

| Course Title:       | Software architecture project                      |
|---------------------|--|
| Course Code:        | CSE552/1   |
| Program:            | Master Degree In Computer Engineering              |
| Department:         | Computer Engineering                               |
| Course coordinator: | Dr. Naziha DHIBI                                   |
| Institution:        | Private Higher School of Engineers of Gafsa (ESIP) |

## A. Course Identification

| 1. Cred   | lit hours: 3 (1.5-1.5-0)                                    |  |  |
|---|---|--|--|
| 2. Cour   | se type   |  |  |
| a.  | College Department Others                                   |  |  |
| b.  | Fundamental Transversal Optional                            |  |  |
| <b>3.</b> Level/year at which this course is offered: 3.1/3 |   |  |  |
| 4. Pre-   | 4. Pre-requisites for this course: CSE452/1, CSE332, CSE131 |  |  |

### 1. Mode of Instruction (mark all that apply)

| No | Mode of Instruction   | Contact<br>Hours | Self-<br>study | Total workload |
|----|-----------------------|------------------|----------------|----------------|
| 1  | Traditional classroom |                  |                |                |
| 2  | Blended               | 15               |                |                |
| 3  | E-learning            |                  | 11             | 26             |
| 4  | Distance learning     |                  |                |                |
| 5  | Other ()              |                  |                |                |

#### 2. Contact Hours (based on academic semester)

| No | Activity          | Contact Hours |
|----|-------------------|---------------|
| 1  | Lecture           |               |
| 2  | Laboratory/Studio | 15            |
| 3  | Tutorial          | -             |
| 4  | Others (specify)  | -             |
|    | Total             | 15            |



#### **B.** Course Objectives and Learning Outcomes

#### **Course Description**

This advanced course aims to prepare computer science students for the professional world by engaging them in complex, real-world software development projects. It covers advanced aspects of the software development lifecycle, from design to maintenance, with an emphasis on problem solving, team collaboration and innovation.

#### **Course Main Objective**

- $\checkmark$  Deepen understanding of advanced software development concepts.
- ✓ Master project management methodologies adapted to large-scale projects.
- ✓ Develop advanced skills in software design and architecture.
- ✓ Engage in agile and iterative development practices.
- ✓ Explore emerging technologies and industry trends

| CLO | CLOs  |         |
|-----|---|---------|
| 1   | Knowledge and Understanding                                       |         |
| 2.1 | ✓ Deepen understanding of advanced software development concepts. | PLO.K2  |
| 2   | Skills  |         |
| 2.1 | ✓ Master project management methodologies adapted to large-scale  | PLOS2   |
| 2.1 | projects  | 1 LO.52 |
| 3.1 | ✓ Develop advanced skills in software design and architecture.    | PLO.S3  |
| 4.1 | ✓ Ability to carry out a complete software development project    | PLO.S4  |
|     | ✓ Integration of new technologies into projects.                  | PLO.S5  |
| 6.1 | ✓ Engage in agile and iterative development practices.            | PLO.S6  |
| 7.1 | ✓ Explore emerging technologies and industry trends               | PLO.S7  |

#### 1. Course Learning Outcomes



### **C.** Course Content

| No    | List of Topics   | <b>Contact Hours</b> |
|-------|--|----------------------|
|       | ✓ Architecture Logicielle Avancée :                              |                      |
| 1     | <ul> <li>Modèles architecturaux (Microservices, SOA).</li> </ul> | 3                    |
|       | Conception de systèmes distribués.                               |                      |
|       | ✓ Advanced Project Management:                                   |                      |
| 2     | • Advanced agile methods (Extreme Programming,                   | 2                    |
| 2     | Feature-Driven Development).                                     | 3                    |
|       | • Complex risk management.                                       |                      |
|       | ✓ Security in Software Development:                              |                      |
| 3     | • Software security principles.                                  | 3                    |
|       | Secure coding practices.   |                      |
|       | ✓ Artificial Intelligence and Machine Learning:                  |                      |
| 4     | • Practical applications in software development.                | 3                    |
|       | • Integration of ML models into projects.                        | 5                    |
|       | ✓ Big Data and Analytics:  |                      |
| c.    | • Big data processing.   | 2                    |
| 5     | • Use of Big Data frameworks (Hadoop, Spark).                    | 3                    |
|       |  |                      |
| Total |  | 15                   |

