.	ECTS	Module Type	Prerequisite Module(s) Code
BCYSCE100-S1	Mathematics	2	3	5.00	S	
BCYSCE105-S1	Linux Administrator	2	1	5.00	C	
BCYSCE102-S1	Fundamentals of Programming	2	2	7.00	C	
BCYSCE104-S1	Fundamentals of Electrical Engineering	2	2	6.00	S	
NTU 101	English language	2	2	2.00	B	
BCYSCE103-S1	Introduction to Sociology	2	-	3.00	S	
NTU100	Human rights and Democracy	2	-	2.00	E	NTU 101
				30.00		

Program Description

Level : 1

Semester : 2

Module Code	Module Name in English	Th.	Pr./ Tu.	ECTS	Module Type	Prerequisite Module(s) Code
BCYSCE101-S2	Digital Electronics	2	3	7.00	S	
BCYSCE106-S2	Introduction to Probability and Statistics	2	1	5.00	S	BCYSCE100-S1
BCYSCE107-S2	Object oriented programming	2	2	7.00	C	BCYSCE102-S1
NTU102	Computer	2	2	2.00	B	
BCYSCE108-S2	Introduction to Cyber security Engineering	2	2	7.00	C	
NTU103	Arabic Language	2	-	2.00	B	
NTU104	Physical Education	-	-		E	
				30.00		

Program Description

Level : 2

Semester : 3

Module Code	Module Name in English	Th.	Pr./ Tu.	ECTS	Module Type	Prerequisite Module(s) Code
BCYSCE200-S1	Computer Electronics	2	3	4.00	S	
BCYSCE205-S1	Discrete Math	2	1	4.00	C	
BCYSCE202-S1	Database system	2	2	4.00	S	
BCYSCE204-S1	Python Programming for Cybersecurity	2	2	5.00	C	
BCYSCE203-S1	Operating Systems	2	2	4.00	C	
NTU203	Bath Party Crimes	2	-	2.00	B	
NTU200	English language	2	-	2.00	B	NTU 101
BCYSCE200-S1	Computer Networks	2	2	5.00	C	
				30.00		

Program Description

Level : 2

Semester : 4

Module Code	Module Name in English	Th.	Pr./ Tu.	ECTS	Module Type	Prerequisite Module(s) Code
BCYSCE205-S2	Data structures	2	2	4.00	S	
BCYSCE202-S2	Database security	2	2	5.00	C	BCYSCE202-S1
BCYSCE204-S2	Computer Organization and Architectures	2	3	5.00	S	
BCYSCE203-S2	Network Security	2	2	6.00	C	BCYSCE200-S1
NTU202	Arabic Language	2		2.00	B	NTU103
NTU 204	Cybersecurity Professional ethics	2		2.00	B	
BCYSCE201-S1	Network Administration and Infrastructure	2	2	4.00	C	BCYSCE200-S1
NTU201	Computer	1	2	2.00	B	
				30.00		

Program Description

Level : 3

Semester : 5

Module Code	Module Name in English	Th.	Pr./ Tu.	ECTS	Module Type	Prerequisite Module(s) Code
BCYSCE203-S1	Introduction to Cryptography	2	2	6.00	C	BCYSCE203-S2, BCYSCE205-S1
BCYSCE305-S1	Introduction to Hardware Security	2	2	7.00	C	BCYSCE200-S1, BCYSCE203-S1
BCYSCE302-S1	Digital Signal Processing	2	2	5.00	S	
BCYSCE304-S1	Mobile and wireless networks	2	2	5.00	C	
BCYSCE303-S1	Fundamentals of Cloud computing	2	2	7.00	C	
				30.00		

