|  |
| --- |
| **Graduation Project** **Course description** The graduation project is a culmination of all the life skills, as well as the knowledge acquired throughout the different courses of the career-oriented programs. It aims to place students in the active role of problem solvers, as they investigate a question, follow all the steps of the scientific method to find a conclusion before presenting their work during their graduation project ceremony.  Students’ progress during this course will be evaluated at three stages as follows: Term 1 – Students prepare and submit an initial ‘Project Proposal/ including their introduction, the significance of their project and a Literature Review. Term 2 – Students submit a working prototype along with the project report that will include methodology, results, data analysis and conclusion. Term 3 – Students conclude the project and present their work to evaluate students’ skills in communication and how well they can advocate their project. The CDU members will be auditing the graduation project progress three times during the year.  At the end of this course, students will be required to submit a scientific report that compiles all their work with proper referencing and appendices. In addition to a proper presentation of their research and the prototype display at the graduation project ceremony. **Assessment Scheme**  Applicable for all terms 1, 2 and 3. |

|  |  |  |
| --- | --- | --- |
| **Assessment type** | **Category** | **Percentage** |
| Formative | Participation | 10% |
| Design/Prototype/Improvement | 60% |
| Summative | Final Report/Product & Presentation | 30% |
| **Course Final Mark** | | **100%** |

# **Learning Outcomes**

Academic knowledge: Students will be able to demonstrate knowledge and understanding of:

* Mathematics, sciences and career-oriented courses through project production and scientific research in an area based on students’ selection.

Subject practical skills: Upon completion, students will be able to do the following:

* Recognize the significance of their research or graduation project topic.
* Apply scientific procedure and engineering design steps in producing their graduation projects.
* Analyse and interpret data collected and results to show if the project satisfies its significance.
* Advocate their project idea properly and seek support form identified organizations in the UAE.

Transferable skills: Upon completion, students will be able to:

* Effectively present and communicate their aim and methodology to academic audience, industry partners and senior management.

# **Syllabus**

The Graduation Project course is delivered through two periods per week in which students meet with their supervisor to monitor their progress throughout the project development stages based on the following timeline.

**Term 1**

Students prepare and submit an initial ‘Project Proposal’ including an introduction, the significance of their project, a literature review and design specifications.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Stage** | **Week** | **Goal** | **Task** |
| **Term-1** | **Project Selection** | **1-3** | Students comprehend the problem, and determine their question. | The instructor divides students into groups of appropriate number (not more than four), and assigns roles and responsibilities. She/he then goes over the stages of project work with students.  **Problem identification**  Students should identify an area or a topic for their project.  All the newly selected topics from students’ proposals should be sent to the CDU for approval before Thursday September 15th 2016. |
| **Research** | **4-5** | Get students to organize their approach to the problem/ topic.  Encourage students to create a hypothesis. | Students seek expert opinion, select the methodology, decide on a proper design and predict expected results. |
| **Ideate & analyze ideas** | **6-7** | Help students recognize relationships and encourage them to expand their thinking about possible solutions. | Students should search previous ideas and existing products and implementation methods for their project. They will then compile the advantages and disadvantages of each of the items mentioned above. Finally, the students will show what unique advantages and specifications their project will have. |
| **Checkpoint** | **8** | Students should submit a draft report to explain their ideas and discuss limitations and constrains.  Encourage students to reflect on and self- assess their report. | Students work in teams to identify strengths and weaknesses of their proposal and provide alternative ideas to resolve the expected constrains.  Introduction and literature review report should be submitted by 13th-10-2016  Use the template in appendix 1 |
| **Design** | **9-1 1** | Students design the prototype/ finalize the methodology and tools required for the research. | How will students will test their hypothesis?  List ALL of the steps they will follow to complete the experiment/ prototype.  Include a timeline of completion of all tasks ie: duration estimation.  Ensure that all material, components and equipment required to implement their project are available/ ordered to be received by week 11. |
|  | **13** | Final evaluation of the planning phase | Students submit a final report that includes the literature review and the design/ methodology on 20th of Nov.  Final presentation to be evaluated between 20-25th of November  Use the template in appendix 2 |

