

UNIVERSITY DIPLOMA IN WEB DEVELOPMENT AND CYBERSECURITY

Main Language of Instruction:French ☐ English ☒ Arabic ☐**Campus Where the Program Is Offered:** CST**OBJECTIVES**

The UD in Web Development and Cybersecurity aims to prepare students to design, develop, secure, and maintain modern web applications and digital systems. The program combines strong foundations in software development, databases, web technologies, software architecture, and cybersecurity with hands-on practical training and real-world projects.

PROGRAM LEARNING OUTCOMES (COMPETENCIES)

- Design a system
- Identify, formulate and solve engineering problems
- Use the techniques, skills, and modern engineering tools necessary for engineering practice

ADMISSION REQUIREMENTS

- Interview-based admission

PROGRAM REQUIREMENTS

45 Credits: Required Courses (36 credits), Institution's Elective Courses (9 credits)

Required Courses (36 Cr.)

Advanced Databases (3 Cr.), Angular Fundamentals (3 Cr.), Concurrent Programming (3 Cr.), Cybersecurity (3 Cr.), Data Structures and Graph Theory (3 Cr.), Database Fundamentals (3 Cr.), Design Patterns (3 Cr.), Introduction to Web Technologies (3 Cr.), Object-Oriented Programming (3 Cr.), Programming Fundamentals (3 Cr.), Secure Coding (3 Cr.), Service-Oriented Architecture (3 Cr.).

Institution's Elective Courses (9 Cr.) to be chosen from the list below:

Advanced Angular Concepts (3 Cr.), Business Patterns (3 Cr.), NoSQL Databases (3 Cr.), Penetration Testing (3 Cr.).

COURSE DESCRIPTION

020AADWF3	Advanced Angular Concepts	3 Cr.
This course delves into advanced techniques and best practices for developing high-performance, scalable applications with Angular. Students will explore key concepts such as creating and managing advanced dynamic components, leveraging advanced modules with lazy loading to optimize application structure, and implementing efficient change detection strategies. The course also covers advanced routing techniques for complex navigation scenarios and performance optimization strategies to enhance application speed and responsiveness. By mastering these advanced Angular concepts, students will be equipped to build sophisticated and highly efficient web applications.		
020ADDWF2	Advanced Databases	3 Cr.
This course delves into advanced topics in relational database management systems (RDBMS). It covers theoretical concepts and practical applications, focusing on database design, normalization, referential integrity, transaction management, and advanced SQL features.		

020AFDWF3	Angular Fundamentals	3 Cr.
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This course introduces the core concepts and essential features of Angular, empowering students to build dynamic, scalable, and maintainable web applications. Key topics include understanding Angular's component-based architecture, working with modules and services, implementing dependency injection, and designing responsive user interfaces using templates and directives. Students will also learn how to manage HTTP requests with observables, create robust forms with validation, and configure routing and navigation for seamless user experiences. By the end of the course, students will have a solid foundation to develop modern web applications using Angular.

020BPDWF3	Business Patterns	3 Cr.
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This course explores foundational business patterns and their practical applications in modeling complex systems. Students will learn to design and implement robust domain models that capture real-world scenarios using established patterns. Key topics include representing dynamic relationships with Actor → Role, distinguishing unique elements with Item → Specific Item, structuring spatial concepts with Space → OuterSpace, and managing temporal dependencies with Transaction → Future Transaction. Through hands-on examples and case studies, students will gain the skills to create flexible and scalable business models tailored to diverse organizational needs.

020CPDWF2	Concurrent Programming	3 Cr.
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This course is designed for students pursuing a Web Development and Cybersecurity University Diploma and provides an in-depth understanding of concurrent programming in C#. It covers essential concepts and techniques such as parallel programming paradigms, concurrency challenges, threads, mutexes, delegates, and the Task Parallel Library (TPL), with a focus on both principles and practical applications of parallel and asynchronous programming. By the end of the course, students will be able to implement efficient concurrent applications, manage concurrency issues, and integrate real-world applications.

020CSDWF1	Cybersecurity	3 Cr.
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This course provides an in-depth exploration of fundamental concepts and practical skills essential for securing digital systems and networks. Students will delve into various aspects of cybersecurity, including system/network security, Application Security, cryptography, risk management, identity and access management (IAM), and security operations. The course emphasizes the application of cybersecurity principles in contemporary technology landscapes, such as Cloud computing, the Internet of Things (IoT), and Blockchains. Students will gain practical knowledge and skills necessary to protect digital assets and mitigate security risks effectively.