Program Description

Level : 3

Semester : 6

Module Code	Module Name in English	Th.	Pr./ Tu.	ECTS	Module Type	Prerequisite Module(s) Code
BCYSCE300-S2	Mobile and wireless networks security	2	2	5.00	C	BCYSCE304-S1
BCYSCE305-S2	Secure software development	2	2	5.00	C	BCYSCE102-S1, BCYSCE204-S1, BCYSCE107-S2
BCYSCE302-S2	Operating system security	2	2	5.00	C	BCYSCE203-S1
BCYSCE304-S2	Practicing Cybersecurity: Attacks and Countermeasures	2	2	5.00	C	BCYSCE203-S2, BCYSCE300-S2 ,BCYSCE202-S2
BCYSCE303-S2	Engineering Analysis	2	2	4.00	S	
BCYSCE301-S2	Cloud Computing security	2	2	6.00	C	BCYSCE301-S2
				30.00		

Program Description

Level : 4
Semester : 7

Module Code	Module Name in English	Th.	Pr./ Tu.	ECTS	Module Type	Prerequisite Module(s) Code
BCYSCE400-S1	Intrusions Detection and prevention System	2	2	6.00	C	
BCYSCE405-S1	Research Methodology	2	-	3.00	S	
BCYSCE402-S1	AI for Cybersecurity Engineering	2	2	6.00	C	
BCYSCE404-S1	Practicing Cybersecurity: Ethical Hacking and Vulnerability	2	2	6.00	C	BCYSCE304-S2, BCYSCE105-S1
BCYSCE403-S1	Cloud Application	2	2	3.00	C	
BCYSCE401-S1	Graduation Project Design	2	2	6.00	C	
				30.0		

Program Description

Level : 4
Semester : 8

Module Code	Module Name in English	Th.	Pr./ Tu.	ECTS	Module Type	Prerequisite Module(s) Code
BCYSCE400-S2	IT Project Management	2	2	6.00	C	
BCYSCE405-S2	Graduation Project Implementation	2	-	3.00	C	BCYSCE401-S1
BCYSCE402-S2	Digital Forensics	2	2	7.00	C	
BCYSCE404-S2	IoTs and Cybersecurity	2	2	7.00	C	
BCYSCE403-S2	Reverse Engineering-Malwares Analysis	2	2	7.00	C	BCYSCE400-S1
				6.00		

Program Learning Outcomes ٧.
Understanding and Knowldge

1. Evaluate computer systems, networks, and software applications for vulnerabilities.

2. Design and implement Cybersecurity measures to protect systems and data from cyber-attacks.

3. Analyze data and verify illegal activities on networks and systems.

4. Understand and deal with cloud computing concepts and applications.

5. Maintain the confidentiality and security of data and detect breaches that occur.
   Take countermeasures to unauthorized intrusions and countermeasures through data protection

Academic Skills

1. Critical thinking: The ability to analyze complex problems, evaluate different solutions, and make informed decisions based on evidence and logic is critical in Cybersecurity engineering.

2. Problem-solving skills: The ability to identify security vulnerabilities, develop effective solutions, and efficiently troubleshoot problems is an essential skill for a Cybersecurity engineer.

3. Analytical skills: The ability to examine data, detect patterns, and interpret trends is essential to understanding cyber threats and developing effective defensive strategies.

4. Attention to detail: Developing a keen eye on detail is vital to ensure the security of systems and networks

5. Creativity: Thinking outside the box and coming up with innovative solutions to combat evolving cyber threats is a valuable skill for Cybersecurity engineers.

6.   Risk assessment skills: The ability to assess and prioritize potential

risks based on their impact and develop risk mitigation strategies is

critical in Cybersecurity.

7.   Adaptability: Being adaptable and wanting to learn new techniques

and techniques is essential to stay ahead of cyber threats.

8.   Collaborative skills: Working effectively in teams, communicating

ideas clearly, and collaborating with colleagues from diverse backgrounds

are important skills for addressing complex Cybersecurity challenges.

   For continuous learning: Having a continuous learning mindset and staying

      up-to-date Trends and technologies are essential to success in the field

General Skills

1.   Teamwork: Ability to work collaboratively with colleagues, share knowledge, and contribute effectively to group projects or incident response teams.