**Term 2**

Students submit a working prototype along with a project report, where applicable, that includes methodology, results, data analysis and a conclusion.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Term 2** | **Stage** | **Week** | **Goal** | **Task** |
| **Build** | **1-4** | Attempt to build a full size working model/ prototype OR perform an experiment | * Students in teams work on building their project according to the approved design that meets the specification.   OR   * If a scientific experiment is required, students perform the experiment, collect, organize, analyze data and draw conclusion. |
| **Check point** | **5** | Student submit a follow up report to show their progress. | Students work in teams to identify strengths and weaknesses of their prototype/ research and suggest modifications. |
| **Test & refine** | **6-8** | Test and evaluate the final working prototype/ evaluate research results. | * Students will test the functionality of the prototype based on the agreed specifications. * In case of a scientific experiment, students will identify sources of error and adjust their procedure accordingly. |
|  | **9** | Final presentation, report, and prototype/ experimental report. | * Refer to the research report template in appendix 2   Final Report to be submitted on the 5th of March.  Final presentation to be evaluated between 05-09th of March 2017 |

**Term 3**

Students conclude the project and present their work to evaluate their skills in communication and how well they can advocate their project.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Term 3** | **Stage** | **Week** | **Goal** | **Task** |
| **Communicate and reflect** | **1-5** | Students are encouraged to communicate and present their project | * Internal communication: peer assessment for the project and report to apply improvements.   Refer to the evaluation forms in Appendices 4 and 5   * External communication: students evidence their communication with external entities that are interested in their project idea and how it will be useful for them. |
| **Final Evaluation** | **6** | Internal evaluation | * Students submit final report and prototype by 14-05-2017 * Internal evaluation committee to judge projects between 14-18 May |
| **7** | Graduation project ceremony | Students are required to advocate their graduation project and present it to industry partners, academic committees and senior management.  Final Report to be submitted on the 21st of May.  Final presentation to be evaluated by 21-25 of May 2017 |

# Rubrics for evaluation

**Term I**

1. The evaluation criteria for **Participation (10 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Criteria** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Promptness | 1 | 2 | 3 | 4 | 5 |
| Level of Engagement | 1 | 2 | 3 | 4 | 5 |
| Behavior | 1 | 2 | 3 | 4 | 5 |
| Preparation | 1 | 2 | 3 | 4 | 5 |

**Note:** Marks should be added and divided by 2

1. The evaluation criteria for **Project Development** (60 marks) is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Criteria** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| **Problem comprehension**.  Students should be fully aware of what must be done for this task and can explain the problem properly. | 1 | 2 | 3 | 4 | 5 |
| **Approach organization** Students seek expert opinion, and select the methodology, the proper design and expected results. | 1 | 2 | 3 | 4 | 5 |
| **Ideate & ideas analysis**  Students should compare and contrast similar and previous projects/implemented ideas, and develop accurate sophisticated developments for their project. | 1 | 2 | 3 | 4 | 5 |
| **Literature review report\*** | 2 | 4 | 6 | 8 | 10 |
| **Prototype design/research methodologies\*\*** | 4 | 8 | 12 | 16 | 20 |
| **Sequence and duration estimation** | 1 | 2 | 3 | 4 | 5 |
| **Material/equipment purchasing**  Ensure that all materials/equipment required for their project are available. | 2 | 4 | 6 | 8 | 10 |

\*Literature review report: refer to appendix 3 for the rubrics

\*\*Project Design / research methodologies refer to appendix 3 for the rubrics

1. The evaluation criteria for **Final Report (20 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Content | 2 | 4 | 6 | 8 | 10 |
| Language & Organization | 2 | 4 | 6 | 8 | 10 |
| Technical knowledge | 2 | 4 | 6 | 8 | 10 |

**Note:** Marks should be added and multiplied by 2/3

1. The evaluation criteria for **Final Presentation (10 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Content & Creativity | 1 | 2 | 3 | 4 | 5 |
| Coherence & Organization | 1 | 2 | 3 | 4 | 5 |
| Speaking skills & Participation | 2 | 4 | 6 | 8 | 10 |
| Technical awareness | 2 | 4 | 6 | 8 | 10 |

