0721226, Object-Oriented Programming
2 hours per week, 2 credit hours, prerequisite: 0216099 + 0750116

This course covers the following major topics: Introduction to Object-Oriented approach, Understanding Class Definition, Object Interaction, Grouping Objects, Using Library Classes, Information Hiding, Inheritance, Polymorphism, Overriding, Abstract Classes, Abstract Methods, Interfaces, Exception Handling, and Designing Applications.

This module will provide the student with a framework for object-oriented thinking. The main focus of this course is general object-oriented and programming concepts from a software engineering perspective.

0721227, Object-Oriented Programming Lab
2 hours per week, 1 credit hours, prerequisite: Co-requisite with 0721226

A practical lab focused on applying object-oriented principles—encapsulation, inheritance, polymorphism, and abstraction—using Java. Students design and implement classes, work with interfaces, handle exceptions, and build projects that integrate multiple OOP concepts, culminating in a capstone application.

0712111, Software Engineering Fundamentals
3 hours per week, 3 credit hours, prerequisite: 0216112

This module introduces the foundational principles and practices of software engineering. It provides a structured overview of the core activities involved in developing high-quality software systems, including software processes, requirements engineering, software architecture, software design, and software testing. Students will engage with both theoretical concepts and practical techniques used throughout the software development lifecycle. By the end of the module, students will understand how software systems are planned, specified, designed, and validated.

0721228, Data Structure
2 hours per week, 2 credit hours, prerequisite: 0721226
In this course, students are exposed to fundamental programming constructs and data types such as lists, stacks, queues, tree, graphs…

An Outside-In approach will be adopted for this course. It consists in first teaching standard data type's interfaces and their use to solve real life problems, and other specific domains like Games, Multimedia problems (Outside view). The implementation aspect of these standard data types will then be covered (Inside view). Moreover, the theoretical lectures will be reinforced by a set of tutorials and laboratory sessions where simple and more complex problems are first solved then programmed**.**

0721229, Data Structure Lab

2 hours per week, 1 credit hours, prerequisite: Co-requisite with 0721228

A practical lab designed to strengthen students' understanding of data structures through implementation in Java. The course emphasizes building and manipulating structures such as arrays, linked lists, stacks, queues, trees, and graphs. Students practice algorithm design, complexity analysis, and problem-solving by coding assignments, mini-projects, and a final capstone project, gaining hands-on skills essential for efficient software development.

0721233, Software Modeling
2 hours per week, 2 credit hours, prerequisite: 0721111

Models are an integral part of every engineering discipline, as they become in software engineering. Modeling can be done in many ways and with different levels of formality. Modeling concerns software products, software processes, enterprise and business processes. Teaching modeling is as important as the modeling itself since it educates the future software engineers in good modeling practices.

0721234, Software Modeling Lab
2 hours per week, 1 credit hours, prerequisite: Co-requisite with 0721233

A practical lab that trains students to analyze, design, and model software systems using industry-standard techniques and tools. The course emphasizes Unified Modeling Language (UML) diagrams, requirements analysis, and system design practices. Students gain hands-on experience with use-case modeling, class diagrams, sequence diagrams, activity diagrams, and state charts, applying them to real-world scenarios. Through assignments, mini-projects, and a final capstone project, learners develop the ability to translate complex requirements into structured, well-documented software models.

0721230, Software Requirements
3 hours per week, 3 credit hours, prerequisite: 0721111

This course will teach students how to derive and develop software requirements that are measurable, testable and lead to a compliant software design and implementation. Using industry best practices and tools, students will learn how to elicit, analyze, specify, and validate functional and non-functional software requirements. Students will develop software requirements models and specifications that capture the customer / user's needs.

0721320, Software Architecture
3 hours per week, 3 credit hours, prerequisite: 0721233

This module introduces the architectural design of complex software systems and the role of architecture in determining system quality. Students will explore common architectural patterns, along with models and notations used to describe and reason about architecture. The course emphasizes quality attributes such as performance, availability, and modifiability, and teaches architectural tactics used to achieve them. Through case studies and practical design activities, students will evaluate existing architectures and design new systems that achieve targeted quality attributes using principled architectural approaches.