2.   Time Management: Skill in prioritizing tasks, meeting deadlines, and efficiently managing workload to handle multiple projects simultaneously

  3.   Ethical mindset: Commitment to upholding ethical standards, maintaining confidentiality, and adhering to legal regulations in Cybersecurity practices.

4.   Resilience: Ability to deal with high-stress situations, recover from setbacks, and persevere in finding solutions to evolving cyber threats.

   5.   English and Arabic speaking skills

6.   Leadership and communication: Developing leadership skills and building a professional network can enhance career opportunities and facilitate collaboration in Cybersecurity.

7.   Research and Commitment to Learning: A Strong Dedication to Continuous Learning and Survival Up-to-date with the latest trends is vital to success in Cybersecurity

Teaching and learning strategies

1. Explain the scientific material to students in detail.
2. Participation of students in solving scientific and mathematical problems related to the selected scientific material
3. Discussion and dialogue on topic-related vocabulary and scientific material
4. Blended learning (online learning material with online interaction, with classroom methods). Science Films, Educational Videos
5. Summer Training
6. Labs
7. Graduation Projects

8. Evaluation Methods

Weekly, monthly, daily exams and end-of-year exams.

9. الهيئة التدريسية

أعضاء هيئة التدريس						
الرتبة العلمية	التخصص		المتطلبات/المهارات الخاصة (ان وجدت)		اعداد الهيئة التدريسية	
	عام	خاص			ملاك	محاضر
استاذ	اقتصاد	كمي			ملاك	

Program Development – For New Faculty Members

1. .Develop an orientation program to introduce new faculty members to the institution and its policies and procedures.

2. Pair new faculty with experienced mentors to provide guidance, support, and advice.

3. Organize regular training workshops on teaching methodologies, assessment and research techniques.

4. Establish a feedback mechanism for new faculty members to receive constructive feedback on their performance and areas of improvement.

5. .Encourage participation in conferences, seminars and research projects to

6. promote professional growth.

7. Provide ongoing support through regular meetings, resources and access to professional development materials.

Program Development – For Faculty Members

1. Faculty members' skills should be assessed to study their educational and technical needs.

2. Provide training courses to help develop faculty skills in areas such as advanced education, educational technologies, and rigorous assessment.

3. Encourage teamwork among faculty members to share experiences and knowledge.

4. Provide continuous updates on the latest in the fields of education and educational technologies.

5. Provide ongoing support to faculty members to help solve the problems and challenges they face.

6. Conduct periodic evaluations to review the professional development of faculty

7. members and identify advantages and disadvantages

10.	Acceptance Criterion

High School Diploma

11.	The most important sources of information about the program

1. University website.
2. Department Websites
3. Academic description files and program specifications.
4. Visit to and from High schools.
5. Academic Program Specification Form.
6. College Research Sites .

12.	Program Development Plan

Curriculum Enhancement:

- Introduce advanced courses in Cybersecurity, cloud computing, artificial intelligence, and data analytics to keep up with industry demands
- Include practical training in network security, threat detection, and secure infrastructure design
- Offer specialized courses in cloud security, encryption techniques, and risk assessment

Faculty Development:

- Recruit experienced professionals in Cybersecurity and cloud computing to enhance teaching quality and industry relevance
- Encourage faculty research in cutting-edge Cybersecurity technologies and cloud computing advancements

Industry Partnerships:

- Collaborate with Cybersecurity firms, cloud service providers, and tech companies for internships, guest lectures, and real-world projects.

- Establish a strong network with industry experts to ensure curriculum alignment with current industry trends and practices

Student Engagement:
- Organize hackathons, Cybersecurity competitions, and cloud computing workshops to foster practical skills and innovation among students.
- Encourage student involvement in research projects related to Cybersecurity, cloud security, and emerging technologies

Infrastructure Development:
- Invest in state-of-the-art Cybersecurity labs, cloud computing resources, and simulation environments for hands-on training and experimentation
- Provide access to industry-standard tools and software used in Cybersecurity and cloud computing for practical learning

COURSES SPECIFICATION

This Course Specification provide a concise summary of the main features course and the learning outcomes that a typical student might reasonable expected to achieve and demonstrate if he/she take advantage of the learning opportunities that are provided. It should be cross-referenced with the specification

Module 1

Code	Course/Module Title	ECTS	Semester
BCYSCET403-S2	Reverse Engineering: Malwares Analysis	7	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	3	79	96
Description			

The Reverse Engineering: Malware Analysis module is a comprehensive module that teaches students how to analyze malware using various tools and techniques. The module covers a range of topics, including static and dynamic analysis, triage, and code analysis.