**Note:** Marks should be added and divided by 3

**Term II:**

1. The evaluation criteria for **Participation (10 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Criteria** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Promptness | 1 | 2 | 3 | 4 | 5 |
| Level of Engagement | 1 | 2 | 3 | 4 | 5 |
| Behavior | 1 | 2 | 3 | 4 | 5 |
| Preparation | 1 | 2 | 3 | 4 | 5 |

**Note:** Marks should be added and divided by 2

1. The evaluation criteria for **Project Development** **(60 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Safety & housekeeping | 2 | 4 | 6 | 8 | 10 |
| Assembly/ solution formulation | 2 | 4 | 6 | 8 | 10 |
| Craftsmanship/ precision | 2 | 4 | 6 | 8 | 10 |
| Creativity | 1 | 2 | 3 | 4 | 5 |
| Reliability | 1 | 2 | 3 | 4 | 5 |
| Results examination/ testing | 2 | 4 | 6 | 8 | 10 |
| Adhering to the timeline | 2 | 4 | 6 | 8 | 10 |

1. The evaluation criteria for **final working prototype/ evaluate research results. (15 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Meets specification | 2 | 4 | 6 | 8 | 10 |
| Reliability | 1 | 2 | 3 | 4 | 5 |

1. The evaluation criteria for **Final Report (10 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Content as per template | 1 | 2 | 3 | 4 | 5 |
| Language & organization | 1 | 2 | 3 | 4 | 5 |
| Technical awareness | 1 | 2 | 3 | 4 | 5 |

**Note:** Marks should be added and multiplied by 2/3

1. The evaluation criteria for **Final Presentation (5 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Content & Creativity | 1 | 2 | 3 | 4 | 5 |
| Coherence & Organization | 1 | 2 | 3 | 4 | 5 |
| Speaking skills & Participation | 2 | 4 | 6 | 8 | 10 |
| Technical awareness | 2 | 4 | 6 | 8 | 10 |

**Note:** Marks should be added and divided by 6

**Term III:**

1. The evaluation criteria for **Participation (10 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Criteria** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Promptness | 1 | 2 | 3 | 4 | 5 |
| Level of Engagement | 1 | 2 | 3 | 4 | 5 |
| Behavior | 1 | 2 | 3 | 4 | 5 |
| Preparation | 1 | 2 | 3 | 4 | 5 |

**Note:** Marks should be added and divided by 2

1. The evaluation criteria for **Project Development (60 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Safety & housekeeping | 2 | 4 | 6 | 8 | 10 |
| Assembly/ solution formulation | 2 | 4 | 6 | 8 | 10 |
| Craftsmanship/ precision | 2 | 4 | 6 | 8 | 10 |
| Creativity | 1 | 2 | 3 | 4 | 5 |
| Reliability | 1 | 2 | 3 | 4 | 5 |
| Results examination/ testing | 2 | 4 | 6 | 8 | 10 |
| Adhering to the timeline | 2 | 4 | 6 | 8 | 10 |

1. The evaluation criteria for **Final Prototype/ Research (15 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Additional features and challenging criteria | 2 | 4 | 6 | 8 | 10 |
| Communication & advocacy | 1 | 2 | 3 | 4 | 5 |

1. The evaluation criteria for **Final Report (10 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Content as per template | 1 | 2 | 3 | 4 | 5 |
| Language & organization | 1 | 2 | 3 | 4 | 5 |
| Technical awareness | 1 | 2 | 3 | 4 | 5 |
| **Note:** Marks should be added and multiplied by 2/3 | | | | | |

1. The evaluation criteria for **Final Presentation (5 marks)** is as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Grading Components** | **Poor** | **Needs Improvement** | **Satisfactory** | **Good** | **Excellent** |
| Content & Creativity | 1 | 2 | 3 | 4 | 5 |
| Coherence & Organization | 1 | 2 | 3 | 4 | 5 |
| Speaking skills & Participation | 2 | 4 | 6 | 8 | 10 |
| Technical awareness | 2 | 4 | 6 | 8 | 10 |

**Note:** Marks should be added and divided by 6

Appendices are in separate documents