020DSDWF2	Data Structures and Graph Theory	3 Cr.
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This course provides a comprehensive introduction to data structures and graph theory, emphasizing problem-solving skills and algorithmic complexity analysis. Students will gain a solid foundation in fundamental data structures, enabling them to efficiently organize and manipulate data, as well as explore advanced techniques for solving optimization problems using dynamic programming.

020DFDWF1	Database Fundamentals	3 Cr.
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This course provides a deep understanding of database management within a client-server architecture, with a specific focus on PostgreSQL, an object-relational database management system. Students will explore the intricacies of the third normal form and its impact on data organization and retrieval. The course covers the implementation of data definition language (DDL) and data manipulation language (DML) commands, along with an in-depth study of indexes, triggers, and stored procedures in PostgreSQL. Additionally, students will learn how to connect a C# application to a PostgreSQL database.

020DPDWF3	Design Patterns	3 Cr.
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This course explores the foundational principles of software architecture and the application of design patterns to build robust, maintainable, and scalable software solutions. Students will learn how to effectively structure applications into objects and address critical design questions such as 'Who creates?', 'Who knows?', and 'Who



does?’. The course emphasizes the ‘Gang of Four’ design patterns, providing practical insights into reusable and time-tested solutions for common software design challenges. By the end of the course, students will gain the skills to implement design patterns and enhance the quality of their software designs.

020WTDWF1	Introduction to Web Technologies	3 Cr.
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This course provides an introduction to the foundational concepts and practical skills required for building and designing dynamic and interactive web applications. Students will explore the fundamental elements of web development, including HTML, CSS, and JavaScript, and gain an understanding of server-side programming and essential web development tools. Additionally, the course will cover user experience (UX) and user interface (UI) design guidelines to ensure the creation of engaging and user-friendly web interfaces.

020NSDWF3	NoSQL Databases	3 Cr.
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This course provides a comprehensive introduction to NoSQL databases, focusing on their principles, advantages, and practical applications compared to traditional relational database management systems (RDBMS). Students will explore the CAP theorem and delve into the unique strengths and use cases of various NoSQL database types, including MongoDB (document databases), Cassandra (columnar databases), and Neo4j (graph databases). By the end of the course, students will understand when and how to leverage NoSQL solutions to address modern data challenges in scalable and efficient ways.

020OPDWF1	Object-Oriented Programming	3 Cr.
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This course covers the principles and practices of object-oriented programming using the C# language, including the foundational concepts of OOP, such as classes, objects, encapsulation, abstraction, inheritance and polymorphism. Through hands-on projects and exercises, students will learn how to design, implement, and manage software systems using the OOP paradigm, fostering the development of scalable and maintainable applications.

020PTDWF2	Penetration Testing	3 Cr.
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This course explores the fundamentals of ethical hacking and cybersecurity, focusing on techniques used to identify and mitigate cyber threats. Students will gain hands-on experience with tools and methodologies to assess vulnerabilities, secure systems, and protect networks from attacks. Topics include reconnaissance, network and system exploitation, malware analysis, social engineering, and strategies for evading firewalls and detection systems. Emphasizing ethical practices, this course prepares students to proactively defend against evolving cyber risks.

020PFDWF1	Programming Fundamentals	3 Cr.
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This course provides students with a comprehensive understanding of the fundamental concepts of programming using the C# language. It focuses on essential programming techniques, including basic syntax, control structures, and data manipulation with an emphasis on data structures such as arrays. Through practical exercises and hands-on projects, students will gain proficiency in writing, debugging, and testing C# code to create simple applications and solve programming challenges.

020SCDWF2	Secure Coding	3 Cr.
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This course covers the essential principles and practical techniques necessary for secure software development. It equips students with the knowledge and skills needed to identify, exploit, and defend against the most common vulnerabilities in software development. Students will learn how to perform penetration testing and implement secure coding practices to prevent these vulnerabilities. Through hands-on labs and practical exercises, the course covers various attack vectors, including injection attacks, IDOR, cross-site scripting (XSS), and more. By the end of the course, students will be adept at writing secure code and implementing effective security measures to protect against these threats.

020SADWF2	Service-Oriented Architecture	3 Cr.
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This course covers the fundamental concepts of SOA, including services, interoperability, service composition, and governance. Through hands-on projects and exercises, students will learn how to design, implement, and manage SOA-based systems, fostering the development of scalable, flexible, and maintainable enterprise solutions.