Module 2

Code	Course/Module Title	ECTS	Semester
CYSCET400-S1	Intrusions Detection	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	3	78	72
Description			

The Intrusion Detection module is designed to provide students with an understanding of the tenets of intrusion detection, the types of intrusion detection products, and traffic analysis. The module will focus on signature-based detection methods and signature base intrusions detection.

Module 3

Code	Course/Module Title	ECTS	Semester
BCYSCE 402- S1	AI for Cybersecurity	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	71
Description			

This module explores the intersection of cybersecurity and artificial intelligence (AI), providing students with the knowledge and skills necessary to govern and secure AI and machine learning systems. The course covers key AI technologies, including machine learning and natural language processing, and their applications in cybersecurity.

Students will learn about the impact of AI on the cybersecurity ecosystem, including threat actors, defenders, regulatory and government agencies

Module 4

Code	Course/Module Title	ECTS	Semester
BCYSCE 403- S1	Cloud Application	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	46
Description			

This module introduces cloud-native applications and their development and support. The course covers the basic building blocks and properties expected from cloud applications, best practices for developing applications, and migrating on-premises applications to the cloud. The course also covers emergent cloud trends and practices, including hybrid Multiclouds, microservices, serverless, DevOps, cloud-native, and application modernization.

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Module 5

Code	Course/Module Title	ECTS	Semester
BCYSCE 404- S2	IoTs and Cybersecurity	7	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	3	79	96
Description			

This module provides an understanding of what the IoT is and the requirements to design certain IoT solutions. The course covers topics such as IoT architecture, IoT communication, and IoT security. Moreover, it provides students with a foundational understanding of cybersecurity and its importance in today's digital world in IoTs sectors.

Module 6

Code	Course/Module Title	ECTS	Semester
BCYSCE 402 S2	Digital forensics	7	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	96
Description			

This module is designed to provide students with an understanding of the basic concepts and principles of digital forensics. The course covers the legal restrictions and requirements around obtaining digital evidence, keeping retrieved digital evidence pristine, analyzing, interpreting, and explaining the results of digital investigations.it also include applying forensic science to the digital artifacts of computers, mobile phones, networks, storage devices, and cyber space.

Module 7

Code	Course/Module Title	ECTS	Semester
BCYSCE 405 S1-	Research Methodology	3	8
Class (hr/w)	**Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	-	49	26
Description			

This module teaches students how to conduct research in a scientific and ethical manner. The course covers topics, including research design, data analysis, and report writing. It introduces students to the language of research and ethical principles and challenges. The course also covers the elements of the research process within quantitative, qualitative, and mixed methods approaches. Students will learn how to formulate hypotheses, develop testable objectives, select subjects, collect data, analyze data, and interpret results. They will also learn how to write research reports and present findings to colleagues.

Module 8

Code	Course/Module Title	ECTS	Semester
BCYSCE 400 - S2	IT Project Management	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			

This module is designed to equip students with the knowledge and skills required to plan, design, and deliver software management projects on time and on budget, with a strategic focus on developing multi and intra-disciplinary characteristics of modern digital and cybersecurity project-based environments. The module will include defining the scope of a project, creating, and managing the project plan

Module 9

Code	Course/Module Title	ECTS	Semester
BCYSCE 400 - S2	Graduate Project Design	3	7
Class (hr/w)	**Pract.**	**SSWL (hr/sem)**	**USSWL (hr/w)**
-	**2**	34	41
Description			

The main purpose of the project graduation course is to encourage the students to apply the knowledge they have acquired during their study. The projects need to integrate engineering criteria and realistic constraints, such as economic, environmental, moral, security, social, political, and sustainability-related considerations.

