People's Democratic Republic of Algeria

Ministry of Higher Education and Scientific Research

Sétif 1 University – Ferhat Abbas

Faculty: Sciences

Engineer's Degree in: Software engineering

Presentation and objective of the specialty

The field of computer science is evolving rapidly, and this Software Engineering training program aims to achieve the following key objectives:

- Train engineers with expertise in software engineering, enabling them to master the entire development lifecycle—from requirements analysis to prototyping, testing, deployment, and software maintenance.
- Through this program, students will gain proficiency in advanced database concepts (distributed, semi-structured, NoSQL, etc.), agile development methodologies, collaborative development, modern information systems engineering, web technologies (IoT, Cloud Computing, Big Data, etc.), mobile development, as well as essential aspects of quality assurance and security for software products.

Admission requirements:

- The preferences expressed by the students.
- The series of obtained results.
- The reception capacities of educational institutions.

Career Prospects/Professions:

Career opportunities in terms of employability include the following profiles:

- Software Developer Engineer
- Software Engineer
- DevOps Engineer
- Engineer in Software Design, Development, and Maintenance
- Etc.

Organization of Studies and Official Duration of the Program:

Program Overview:

Semester 1:
Algorithms and Data Structures 1, Machine Structure, Introduction to Operating Systems 1, Mathematical Analysis 1
Algebra 1, Fundamental Electronics, Written Communication Techniques and Office Tools

Semester 2:
Algorithms and Data Structures 2, Computer Architecture, Mathematical Analysis 2, Algebra 2
Mathematical Logic, Probability and Statistics 1, Oral Communication Techniques

Semester 3:
Algorithms and Data Structures 3, Object-Oriented Programming 1, Introduction to Information Systems
Mathematical Analysis 3, Algebra 3, Probability and Statistics 2, Entrepreneurship

Semester 4:
Object-Oriented Programming 2, Introduction to Operating Systems 2, Introduction to Computer Networks
Introduction to Databases, Language Theory, Graph Theory, Computer Ethics

Semester 5:
Advanced Algorithms and Complexity, Software Engineering, Databases: Administration and Architecture, Operating Systems: Synchronization and Communication
Optimization Techniques, Foundations of Artificial Intelligence

Semester 6:
Software Design, Web Programming, Databases: Optimization and Management of Concurrent Access
Compilation 1, Numerical Analysis, Introduction to Computer Security

Semester 7:
Advanced Database Concepts, Project Management, Data Mining, Compilation 2
Agile Management Methods, Networks and Protocols, Interface Design and Evaluation

Semester 8:
Advanced Information Systems Architecture and Management, Big Data and NoSQL Databases

Training Canvas:

- Introduction to Programming
- Data Structures and Algorithms
- Discrete Mathematics
- Computer Architecture

- Software Development Life Cycle (SDLC)
- Object-Oriented Programming (OOP)
- Version Control and Collaboration

- Front-End Development
- Back-End Development
- Databases
- Mobile App Development

Advanced training modules:

- Software Testing and Debugging
- Software Design Patterns
- Code Quality and Refactoring

- Cloud Computing and Distributed Systems
- Security in Software Development
- AI and Machine Learning Basics
- DevOps and Continuous Integration/Continuous Deployment (CI/CD)

- Integrated Development Environments (IDEs)
- Agile Methodology
- Project Management Tools

- Blockchain Development
- Augmented Reality (AR) and Virtual Reality (VR) Development
- **IoT (Internet of Things) Development**

Language of instruction:

English

Training framework:

The tables provided in the previous section "Program Overview"

Software Architectures, Software Process Models and Management, Software Testing and Quality Assurance
Performance Modeling and Evaluation, Mobile Operating Systems, Multidisciplinary Project

Semester 9:
Formal Methods for Software Engineering, Embedded Software Development, Video Game Design: Theory and Practice
Internet of Things (IoT): Concepts and Development, DevOps & Cloud Computing, Software Security
Mobile Development, Legal Aspects

Semester 10:
Internship in a company, culminating in a thesis and a defense, either in-person or remotely.

Curriculum Highlights:

The skills targeted by this program are:

- Mastering the development of a quality software product
- Knowing how to manage a software development project
- Mastering collaboration within a development project
- Mastering current development tools and technological environments (Cloud, Big Data, NoSQL, etc.)
- Being able to meet the needs of businesses and decision-makers through the mastery of appropriate IT methods and tools
- Mastering new technologies and their impact on the company's information system

Admission Information:

Coordinator of the Program: Dr. Nadia Zerguine
Contact: nadia.zerguine@univ-setif.dz

During the training period, the student will be assessed based on the following criteria:

- The current application of Articles 171 and 1023.

- Continuous assessment during tutorials, including quizzes, active participation, attendance, and presentations.
- Final exam.