

Study Plan:

A student is awarded Bachelor degree after successfully passes (129) credit hours according to the regulations in Al-Zaytona University for Science and Technology. The credit hours are indicated in Table (1):

Credit Hours Requirements:

and specialization requirements ,college ,Credit hours for university :(Table (1

Type of Requirements	Compulsory		Elective		Total		Notes
	of .No hours	Percentage	of .No hours	Percentage	of .No hours	Percentage	
University	17	10.9%	0	0	17	10.9%	Less than 20%
College	22	% 14.1	0	0	22	% 14.1	Less than 15%
Specialization	75	% 65.4	12	7.5%	87	73.1%	More than 65%
Free Subjects	0	0	3	%1.88	3	% 1.9	Less than 5%
Total	117	90.4%	12	%9.4	129	100%	

Knowledge Fields:

Table (2) illustrates the distribution of the theoretical subjects according to the knowledge fields.

Table (2): Theoretical knowledge fields for Cyber security and data science path

Knowledge Field		Subjects	Credit Hours
1	Supporting Subjects	Calculus, General Physics, Discrete Mathematics, Linear Algebra, Statistics & Probability,	33
2	Computer Fundamentals and Programming	Logic circuits, structured programming, object-oriented programming, operating systems, Data Structure and algorithms, Database, network programming and applications	55
3	Cybersecurity	Cybersecurity Fundamentals, network security, penetrating testing, intrusion detection, cryptography, ethical hacking	18
4	Projects & Training	Graduation Projects, Field Training, Engineering Management	4

Practical Fields: These cover the following subjects;

Fluids Mechanic, Measurements and instrumentation, Electric Machines, Electric Circuits and Electronics, Digital Electronics, Robotic Systems.

1. **University Requirements:** These requirements are (17) credit hours as shown in Table (3).

Table (3): Compulsory university requirements.

Subject Code	Subject Name	of Hours .No			Prerequisite
		Th.	Pr.	Credit	
UR00101	Arabic Language Skills	3		3	
UR00111	English Language Skills (1)	3		3	
UR00112	English Language Skills (2)	3		3	UR00111
UR00121	Culture & Civilization	3		3	
UR00122	History of Palestine	3		3	
UR00131	Computer Skills	1		1	
UR00141	Leadership & Communication Skills	1		1	

2. **College Requirements:** These requirements are (22) credit hours as shown in Table (4).

Table (4): Compulsory college requirements.

Subject Code	Subject Name	of Hours .No			Prerequisite
		Th.	Pr.	Credit	
ETBS101	Calculus(1)	3		3	
ETBS102	Calculus(2)	3		3	ETBS101
ETBS111	General Physics(1)	3		3	
ETBS112	General Physics(2)	3		3	ETBS111
ETBS113	Physics Lab.	1	2	1	
ETCS210	Linear Algebra	3		3	Calculus 2
ETCS101	Computer programming 1	3		3	
ETCS102	Computer programming 2	3		3	ETCS101

3. **Specialization Requirements:** These requirements are (88) credit hours distributed as follows:

- (a). **Compulsory Specialization Requirements:** These requirements are (76) credit hours, as shown in Table (5).

Table (5): Compulsory specialization requirements.



Subject Code	Subject Name	of Hours .No			Prerequisite
		Th.	Pr.	Credit	
ETCS201	Discrete Mathematics	3		3	Calculus 2
ETCS212	Statistics & Probability	3		3	Calculus 2
ETCS222	Numerical analysis	3		3	Linear Algebra
ETCS223	Graph Theory	3		3	Discrete Mathematics
ETCS201	Logic Circuits	3		3	Discrete Mathematics
ETCD226	Web Development	3		3	Computer Programming 2
ETCS227	Data Structures	3		3	Computer Programming 2
ETCS229	Database systems	3		3	Objected Oriented Programming
ETCS301	Design and analysis of Algorithms	3		3	Data Structures
ETCS302	Objected Oriented Programming	3		3	Data Structures
ETCD303	Software Security and Development Lifecycle	3		3	Objected Oriented Programming
ETCS313	Operating Systems	3		3	Logic Curcuits
ETCS314	Computer Networks	3		3	Logic Circuits