Module 10

Code	Course/Module Title	ECTS	Semester
BCYSCE 400 - S2	Graduate Project Implementation	4	7
Class (hr/w)	**Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
-	**Pract.**	34	66
Description			
The main purpose of the project graduation course is to encourage the students to apply the knowledge they have acquired during their study. The projects need to integrate engineering criteria and realistic constraints, such as economic, environmental, moral, security, social, political, and sustainability-related considerations.			

Module 11

Code	Course/Module Title	ECTS	Semester
BCYSCE 402 S2	Practicing Cybersecurity: Ethical Hacking and Vulnerabilities Analysis	7	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
1	3	63	112
Description			
This module is hands-on and teaches students how to research, discover and scan targets, analyze vulnerabilities and test attack methods and tools for practical experience. The course is designed to teach students how to choose the right tools when performing a cybersecurity penetration test and to explain why the chosen technique will work. The module covers topics such as threats and vulnerabilities, password cracking, web application attacks, IoT and OT attacks, cloud computing, pen testing fundamentals.			

Module 12

Code	Course/Module Title	ECTS	Semester
BCYSCE 300- S3	English Language	3	Summer
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	-	33	42
Description			
This Module introduces students to practical skills such as network installation and configuration, and other skills and knowledge they gain through their study in the first two levels. The activities will be conducted in a controlled environment, allowing students to experiment with different tools and techniques. The training will provide students with hands-on experience that allow students to practice their skills in work environment and in a safe and controlled environment.			

Module 13

Code	Course/Module Title	ECTS	Semester
BCYSCE 300 -S1	Introduction to Cryptography	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	2	63	87
Description			

This module introduces students to the fundamental concepts of cryptography. The course covers the foundations of cryptography, with emphasis on precise definitions and proof techniques. The course covers topics such as one-way functions, encryption, signatures, pseudo-random number generation, zero-knowledge, and basic protocols. The course also discusses public-key techniques that let two parties generate a shared secret key. Throughout the course, students will be exposed to many exciting open problems in the field and work on programming projects.

Module 14

Code	Course/Module Title	ECTS	Semester
BCYSCE 305 -S1	Introduction to Hardware security	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			

This is designed to provide students with a fundamental understanding of the security of hardware systems. The course covers a range of topics, including active and passive attacks, reverse engineering, counterfeiting, and the design of hardware security primitives such as random number generators, physical unclonable functions, and crypto processors.

Module 15

Code	Course/Module Title	ECTS	Semester
BCYSCE 302 -S1	Digital Signal Processing	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			

This module introduces the theory and methods for processing digital signals. The course teaches the basic concepts of discrete-time signals and proceeds to teach how to analyze data via the Fourier transform, how to manipulate data via digital filters, and how to convert analog signals into digital. The course introduces processing of discrete-time (DT) signals, including fundamental principles of DT systems and signals, in both time and Fourier domains. The course also covers the design of digital filters and the z-transform and its applications.

Module 16

Code	Course/Module Title	ECTS	Semester
BCYSCE 305 -S1	Fundamental of Cloud Computing	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			

This module is designed to give an introduction and overview of cloud computing. The course covers a wide variety of topics that are critical for understanding cloud computing. The course aims to equip students with basic knowledge of cloud technologies in use today. The course focuses on the core features of cloud technologies, including cloud deployment models, cloud service models, a fundamental understanding of what cloud computing is and how it works.

Module 17

Code	Course/Module Title	ECTS	Semester
BCYSCE 305 -S2	Secure Software development	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			

This module designed to provide students with the knowledge and skills necessary to develop secure software. The course covers the concepts of software assurance and the fundamentals of the secure software lifecycle as it relates to software development.Students will experience the secure software lifecycle process by developing concrete artifacts and practicing in a lab environment. The course covers topics such as secure coding practices, application security, security testing and auditing, and techniques and tools to develop secure software.

