ثالث إً: توصيف المقررات الدراسية – قسم هندسة البرمجيات.

ت	اسم المقرر	رمز المقرر	التوصيف
.1	مقدمة في هندسة البرمجيات Introduction to Software Engineering	SE210	Software design process and its models, representations of design/architecture, software architectures and design plans, design methods, design state assessment, design quality assurance, design verification. Implementation of a group project is encouraged.
.2	التفاعل بين الإنسان والحاسوب Human Computer Interaction	SE211	User interface (UI) design: principles; standards; and guidelines. User-centered design: standards and design rationale; heuristic evaluation; iterative design; and prototyping. Task-centered design. Rationalized design: usability engineering; dialogue notations; user models; diagrammatic notations; and textual notations. UI evaluation: quantitative and qualitative; UI implementation.
.3	تط Website Design and Development	SE213	Introduction to Static and Dynamic Websites (Website Designing and Anatomy of Webpage). Introduction to HTML and CSS (Basic Tags, Lists, Handling Graphics, Tables, Linking, Frames, Forms), Introduction to JavaScript (Basic Programming Techniques & Constructs, GET/POST Methods, Operators, Functions, DOM Event handling, Forms Validation, Cookies), Inter-page communication and form data handling using JavaScript. Introduction to PHP (Working, Difference with other technologies like JSP and ASP), PHP Programming Techniques (Data types, Operators, Arrays, Loops, Conditional statements, Functions, Regular expressions), Form Data Handling with PHP, Database connectivity and handling using PHP-MySQL.
.4	تطوير نظم قواعد البيانات Database Systems Development	SE214	This course delves into the principles, architecture, and advanced techniques used in the design, implementation, and development of applications around modern database management systems (DBMS): indexes, I/O management, Transaction Processing: Properties of transactions, Concurrency control, and Database Recovery. Use of a

major DBMS (e.g., Oracle) for implementing and manipulating normalized data objects using SQL, moving beyond basic SQL, students will explore database programming, internal system components, performance tuning, and the integration of databases with applications. The course has a significant practical component, requiring students to design and build a full-stack application with a robust database backend.			
A philosophy of tool building will be introduced and illustrated using a software development environment such as UNIX. The place of tool support within the software development process will be considered including the need for tool support; when tool support is, and is not, appropriate; tool selection criteria; tool interactions. A number of software development tools will be introduced such as: a development environment such as UNIX underlying organization, commands, shells, shell programming; software development utilities (debuggers, etc.); software configuration and management; project planning and control support; prototyping and RAD; formal specification; CASE; testing: reverse engineering and maintenance; software measurement; documentation.	**SE301**	**بيئات هندسة البرمجيات** **Software Engineering Environments**	**.5**
Concepts and advanced technologies in software evolution: program comprehension; configuration and change management; construction of reusable software; separation of concerns; techniques for reverse engineering and re-engineering software; design for change, layered design and incremental refinement; legacy systems.	**SE302**	**صيانة و تطوير البرمجيات** **Software Evolution and Maintenance**	**.6**
Introduction to distributed systems topics such as Process Management. Introduction to the theory of distributed systems and networks: distributed system and network characteristics; failure, delay/asynchrony, and throughput; types of network interaction; fault tolerance; recovery from failure; use of middleware software such as CORBA, Dot Net, or EJB for developing distributed systems.	**SE322**	**الأنظمة الموزعة** **Distributed Systems**	**.7**

An introduction to software development processes: basic principles of software engineering; software process models; software development life cycle; phases and activities in each phase; working in teams; process customization; process assessment and evaluation; tool support for software processes; notations used in software documentation.	SE330	إجراءات تطوير البرمجيات Software Development Process	.8
An introduction to object-oriented analysis design: the Unified Process development cycle; use case analysis; Unified Modelling Language (UML) sequence and static diagrams; encapsulation; inheritance; polymorphism; design principles of coupling and cohesion; design patterns. The course includes a large-scale software-development project.	SE346	التصميم و التحليل الموجه نحو الهدف Object-Oriented Analysis and Design	.9
This course provides a comprehensive overview of the principles and practices for securing software systems and protecting data. Students will move from theoretical foundations to practical applications, learning how vulnerabilities are introduced in the software development lifecycle and how to mitigate them. Topics include secure coding practices, common software vulnerabilities (e.g., buffer overflows, injection flaws), cryptography, web application security, network security, and security in modern paradigms like cloud and DevOps. The course will involve hands-on labs, analyzing real-world case studies of major breaches, and a culminating security assessment project.	SE348	أمن البرمجيات والبيانات Software and Data Security	.10

