**Description, objectives and learning outcomes of the courses offered in the plan**

**1 601 CIS Scientific Research Methodology**

**Course Description**

**The research methodology course includes the following topics: defining the research problem, formulating research questions, identifying research variables, collecting data, analysis techniques, verifying the validity and reliability of studies and design research, technical writing, research ethics and presentation. It also discusses computer applications related to data analysis. The course aims to introduce the student to research methodology, including the basics of quantitative, qualitative and design scientific research. Through this course, the student will be able to demonstrate the ability to: define the scientific research process and its principles, identify the main methodologies for practical research, prepare the main elements of a research proposal, collect data and conduct experiments that address the research questions, analyze them and discuss the results.**

**Course Objectives**

**The course aims to: Introduce the student to the research methodology, including the basics of quantitative, qualitative, and design scientific research. Learning Outcomes**

**After studying this course, the student is expected to be able to:**

**1. Know scientific research, discuss and apply the concepts of scientific research, describe the scientific research process and its principles, and**

**Learn about the ethics related to the research process.**

**.2 Describes and compares the main methodologies of scientific research and includes (and, qualitative, quantitative**

**design science).**

**3 Prepares a summary of previous studies (Review Literature) related to the research topic using various research databases and prepares citations and literary references according to accepted patterns such as (APA**

**and IEEE).**

**4 Prepares the main elements of a research proposal, including defining the research problem, writing literature reviews, renewing the research methodology, collecting data that addresses the research questions, analyzing the data and explaining the results.**

**2 CIS 641 Software Engineering (Advanced)**

**Course Description**

**This course aims to provide students with advanced concepts in software engineering and includes the following topics:**

**Software architecture, software reuse, software reliability,**

**Software protection and confidentiality,**

**Error reduction, verification and review, cost estimation, quality control,**

**Software development. During this course, the student will be able to apply appropriate software development methods to maintain:**

**Maintain and restructure available software and manage software development.**

**Course objectives**

**The course aims to:**

**-1 The student distinguishes different design methods, models and measures.**

**-2 The student uses different software testing and inspection methods and strategies, pointing out the importance of inspection in**

**achieving high-quality software.**

**-3 The student explores the concept of reliability, the role it plays in software engineering, and methods of modeling and measuring it.**

**-4 Show how the product and its production process are organized and controlled in order to maintain software quality assurance.**

**-5 Explores the importance of maintenance, restructuring and software rebuilding programs.**

**-6 The student estimates the cost of software using different techniques The student analyzes and evaluates the risks facing**

**Software.**

**Learning outcomes**

**After studying this course, the student is supposed to be able to:**

**1. Identify the difference between different software design models and techniques and how to apply them.**

**.2 Explores the importance of software reliability and how we can design independent software, and what are the metrics used in the reliability testing process.**

**.3 Understand the basic principles and techniques in the process of inspecting and testing software and making it error-free and acceptable. Identify the importance of software standards and quality assurance.**

**.4 Apply appropriate software development methods to maintain: Maintain and restructure available software and manage software**

**development. Use appropriate methods and tools to estimate the cost of the program.**

**.3 642 CIS Software Modeling and Design**

**Course Description**

**The course includes the necessary knowledge to perform the programming process, clarify and compare traditional and modern approaches to the software process, design principles for the software system, elements and guidelines for designing user interfaces, stages of logical design, physical design, data design, software module design, software recycling and modern trends in software engineering, such as cloud computing. The course aims to build students' capabilities and skills in the field of modeling and designing systems, including object-oriented modeling. Through this course, the student will be able to:**

**The student will be able to create a number of documents that include modeling activities during different levels of the design phase.**

**Course Objectives**

**The course aims to: Achieve knowledge and build the necessary modeling and design skills for any professional graduate in the field of information technology, specifically: information systems analyst, software designer, business analyst, website developer, systems administrator, database administrator and software engineers.**

**Learning Outcomes**

**After studying this course, the student is expected to be able to:**

**1. Understand traditional and modern methodologies of the programming process and be able to adopt the appropriate method for the intended system**

**to be computerized.**

**2. The ability to use, install and compare different modeling techniques and concepts in a manner that is compatible with the various application fields.**

**3. Apply design basics and guidelines to user interfaces, software modules and data.**

**.4 Improve students' modeling abilities and skills to keep pace with modernity and future trends in software engineering.**

**.4 643 CIS Requirements Engineering**

**Course Description**

**The course includes managing requirements related to large, complex, and changing systems and complex software from technical, organizational, and administrative perspectives. This course aims to provide students with the basic principles related to systematic organization, and past, current, and future methodologies in requirements requirements. The student is expected to be able to analyze system requirements, apply requirements elicitation processes, and compare types**