### **D.** Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code   | <b>Course Learning Outcomes</b>   | Teaching<br>Strategies   | Assessment<br>Methods  |
|--------|---|--|--|
| 1.0    | Knowledge and Understanding   |  |  |
| PLO.K2 | <ul> <li>Deepen understanding of advanced<br/>software development concepts.</li> </ul> | <ul> <li>✓ Lectures</li> <li>✓ Group<br/>Discussions</li> <li>Research Projects</li> </ul> | <ul> <li>Homework<br/>assignments</li> <li>Practical Work</li> </ul> |
| 3.0    | skills  |  |  |
| PLO.S2 | ✓ Master project management<br>methodologies adapted to large-scale<br>projects.        | ✓ Lectures   | <ul> <li>Homework</li> </ul>   |
| PLO.S3 | ✓ Develop advanced skills in software design and architecture.                          | <ul><li>✓ Hands-On Labs</li><li>✓ Group</li></ul>  | <ul> <li>assignments</li> <li>Practical</li> </ul>                   |
| PLO.S4 | <ul> <li>Ability to carry out a complete<br/>software development project</li> </ul>    | Discussions<br>Research Projects   | Work   |
| PLO.S5 | <ul> <li>Integration of new technologies into projects.</li> </ul>                      |  |  |



| Code   | <b>Course Learning Outcomes</b>   | Teaching<br>Strategies | Assessment<br>Methods |
|--------|---|------------------------|-----------------------|
| PLO.S6 | ✓ Engage in agile and iterative development practices.                    |                        |                       |
| PLO.S7 | <ul> <li>Explore emerging technologies and<br/>industry trends</li> </ul> |                        |                       |

#### 2. Assessment Tasks for Students

| # | Assessment task*      | Week Due | Percentage of Total<br>Assessment Score |
|---|-----------------------|----------|---|
| 1 | Work carried          | Weekly   | 20%                                     |
| 2 | Prototype realization | Random   | 30%                                     |
| 3 | Final Evaluation      | _        | 50%                                     |

### E. Student Academic Counselling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

1- Office hours

2- Blackboard interface

# F. Learning Resources and Facilities

1. Learning Resources

| <b>Required Textbooks</b>         | NA  |
|-----------------------------------|---|
| Essential References<br>Materials | NA  |
| Electronic Materials              | <ul> <li>IEEE Xplore &amp; ACM Digital Library</li> <li>Microsoft Learn &amp; AWS Training – <i>Cloud architecture best practices and DevOps</i></li> <li>YouTube Channels: <i>The Pragmatic Engineer, TechWorld with Nana, DevOps Toolkit – Software architecture and system design tutorials</i></li> </ul> |
| Other Learning<br>Materials       | NA  |

#### 2. Facilities Required

| Item                 | Resources                                |
|----------------------|--|
|                      | Classroom board                          |
| Accommodation        | Computer lab with the necessary software |
|                      | Internet access                          |
| Technology Resources | Data projector                           |



# G. Course Quality Evaluation

| <b>Evaluation Areas/Issues</b>  | Evaluators  | <b>Evaluation Methods</b> |  |
|---------------------------------|---|---------------------------|--|
| Effectiveness of teaching and   | Students, course coordinator, Alumni,                   | Direct/Indirect           |  |
| assessment.                     | Employers   | Direct/indirect           |  |
| Extent of achievement of course | achievement of course Faculty, Program Leaders, quality |                           |  |
| learning outcomes.              | department  | Direct                    |  |
| Quality of Learning resources   | Faculty, Program Leaders,                               | Direct, Indirect          |  |
| Teaching and learning quality   | Students, Faculty Program Londors                       | Direct Indirect           |  |
| and effectiveness.              | Students, Faculty Flogram Leaders,                      | Direct, mullect           |  |

# H. Specification Approval Data

| Council / Committee | Computer Engineering Council |
|---------------------|------------------------------|
| Date                | 11/09/2023                   |