Module 18

Code	Course/Module Title	ECTS	Semester
BCYSCE 304 -S1	Mobile and Wireless Network	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	2	64	61
Description			

This module covers various topics relevant to wireless networking and mobile computing. The course introduces students to recent advances in mobile networking and sensing, with an emphasis on practical design aspects of mobile systems. The course covers the basic concepts of telecommunications, basic technology used in wireless communication, examples of wireless communication systems, and communication protocols for wireless networks. The course also investigates telecommunication architectures and protocols for wireless sensor networks and wireless embedded systems, Wi-Fi and wireless local area networks, mobile ad-hoc networks, next-generation cellular systems, and satellite networks.

Module 19

Code	Course/Module Title	ECTS	Semester

BCYSCE 300-S2	Mobile and Wireless Network Security	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	60	65
Description			

This module includes topics such as wireless and mobile network security overview, design, planning, installation, and security mechanisms and protocols in wireless communication networks. Students will learn about models, design principles, mechanisms, and solutions used in wireless network security to obtain secrecy, integrity, authentication, privacy, crypto key distribution, and access control.

Module 20

Code	Course/Module Title	ECTS	Semester
BCYSCE 301-S2	Cloud Computing Security	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			

This module is designed to teach the fundamentals of cloud computing and security. It covers the guiding security design principles, design patterns, industry standards, applied techniques, and procedures to prevent and mitigate risks. The course provides an in-depth look at the strengths and weaknesses of cloud computing security, as well as the considerations to consider.

Module 21

Code	Course/Module Title	ECTS	Semester
BCYSCE 303-S2	Engineering Analysis	4	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			

This module is designed to teach students the fundamental principles of engineering problem-solving. It covers topics such as linear and vector algebra, particle equilibrium, rigid body motion, and numerical solutions of linear algebraic equations. Students learn how to set up analysis problems that arise in engineering and make data-driven decisions. The course also emphasizes the role of computers in engineering and report writing. Overall, Engineering Analysis is a comprehensive course that familiarizes students with advanced applied mathematics as it relates to engineering.

Module 22

Code	Course/Module Title	ECTS	Semester
BCYSCE 304-S2	Practicing Cyber Security: Attacks and	5	6

		Countermeasures		
Class (hr/w)	**Lect/Lab./Prac./Tutor**		**SSWL (hr/sem)**	**USSWL (hr/w)**
1	2		49	76
Description				

This module aims to provide learners with a baseline understanding of common cybersecurity threats, vulnerabilities, and risks. covers topics such as business intelligence data mining, information security, risk management, systems security management, penetration testing.

Module 23

Code	**Course/Module Title**	**ECTS**	**Semester**
BCYSCE 302 -S2	Operating System Security	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	61
Description			

This module is designed to teach students how to safeguard computer operating systems. The course aims to identify security threats, configure operating systems to industry security standards. The course covers topics such as protection systems, foundational security principles, classic approaches to system security, system vulnerabilities, mandatory access controls in research and commercial operating systems, capability systems, virtual machines, and security kernels.

Module 24

Code	**Course/Module Title**	**ECTS**	**Semester**
BCYSCE 200 -S1	Computer Electronics	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			

This module covers the basic components of electronics such as diodes, transistors, and op amps, and their basic operation and some common applications. The module teaches students to design digital circuits using a high-level abstraction called Register Transfer Language (RTL). the Register Transfer Designs course teaches students how to design digital circuits using RTL, a powerful high-level method of describing the architecture of a circuit.

Module 25

Code	**Course/Module Title**	**ECTS**	**Semester**
BCYSCE 203 -S2	Operating Systems	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**

2	3	78	72

Description
This module teaches the basic abstractions, mechanisms, and implementations of operating systems. The course covers topics such as Process and Thread Management, Resource Management and Communication, concurrent programming (threads and synchronization), inter-process communication.