0721345, Mobile Computing Technology
3 hours per week, 3 credit hours, prerequisite: 0750261

This course introduces students to the fundamental concepts, principles, and technologies that underpin mobile computing. It explores the architecture, components, and operation of mobile systems, emphasizing how mobile computing supports communication, data access, and application delivery in modern life. Students will gain an understanding of mobile networks, wireless communication protocols, and mobile operating systems, as well as the constraints and opportunities unique to mobile environments.

0721322, System Analysis and Design
3 hours per week, 3 credit hours, prerequisite: 0721230

This course completes the students' knowledge of Software Design. This course introduces the major design goals (correctness, reusability, robustness, flexibility). Then the course focuses on design principles and design patterns.

0721352, Database Management Systems
2 hours per week, 2 credit hours, prerequisite: 0750261

This course provides students with a comprehensive understanding of relational database concepts and Oracle development tools. It begins with a review of the fundamental principles of relational databases, including data modeling, normalization, and relational integrity. Students will explore the structure and functionality of SQL, distinguishing between Data Definition Language (DDL) and Data Manipulation Language (DML) statements for database creation and data management.

0721353, Database Management Systems Lab
2 hours per week, 1 credit hours, prerequisite: Co-requisite with 0721352

A practical lab focused on the design, implementation, and management of database systems. Students gain hands-on experience with SQL queries, normalization, indexing, transactions, and security

mechanisms. The course emphasizes database design principles, performance optimization, and backup/recovery strategies. Through assignments, mini-projects, and a final capstone project, learners develop the ability to manage and maintain efficient, reliable, and secure database systems in real-world applications.

0216204, Introduction to Web Programming
2 hours per week, 2 credit hours, prerequisite: 0750116

This course is intended to give the student basic issues in website design and implementation. provides students with an insight and the basics of web application development and programming. It focuses on the main web technologies on HTML5 and the related technologies in its ecosystem, diving into the exciting new features of HTML5, CSS3 style sheets, JavaScript, in addition , give students a brief overview of XML, web servers, database and PHP/ASP programming.

0216205, Introduction to Web Programming Lab
2 hours per week, 1 credit hours, prerequisite: 0750116

A practical, hands-on course where students learn to design and develop websites. The lab covers HTML, CSS, and JavaScript. Emphasis is placed on building responsive, interactive applications, using version control, and deploying projects. Students' complete assignments, mini-projects, and a final capstone project to gain real-world web development skills.

0216206, Ethics and Technical Writing in IT
3 hours per week, 3 credit hours, prerequisite: 0750118

This course will develop the ethical foundations of good professional practice in computing and will give students an informed awareness of the principal issues of ethics and professional responsibility in the development and use of computers and information systems. It will provide a basic survey of ethical theories and discuss the role of professional organizations in maintaining good practice, both in general and then specifically in the computing industry. It will also consider legislation that applies in the computing industry, including three major areas of ethical concern in computing: computer cracking, data privacy and intellectual property of software.

0721350, Computer Organization and Architecture
3 hours per week, 3 credit hours, prerequisite: 0216203

The module emphasizes on the following knowledge areas: Digital components used in the organization and design of digital computer, serial and parallel transfer, Flow of information and timing signals, design an elementary basic computer, organization and architecture of the central processing unit.

0216112, Introduction to Information Systems and Information Technology
3 hours per week, 3 credit hours, prerequisite: none

This course introduces information systems and information technology, information systems concepts, and application software. It identifies the basic hardware input and output devices, the main concepts of networks and communication. This course introduces databases and information systems. In addition to that it describes the world wide web and takes into consideration browsing the web and searching the web. Finally, the challenges of digital age.

0721425, Software Development and Documentation
3 hours per week, 3 credit hours, prerequisite: 0721322

This course covers a set of major topics related to the Software Construction discipline. It introduces the fundamental aspects of the software construction activities, presents various recommended practical approaches and techniques, and details a set of widely used software construction technologies. An overview on the software construction tools is also presented.

0721331, Software Project Management
3 hours per week, 3 credit hours, prerequisite: 0721322

Software management is concerned with knowledge about the planning, organization, and monitoring of all software life-cycle phases. Management is critical to ensure that software development projects are appropriate to an organization, work in different organizational units is coordinated, software versions and configurations are maintained, resources are available when necessary, project work is divided appropriately, communication is facilitated, and progress is accurately charted.