ETCD312	AI for Cyber Defense and Threat Detection	3		3	Statistics & Probability
ETCDS323	Data Science and Risk Analytics	3		3	Statistics & Probability
ETCS325	Mobile Applications	3		3	Data Structures
ETCS327	Foundations of Cybersecurity	3		3	Computer Networks
ETCS333	Web Security	3		3	Web Development and Foundations of Cybersecurity
ETCD401	Machine Learning for Security Applications	3		3	AI for Cyber Defense and Threat Detection
ETCS411	Machine Learning for Cybersecurity	3		3	AI for Cyber Defense
ETCS402	Cryptography and Computer Security	3		3	Foundations of Cybersecurity
ETCD421	Cybersecurity for Cloud Environments	3		3	Cryptography and Computer Security



ETCS423	Ethical Hacking and Penetration Testing	3		3	Foundations of Cybersecurity
ETCS434	Blockchain Technology and Security	2		2	Ethical Hacking and Penetration Testing
ETCS433	Field Training			0	Pass (100) Cr. Hrs.
ETCS501	Graduation Project(1)	1		1	Hrs. .Pass (100) Cr
ETCS502	Graduation Project(2)	1		3	Graduation Project(1)

(b). Elective Specialization Requirements: This requirement is (12) credit hours, as shown in Table (6).

Table (6): Elective specialization requirements.

Subject Code	Subject Name	of Hours .No			Prerequisite
		Th.	Pr.	Credit	
ETCD511	Digital Forensics and Incident Response	3		3	Foundations of Cybersecurity
ETCD503	Privacy Engineering and Data Protection	3		3	Database And



					Foundations of Cybersecurity
ETCS510	Software Reverse Engineering	3		3	Cryptography and Computer Security
ETCD511	Blockchain Technology and Security	3		3	Cryptography and Computer Security
ETCD512	Special Topics	3		3	
ETCD513	Image Processing for Cybersecurity Applications	3		3	
ETCD521	Information Systems Security Assessment	3		3	Foundations of Cybersecurity
ETCD522	Cyber Laws	3		3	Foundations of Cybersecurity
ETCD523	Risk Management in Cybersecurity	3		3	Computer Networks

4. **Free Subjects:** This requirement is (3) credit hours chosen from other colleges in the university.

Advisory Study Plan Cyber security and data science

First Semester				Second Semester			
Code	Subject Name	CrHr	Prerequisite	Code	Subject Name	CrHr	Prerequisite
UR00101	Arabic Language Skills	3		UR00112	English Language Skills(2)	3	UR00111
UR00111	English Language Skills(1)	3		ETBS102	Calculus(2)	3	ETBS101



ETBS101	Calculus(1)	3		UR00121	Culture & Civilization	3	
ETBS111	General Physics(1)	3		ETBS112	General Physics(2)	3	ETBS111
ETCS101	Computer Programing 1	3		ETBS113	Physics Lab.	1	ETBS111
UR00122	History of Palestine	3		ETCS102	Computer Programing 2	3	Computer Programing 1
				UR00141	Leadership & Communication Skills	1	
Total		18		Total		17	

First Semester				Second Semester			
Code	Subject Name	CrHr	Prerequisite	Code	Subject Name	CrHr	Prerequisite
ETCS201	Discrete Mathematics	3	Calculus 2	ETCS325	Mobile Applications	3	Computer Programming
ETCS227	Data Structures	3	Computer Programming 2	ETCS223	Graph Theory	3	Discrete Mathematics
ETCS212	Statistics & Probability	3	Calculus 2	ETCS302	Objected Oriented Programming	3	Data Structures
ETCS226	Web Development	3	Computer Programming 2	ETCS301	Design and analysis of Algorithms	3	Data Structures
ETCS201	Logic Circuits	3	Computer Programming	ETCS314	Computer Networks	3	Logic Circuits