Module 26

Code	Course/Module Title	ECTS	Semester
BCYSCE 200 -S2	Computer Networks	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	46

Description
This module provides a comprehensive understanding of networking systems, their architecture, function, and operation. The course explains how layers of different scope are combined to create a network. The course teaches s students the principles that underlie all networks and the application of those principles to current network protocols and systems. The course covers topics such as physical media, protocols, error detection, delimiting, lost and duplicate detection, flow and retransmission control, routing, congestion management, QoS, network management, security, and the common network.

Module 27

Code	Course/Module Title	ECTS	Semester
BCYSCE 203- S2	Network Security	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	3	79	71

Description
This module is designed to teach students how to monitor and control unauthorized access, misuse, and unwanted modification in networking systems. The course covers a wide range of topics, including network security, security protocol design and analysis, security modeling, trusted computing architecture security, security policy, web security.

Module 28

Code	Course/Module Title	ECTS	Semester
BCYSCE 202- S1	Database System	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47

Description
This module is designed to teach fundamental concepts necessary for designing, using, and implementing database systems and applications. The course covers database modeling and design, languages and models provided by database management systems, and database system implementation techniques, object-oriented models, and relational databases.

Module 29

Code	Course/Module Title	ECTS	Semester
BCYSCE 202- S2	Database System Security	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	3	79	71
Description			
This module is designed to teach students how to secure databases and data at rest. The course covers a range of topics, including database and server log monitoring, policies and procedures, standards, and change management.			

Module 30

Code	Course/Module Title	ECTS	Semester
BCYSCE 201- S2	Cybersecurity ethics	3	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	-	33	42
Description			
This module explores the ethical issues and responsibilities faced by Cybersecurity professionals. The course provides a study of the risk factors for digital and ethical misconduct, and it covers relevant laws, regulations, policies, standards, moral, and social issues. The course is designed to teach students the proper techniques to approach the difficult ethical dilemmas that arise from using technology. The course content includes an introduction to cybersecurity ethics, important ethical issues in cybersecurity, case studies, and techniques to approach ethical dilemmas. The course also addresses the salient ethical questions in relation to security, technologies, and artificial intelligence, freedom, and responsible use of technology.			

Module 31

Code	Course/Module Title	ECTS	Semester
BCYSCE 205- S2	Data Structures	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47

Description
This Module teaches students about the different types of data structures and algorithms used in various computational problems. The course covers topics such as arrays, stacks, queues, trees, graphs, and their various implementations, programming styles, and run-time representations. Students will also learn about algorithms for sorting, searching, and some graph algorithms. The course also covers algorithm analysis and efficient code design.

Module 31

Code	Course/Module Title	ECTS	Semester
BCYSCE 205- S2	Python for Cybersecurity	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
This Module covers python programming language. The student will study essential python programming components. The modules include topics such as basic input output, data, variables, files, libraries. Hands-on practice on cybersecurity problems.			

Module 33

Code	Course/Module Title	ECTS	Semester
BCYSCE 301- S1	English Language	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	-	67	53
Description			
This Module covers python programming language. The student will study essential python programming components. The modules include topics such as basic input output, data, variables, files, libraries. Hands-on practice on Cybersecurity problems.			

Module 34

Code	Course/Module Title	ECTS	Semester
BCYSCE 201- S1	Network Infrastructure and Administration Lab	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
1	2	48	52
Description			
This Module designed to provide students with the skills and knowledge necessary to maintain reliable computer systems in a multi-user environment.			

Module 35

Code	Course/Module Title	ECTS	Semester
BCYSCE 201- S1	Computer Organization and Architecture	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
This Module designed to provide students with the skills and knowledge necessary to maintain reliable computer systems in a multi-user environment.			

Module 36

Code	Course/Module Title	ECTS	Semester
BCYSCE 205- S1	Discrete Mathematic	4	3
Class (hr/w)	**Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	1	48	52
Description			
This Module introduces students to the basic concepts of discrete mathematics, covering topics such as sets, logic, enumeration methods, probability, recurrence relations, induction, linear algebra, and graph theory.			