0721426, Web Software Engineering
2 hours per week, 2 credit hours, prerequisite: 0216204

The World Wide Web has evolved into a central platform for the delivery of information resources and services. However, many web applications are still developed in an ad-hoc manner, leading to challenges in usability, maintainability, quality, and reliability. This course provides a systematic and disciplined approach to the development of high-quality, reliable, and user-centered web applications.

0721427, Web Software Engineering Lab
2 hours per week, 2 credit hours, prerequisite: Co-requisite with 0721426

A practical lab that focuses on applying software engineering principles to the design and development of web applications. Students gain hands-on experience in requirements analysis, system modeling, architectural design, testing, and deployment using modern web technologies. The course emphasizes team-based projects, version control, and best practices for building

scalable, maintainable, and high-quality web systems. Through assignments, mini-projects, and a final capstone project, learners develop the skills needed to engineer robust web software solutions in real-world contexts.

0721410, Secure Software Construction
3 hours per week, 3 credit hours, prerequisite: 0721425

This course explores the foundations of software security. We'll consider important software vulnerabilities and attacks that exploit them – such as buffer overflows, SQL injection, and session hijacking – and defenses that prevent or mitigate these attacks, including advanced testing and program analysis techniques. Importantly, we'll take a "build security in" mentality, considering techniques at each phase of the development cycle that can be used to strengthen the security of software systems.

0721433, Software Testing
3 hours per week, 3 credit hours, prerequisite: 0721322

This course provides an in-depth exploration of software testing across various levels, including unit, integration, subsystem, and system testing. It covers manual and automated techniques for generating test data and emphasizes designing and implementing tests to ensure software maintainability and quality. Students will learn key concepts such as test planning, test case design, and tools for verification and validation (V&V). The course also examines formal methods for testing, the economics of software testing, and how testing integrates with other quality assurance activities in the software development lifecycle. Topics include black-box and white-box testing, performance and load testing, and automated testing tools to improve software reliability.

0721434, Practical Training
3 hours per week, 3 credit hours, prerequisite: 90 Training Hours

This course covers practical training in professional and industrial environments, allowing the student to apply the skills and knowledge acquired during previous years at the university to real projects. The course includes direct supervision from a training supervisor to ensure the quality of learning, enhance problem-solving skills, work within multidisciplinary teams, and gain practical experience that helps the student transition smoothly into the job market.

0721448, Research Project (1)
1 hour per week, 1 credit hours, prerequisite: 90 Hours

This course covers the methodology of scientific research and planning for software projects, where the student identifies the topic of their project, gathers and analyzes the necessary data, and designs preliminary software solutions. The course focuses on developing the ability to

conduct systematic research, formulate software problems, and use research and analysis tools and techniques to ensure project quality.

0721449, Research Project (2)
2 hours per week, 2 credit hours, prerequisite: 0721448

This course continues the practical research project that the student started in Research Project (1), focusing on fully implementing software solutions and developing the resulting software. The course includes design review, development, testing, evaluation, and submission of the final project with detailed documentation, in addition to presenting the results and defending the project before a specialized academic committee to ensure the application of quality standards and academic accreditation.

0721439, Special Topics in Software Engineering
3 hours per week, 3 credit hours, prerequisite: 0721322

This course provides a comprehensive introduction to User Experience (UX) and User Interface (UI) Design, focusing on creating intuitive, engaging, and efficient digital experiences. Students will learn the principles of designing user-centered interfaces, the process of conducting user research, and the methods for testing and evaluating user interfaces. The course covers essential topics such as interaction design, visual design, prototyping, and usability testing, with an emphasis on creating responsive designs for various platforms, including web and mobile.

0721423, Graphical User Interface
3 hours per week, 3 credit hours, prerequisite: 0721322

This course provides a comprehensive introduction to User Experience (UX) and User Interface (UI) Design, focusing on creating intuitive, engaging, and efficient digital experiences. Students will learn the principles of designing user-centered interfaces, the process of conducting user research, and the methods for testing and evaluating user interfaces. The course covers essential topics such as interaction design, visual design, prototyping, and usability testing, with an emphasis on creating responsive designs for various platforms, including web and mobile.