			2				
ETCS210	Linear Algebra	3	Calculus 2	ETCS323	Introduction to Data Science	3	Statistics & Probability
Total		18		Total		18	

First Semester				Second Semester			
Code	Subject Name	CrHr	Prerequisite	Code	Subject Name	CrHr	Prerequisite
ETCS229	Database systems	3	Objected Oriented Programming	SCS411	Machine Learning for Cybersecurity	3	Introduction to Machine Learning
ETCS401	Introduction to Machine Learning	3	Artificial Intelligence	ETCS402	Cryptography and Computer Security	3	Foundations of Cybersecurity
	Artificial Intelligence	3	Statistics & Probability	ETCS423	Ethical Hacking and Penetration Testing	3	Foundations of Cybersecurity
ETCS327	Foundations of Cybersecurity	3	Computer Networks	ETCS303	Software Engineering	3	Objected Oriented Programming
ETCS313	Operating Systems	3	Logic Circuits	ETCS333	Web Security	3	Foundations of Cybersecurity And Web Dev



ETCS222	Numerical analysis	3	Linear Algebra				
Total		18		Total		15	

First Semester				Second Semester			
Code	Subject Name	CrHr	Prerequisite	Code	Subject Name	CrHr	Prerequisite
ETCS434	Blockchain Technology and Security	3	Ethical Hacking and Penetration Testing	ETCS5xx	Elective 3	3	
ETCS412	Cloud Computing and Security	3	Cryptography and Computer Security	ETCS5xx	Elective 4	3	
ETCS5xx	Elective 1	3		xxx	Free Subject	3	
ETCS5xx	Elective 2	3		ETCS502	Graduation Project(2)	3	Graduation Project(1)
ETCS433	Feild Training		Pass (100) CrHr				
ETCS501	Graduation Project(1)	1	Pass (100) CrHr				
Total		13		Total		12	

Cyber security and data science Course Description

Subject	Description
Calculus(1) ETBS101	Review of functions: notation, operations, Limits and continuity, including trigonometric functions, Derivatives: rates of change and techniques of differentiation, including trig functions, Function composition, chain rule, and implicit differentiation, Applications of derivatives: related rates and optimization problems, Exponential and logarithmic functions — graphs, derivatives, and applications, Inverse trigonometric and hyperbolic functions — graphs, derivatives, and applications, improper integrals, Techniques of integration — integration by parts, integration by partial fractions.
Calculus(2) ETBS102	Sequences and series, power series, convergence theorems: integral, ratio, and alternating-series tests, Polar coordinates and functions, integration and differentiation of polar functions, Vectors in three-dimensional space, spherical and cylindrical coordinates, Vector valued functions, Partial derivatives, multiple integrals, Topics in vector calculus.
General Physics(1) ETBS111	Physics and measurement, Motion in one dimension, Vectors, Motion in two dimensions, Force and motion, Kinetic energy and work, Potential energy and conservation of energy, Linear momentum and collisions, Rotation, Rolling and angular momentum.
General Physics(2) ETBS112	Electric Fields, Gauss's Law, Electric Potential, Capacitance and Dielectrics, Current and Resistance, Direct Current Circuits, Magnetic Fields, Sources of the Magnetic Field, and Faraday's Law.
Physics Lab. ETBS113	Developing a good understanding of a few important concepts in Mechanical physics, Learning to apply these concepts to familiar and unfamiliar situations and Gaining the ability to reason qualitatively and quantitatively about Mechanics.
Discrete Mathematics	This course covers fundamental concepts in discrete mathematics, including logic, set theory, combinatorics, graph theory, and algorithms. It provides the mathematical foundation for computer science.
Linear Algebra	An introduction to linear algebra, covering vectors, matrices, determinants, eigenvalues, and eigenvectors. Applications in computer science are emphasized.
Numerical Analysis	A study of numerical methods for solving mathematical problems. Topics include error analysis, numerical solutions of equations, interpolation, and numerical integration.
Computer	This introductory course provides students with a comprehensive