Module 38

Code	Course/Module Title	ECTS	Semester
BCYSCE 100- S1	Mathematic	5	1
Class (hr/w)	**Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	1	64	61
Description			
This Module introduces students to the basic concepts of mathematics Calculus 1 and Calculus 2.			

Module 39

Code	Course/Module Title	ECTS	Semester

BCYSCE 105- S1	Linux Administrator	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	3	79	96
Description			

This Module is designed to provide students with the skills and knowledge necessary to become a Linux system administrator. The course covers a wide range of topics, including installing and configuring the Linux operating system, managing software and devices, creating and maintaining system users and groups, and controlling processes.

Module 40

Code	Course/Module Title	ECTS	Semester
BCYSCE 105- S1	Fundamental of Programming	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	96
Description			

This Module covers the fundamental concepts of structured programming, including software development methodology, designing, coding, debugging, testing, and documenting programs using a high-level programming language. The course is designed to teach students how to solve complex problems by writing computer programs

Module 41

Code	Course/Module Title	ECTS	Semester
BCYSCE 104- S1	Fundamental of Electrical Engineering	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	96
Description			

This Module covers the basics of electrical engineering. The course focuses on the creation, manipulation, transmission, and reception of information by electronic means. The course covers elementary signal theory, time- and frequency-domain analysis, and principles of feedback. The course also covers the basics of DC and AC circuits, including single-phase and three-phase circuits.

Module 42

Code	Course/Module Title	ECTS	Semester
BCYSCE 103- S1	Introduction to Sociology	4	2
Class (hr/w)	**Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	-	33	67
Description			

This Module introduces students to the scientific study of human society, culture, and social interactions with special emphasize of cybersecurity and technology and their effects on society. The course covers a range of topics, including socialization, research methods, diversity and inequality, cooperation and conflict, social change, social institutions, and organizations. Students will learn about the origins of sociology as a discipline, and some major sociological theories and research methods. The course addresses the social, political, legal, criminological, and economic dimensions of cybersecurity through a social science framework

Module 43

Code	Course/Module Title	ECTS	Semester
BCYSCE 101- S2	Fundamentals of Digital Electronics	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	3	79	96
Description			

This Module introduces students to combinational and sequential logic circuits, number systems, Boolean algebra, logic families, medium scale integration (MSI), and the design of digital circuits.

Module 44

Code	Course/Module Title	ECTS	Semester
BCYSCE 103- S1	Introduction to Probability and Statistics	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	61
Description			

This module is designed to provide students with a solid foundation in the principles and methods of Probability and Statistics. The module covers topics such as probability theory, statistical inference, hypothesis testing, regression analysis, and data analysis, and to prepare them for further study in related fields such as data science, economics, and engineering.

Module 45

Code	Course/Module Title	ECTS	Semester

BCYSCE 107- S2	Object oriented programming	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USSWL (hr/w)**
2	3	79	96
Description			

This module is designed to teach students how to program in C++ and use some of its most important APIs.The course emphasizes current techniques in object-oriented design, analysis, and programming. The students will have demonstrated the ability to understand object-oriented programming principles, write, compile, and execute C++ programs, understand the C++ architecture, and use the C++ APIs, understand and use of inheritance and polymorphism as implemented in C++, understand and use the exception handling mechanism of C++, perform standard input-output operations, and understand and use GUI components.

Module 46

Code	Course/Module Title	ECTS	Semester
BCYSCE 108- S2	Foundation of Cybersecurity Engineering	7	2
Class (hr/w)	**Practice.**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	79	96
Description			

This course introduces student to basic concept of cybersecurity engineering. The module covers topics such as: Introduction to Cybersecurity, Cyber security Fundamentals, Cybersecurity Operation, Cybersecurity Ethics and Law, Incident Response and Recovery.

Module 47

Code	Course/Module Title	ECTS	Semester
BCYSCE 109- S2	Human rights and Democracy	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	-	33	67
Description			

The module provides students with a comprehensive understanding of the relationship between democracy and human rights, and how they can be used to promote sustainable development and lasting peace.