Software Quality Assurance (SQA)

1. **Course number and name:** 020SQAES4 Software Quality Assurance

2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours

3. **Name of course coordinator:** Maroun Ayli

4. **Instructional materials:**

   - N. F. PhD, J. Humble, and G. Kim, Accelerate: The Science of Lean Software and DevOps: and Scaling High Performing Technology Organizations. IT Revolution, 2018.

   - D. Galin, Software quality assurance: from theory to implementation, Nachdr. Harlow Munich: Pearson, 2009.

   - K. Naik and P. Tripathy, Software Testing and Quality Assurance: Theory and Practice. John Wiley & Sons, 2011.

5. **Specific course information**
   a. **Catalog description:**
   This course, Software Quality Assurance, offers an in-depth exploration into the methodologies, techniques, and tools used in the quality assurance and testing of software systems. It is designed to equip students with the knowledge and practical skills necessary to ensure the quality and reliability of software products. Throughout the course, students will delve into the key concepts of software quality assurance, learn various testing methods, and understand the role of a QA engineer in the software development lifecycle. The curriculum includes both theoretical foundations and hands-on practice, enabling students to apply learned concepts in real-world scenarios.

   b. **Prerequisites:** None

   c. **Selected Elective** for CCE students

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
   - Understand Fundamental Concepts of SQA.
   - Knowledge of Testing Methodologies
   - Proficiency in Test Planning and Design
   - Applying different types of testing (Unit, Integration, API, GUI, etc…)
   - Application of SQA in Different Development Environments (Agile and DevOps)
   - Understanding of Quality Standards and Metrics. (ISO, IEC)

- Applying AI techniques for SQA. (User intent identification, Automatic GUI testing, etc.)

b. PI addressed by the course:

PI	1.3	2.3	2.5	7.1
Covered	x	x	x	x
Assessed	x	x	x	

7. Brief list of topics to be covered

- Introduction to Software Quality Assurance:
  - Overview of Quality Assurance: 1 lecture
  - Importance in Software Development: 1 lecture
- Fundamentals of Software Testing:
  - Testing Principles: 1 lecture
  - Quality Models: 1 lecture
- Software Testing Life Cycle (STLC):
  - Phases of STLC: 1 lecture
  - Role in Software Development: 1 lecture
- Test Design Techniques:
  - Black Box and White Box Techniques: 1 lecture
  - Test Case Design: 1 lecture
- Test Automation:
  - Automation Strategies: 1 lecture
  - Tools and Frameworks: 3 lectures
- Unit Testing:
  - Concepts and Tools: 1 lecture
- Integration Testing:
  - Strategies and Practices: 1 lecture
- User Acceptance Testing:
  - Concepts and Execution: 1 lecture
- Non-Functional Testing:
  - Performance Testing: 1 lecture
  - Security Testing: 1 lecture
- Quality Standards and Metrics:
  - ISO Standards: 1 lecture
  - Key Metrics: 1 lecture
- SQA in Agile and DevOps:
  - Agile Testing Practices: 1 lecture
  - QA in Continuous Integration/Continuous Deployment: 1 lecture
- Risk Management in Testing:
  - Identification and Management: 1 lecture
- Artificial Intelligence and new trends in SQA: 3 lectures