# Course Specification
## (Bachelor)

| |
|---|
| **Course Title**:  Graduation Project (2) |
| **Course Code**:   497-MEC-2 |
| **Program**: Bachelor of Science in Engineering |
| **Department**:   Mechanical Engineering |
| **College**:  College of Engineering |
| **Institution**:  Najran University |
| **Version**:  1.0 |
| **Last Revision Date**:   27 February 2024 |

## Table of Contents

## A. General information about the course:

### 1. Course Identification

| **1. Credit hours: (2)** |
|---|

### 2. Course type

| A. | ☐University | ☐College | ☒ Department | ☐Track | ☐Others |
|---|---|---|---|---|---|
| B. | ☒ Required | | | ☐Elective | |

**3. Level/year at which this course is offered: (Fifth Year \ Level 10)**

**4. Course general Description:**

With faculty supervision, students must integrate and apply what they have learned from earlier academic work and field experiences for their graduation project, which serves as the course's capstone assignment. Graduation project-II should be taken the following semester since this is the continuation of graduation project-I. The students attempt to put what they suggested in graduation project-I into practice as a group during the semester. Weekly meetings in class or lab are held by project students, who divide their work into smaller projects and then combine them all to fulfill their goals and receive teacher feedback and suggestions. Students present their design projects and the thesis to the grading committee at the end of the semester.

**5. Pre-requirements for this course** (if any)**:**

494-MEC-2 (GRADUATION PROJECT (1))

**6. Co-requisites for this course** (if any)**:**

NIL

**7. Course Main Objective(s):**

1. Identify and formulate engineering problems in the area of electrical engineering
2. Work effectively as a member of the team
3. Conduct enough literature review in the project domain
4. Design a system, component or process with defined constraints
5. Solve engineering problems and implement designed solution
6. Collect and analyze data, and draw conclusions though experiments while testing a project
7. Communicate orally and in writing the project design details in a technical report

## 2. Teaching mode (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|----|---------------------|---------------|------------|
| 1 | Traditional classroom | 60 | 50% |
| 2 | E-learning | 20 | 50% |
| 3 | Hybrid<br>• Traditional classroom<br>• E-learning | | |
| 4 | Distance learning | | |

## 3. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|----|----------|---------------|
| 1. | Lectures | 40 |
| 2. | Laboratory/Studio | 20 |
| 3. | Field | |
| 4. | Tutorial | |
| 5. | Others (specify) | |
| Total | | 60 |

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|------|--------------------------|-----------------------------------|---------------------|--------------------|
| 1.0 | Knowledge and understanding | | | |
| 1.1 | Conduct enough literature review in the project domain. | 7 | -Lectures<br>-Discussion rounds<br>Tutorials | -Presentation<br><br>-Final Report Draft |
| 1.2 | Identify and formulate engineering problems in the area of Mechanical engineering | 1 | -Lectures<br>-Discussion rounds<br>Tutorials | -Presentation<br><br>-Final Report Draft<br><br>-Log book |

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|------|--------------------------|-----------------------------------|---------------------|--------------------|
| **2.0** | **Skills** | | | |
| 2.1 | Design a system, component or process with defined constraints. | 2 | -Lectures -Discussion rounds Tutorials | -Presentation -Final Report Draft |
| 2.2 | Solve engineering problems and implement designed solution | 2 | -Lectures -Discussion rounds Tutorials | -Presentation -Final Report Draft |
| 2.3 | Collect and analyze data, and draw conclusions though experiments while testing a project | 6 | -Lectures -Discussion rounds Tutorials | -Presentation  -Final Report Draft  -Log book |
| **3.0** | **Values, autonomy, and responsibility** | | | |
| 3.1 | Communicate effectively in written engineering report and in oral presentation | 3 | discussion rounds, homework, tutorials, assignments | -Log book |
| 3.2 | Work effectively as a member of the team | 5 | discussion rounds, homework, tutorials, assignments | -Log book -Presentation |
| 3.3 | Recognize ethical and professional responsibilities in engineering situations and make informed judgments. | 4 | discussion rounds, homework, tutorials, assignments | -Discussion,  -Log book  -Presentation |

## C. Course Content

| No | List of Topics | Contact Hours |
|----|----------------|---------------|
| 1. | Prepare a road-map, collect the necessary equipment/software for the project that was proposed, planned and studied in graduation project I. | 8 |
| 2. | Planning and implementation, peer review, critical comments and suggestions from the supervisor. | 8 |
| 3. | Design and investigation of complex problems using proper techniques, tools and resources | 8 |
| 4. | Testing, data analysis, validation and critical thinking | 8 |
| 5. | Results and discussion including societal/health/safety impact | 8 |
| 6. | Comparison, conclusion, recommendation and assessment on implication to society/environment | 10 |
| 7. | Submit the report along with the project work to the committee | 10 |
| **Total** | | **60** |

## D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|----|------------------------|--------------------------------|--------------------------------------|
| 1. | Logbook | Every week | 15 % |
| 2. | Presentation and Poster (Assessment Panel) | Week 10 | 20 % |
| 3. | Final Report Draft (Supervisor) | Week 10 | 35 % |
| 4. | Final Report Draft (Assessment Panel) | Week 10 | 30 % |

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

| Essential References | Any available books in the library related to project work |
|----------------------|-----------------------------------------------------------|
| Supportive References | The students review the literature of the project from Published research articles. |
| Electronic Materials | Youtube channel for project concepts |
| Other Learning Materials | The work is done by the students on the software related to the project (like AutoCAD, Ansys, COMSOL Multiphysics, ABACUS) |

## 2. Required Facilities and equipment

| Items | Resources |
|---|---|
| **facilities**<br>(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | The department provides the classroom and Lab facilities needed by the students (maximum 3 students for each group). |
| **Technology equipment**<br>(projector, smart board, software) | AutoCAD, Ansys, COMSOL Multiphysics, ABACUS |
| **Other equipment**<br>(depending on the nature of the specialty) | Desktop Computer |

## F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| **Effectiveness of teaching and assessment** | Students | -Questionnaire is administered upon completing the course syllabus<br>-Open discussion for the students during the semester to recognize their weakness points in the course<br>Feedback from Test 1, Test 2 and Final exam records |
| **Evaluation of teaching** | Peer reviewer | The peer reviewer will monitor a teaching session for assessment by filling the peer reviewer assessment form |
| **Extent of students' achievement of course learning outcomes** | Teaching staff | CLOSO program |
| **Improvement of teaching** | - Students<br>Peer reviewer | -Learning form students feedback<br>-Learning from peer reviewer and department feedback<br>-Learning/Using various teaching methods (lecturing, discussions, workshops, exams)<br>Learning/Using various teaching medias (projector, whiteboard, videos, educational visits) |

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| **Quality of learning resources** | Peer reviewer | The questionnaire is administered by end of every semester. |
| **Verifying standards of student achievement** | Students | Check student's marks by an independent member teaching staff/program leader of a sample of student work and remarking of tests or a sample of assignments. |

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

| COUNCIL /COMMITTEE | DEPARTMENT OF MECHANICAL ENGINEERING |
|---|---|
| **REFERENCE NO.** | |
| **DATE** | 27/02/2024 |