programming 1	foundation in Python programming, a versatile and widely-used language in fields such as web development, data analysis, and automation. Students will learn core programming concepts, including data types, control structures, functions, and file handling. The course also introduces basic algorithmic thinking and problem-solving techniques. Through practical exercises and projects, students will develop the skills to write efficient, modular code, preparing them for more advanced studies and diverse professional applications in technology.
Computer programming 2	Concepts of computer programming languages, C++ basic programming fundamentals, data types “variable and constants”, all types of mathematical and logical operations, control and repetitive instructions, methods of algorithmic study and analysis, declaration of one and two dimensional arrays, pointers declaration, series operations, types of files and templates.



Graph Theory	This course covers the theory and applications of graphs. Topics include graph representations, connectivity, graph coloring, and graph algorithms.
Web Development	A comprehensive course on web development, covering HTML, CSS, JavaScript, and backend technologies. Students learn to create dynamic and responsive web applications.
Data Structures	An in-depth study of data structures, including arrays, linked lists, stacks, queues, trees, and graphs. Emphasis is placed on their implementation, analysis, and application in solving computational problems.
Database Systems	This course covers the principles of database design, implementation, and management. Topics include relational databases, SQL, normalization, and database security.
Design and Analysis of Algorithms	A study of algorithm design techniques and their efficiency. Topics include sorting, searching, dynamic programming, and complexity analysis.
Object-Oriented Programming	This course introduces object-oriented programming principles, including classes, objects, inheritance, polymorphism, and encapsulation. Students apply these concepts in developing robust software applications.
Software Engineering	An introduction to software engineering principles and practices. Topics include software development life cycles, project management, design patterns, and quality assurance.
Operating Systems	This course covers the fundamental concepts of operating systems, including process management, memory management, file systems, and concurrency.
Computer Networks	An exploration of computer network principles, including network architectures, protocols, data transmission, and network security.
Statistics & Probability	Probability, Discrete Distributions and their applications, Continuous Distributions and their applications, Estimation of parameters, Hypothesis testing, Regression, Quality control.
Logic Circuits	Different types of number systems, Boolean algebra, Boolean operations, synchronous logic circuits, analysis and design of sequential circuits, Counters and registers, types of memories.

Artificial Intelligence	An introduction to artificial intelligence concepts and techniques, including search algorithms, machine learning, natural language processing, and expert systems.
Introduction to Data Science	This course provides an overview of data science, covering data collection, cleaning, analysis, visualization, and interpretation. Students learn to use data science tools and techniques to solve real-world problems.
Mobile Applications	An introduction to mobile application development, focusing on designing, developing, and deploying applications for mobile platforms.
Foundations of Cybersecurity	This course introduces the basic principles of cybersecurity, including threat analysis, risk management, security policies, and ethical considerations.
Web Security	A study of web security principles and practices, including common vulnerabilities, attack prevention, and secure web application development.
Machine Learning for Cybersecurity	This course explores the application of machine learning techniques in cybersecurity, including anomaly detection, intrusion detection systems, and threat intelligence.
Cloud Computing and Security	An overview of cloud computing concepts and architectures, with a focus on cloud security practices, including data protection, access control, and secure cloud services.
Cryptography and Computer Security	An introduction to cryptographic techniques and their applications in computer security. Topics include encryption, decryption, hashing, and digital signatures.
Database Systems Security	This course covers the security aspects of database systems, including access control, data integrity, and secure database design.
Ethical Hacking and Penetration Testing	An exploration of ethical hacking techniques and penetration testing methodologies. Students learn to identify and exploit vulnerabilities in computer systems in a controlled environment.



Blockchain Technology and Security	An introduction to blockchain technology and its security implications. Topics include blockchain architecture, consensus algorithms, and smart contract security.
Field Training	Practical experience in a professional setting, where students apply their knowledge and skills in real-world computer science and cybersecurity projects.