An introduction to software testing and metrics within the context of software quality engineering: module and unit testing; integration and acceptance testing; quality factors and metrics; verification and validation; review and inspections; reliability, security and safety assurance; software certification; automated software testing.	SE451	اختبار وقياس البرمجيات Software Metrics and Testing	.11

Formal notations used for the specification of software systems and mathematically reason about program properties, Topics include predicate calculus and natural deduction: inductive definitions of data types as a basis for recursive functions and structural induction: regular expressions; finite state machines and context free grammars.	SE463	طرق تصميم و المواصفات الرسمية Formal Specifications and Design Methods	.12
Introduction project management concepts, tools, and techniques: organization of a large software project; roles of team members; leaders and managers skills and responsibilities; scope management; scheduling; budget control; progress monitoring; integration management; human resource management; communication management.	SE475	ادارة المشاريع البرمجية Software Project Management	.13
An introduction to requirements engineering within software life-cycle: requirements elicitation and modelling issues and techniques; documentation and management of requirements; standards and CASE tools; cognitive and socio-organizational issues.	SE481	مواصفات ومتطلبات البرمجيات Software Requirements & Specification,	.14

.15	تـ در Open-Sou Deve	SE482	Concepts, principles and applications of open-source software. Open source software development process. Economy, business, societal and intellectual property aspects of open source software. Hands-on experiences on open source software and related tools through developing various open source software. Applications such as mobile application and web applications building on existing open source frameworks and application development platforms.
.16	تطوير تطبيقات الهواتف الذكية Mobile Application Development	SE485	Introduction to mobile application development. Topics include creating and deploying mobile applications, development approaches, programming languages, frameworks, application architecture, event-driven programming, model-view-controller, user interface, and usability.
.17	الحوسبة المتوازية Parallel Computing	SE486	This course, introduces the fundamentals of parallel computing, including parallel architectures, programming models, and algorithms. The course covers topics such as parallelism concepts, parallel architectures like GPUs, parallel decomposition techniques, distributed computing models, programming frameworks like MPI and CUDA, and designing parallel algorithms. Students learn to develop basic parallel applications using shared memory and message passing paradigms. The course aims to help students apply parallel concepts, analyze performance issues, and develop skills in parallel programming.

This course provides a comprehensive journey into building dynamic, robust, and secure web applications using the latest technologies in the Microsoft .NET platform and the ASP.NET framework. It begins with the essential fundamentals of the C# language and progresses to advanced topics such as security, data services, and AJAX techniques for enhancing user experience. Overall Course Goal: To enable students to design, develop, and deploy complete, professional web applications using the ASP.NET Web Forms framework.	SE487	تطوير الويب المتقدم Advanced Web Development	.18
This course provides a comprehensive introduction to the fundamental concepts, tools, and frameworks used to process, store, and analyze massive volumes of data that exceed the capabilities of traditional database systems. Students will explore both batch and real-time data processing paradigms using industry-standard technologies such as Hadoop and Spark. The course emphasizes hands-on experience with big data ecosystems, data ingestion, storage solutions, and analytical techniques to derive actionable insights from diverse and complex datasets.	SE488	تقنيات البيانات الضخمة Big Data Technologies	.19
This course introduces the main topics: Internet of Things architecture, smart things, application protocols, security challenges, design and development of an integrated IoT system that connects devices (Sensors/Actuators), communication, cloud, and user applications using Arduino.	SE489	أساسيات انترنت الأشياء Fundamentals of IoT	.20

This course, depend on the topic to be chosen by the department staff member (supervisor) and on the interest of both supervisor and students. The students should prepare and represent as first step all related theoretical project idea depend on scientific approach of research methods. The second step the students develop a particle software project as team or alone. Third step a report that which documented the project framework based on scientific research methodology and software engineering aspects should be submitted at the end of the semester.	SE499	مشروع التخرج Project	.21

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