VIP Senior Design Reflection, Outcomes, and Rubric (ROR)

Last revised 8/17/2022

**INSTRUCTIONS (Delete page 1 and 2 prior to submitting the final ROR for the semester):**

This document is an individual document to be submitted by students using VIP to fulfill senior design requirements for both the mid-semester and final assessment assignments instead of the “Individual Performance Evaluation (IPE)”. Please note below the scope and the responsibility of completing each of the sections.

***Section A:*** *To be completed each semester at both mid-semester and final submission*

This section should be completed for the given semester. Within each semester, you will edit and resubmit this document for both the mid-semester and final assessment assignments.

***Section B:*** *To be completed for the only for the final submission each semester. Your reflection should consider all your accomplishments and learning throughout your senior design experience****.*** *Please keep this as a separate page or pages from the rest of the document and delete the instructions at the top of that page for the final submission.*

***Section C:*** *To be completed by VIP team mentor*

**DEFINITIONS**:

**Engineering Design:** Engineering design is a process of devising a system, component, or process to meet desired needs and specifications within constraints. It is an iterative, creative, decision-making process in which the basic sciences, mathematics, and engineering sciences are applied to convert resources into solutions. Engineering design involves identifying opportunities, developing requirements, performing analysis and synthesis, generating multiple solutions, evaluating solutions

against requirements, considering risks, and making trade- offs, for the purpose of obtaining a high-quality solution under the given circumstances. For illustrative purposes only, examples of possible constraints include accessibility, aesthetics, codes, constructability, cost, ergonomics, extensibility, functionality, interoperability, legal considerations, maintainability, manufacturability, marketability, policy, regulations, schedule, standards, sustainability, or usability.

**Complex Engineering Problems:** Complex engineering problems include one or more of the following characteristics: involving wide-ranging or conflicting technical issues, having no obvious solution, addressing problems not encompassed by current standards and codes, involving diverse groups of stakeholders, including many component parts or sub-problems, involving multiple disciplines, or having significant consequences in a range of contexts.

**Team:** A team consists of more than one person working toward a common goal and should include individuals of diverse backgrounds, skills, or perspectives.

**Engineering Standards:** Engineering standards are documents that define the characteristics of a product, process, or service to meet technical, economic, environmental, and/or societal challenges. (The IEEE is a good source for finding appropriate standards: standards.ieee.org.

**Engineering Judgement:** Engineering judgement is the ability to decide upon the design, operation, applicability, and/or installation of a product based on the use of appropriate scientific/engineering principles, standards, and practices.

**Types of Audiences:** Basic audience types include executives, managers, investors, marketers, peers, subordinates, and the general public. The composition of these audiences can include experts, knowledgeable non-experts, and laypersons. Actual audiences may be very specific or be a mixture of these types and compositions. The nature of any of these audiences can be sympathetic, persuadable, apathetic, critical, hostile, or a combination of these.

**Learning Strategies**: Learning is “the acquisition of knowledge or skills through study, experience, or being taught.” Specific methods to acquire and apply new knowledge include self-study, short courses, professional conferences/forums, review of the professional literature, consultation with experts, etc.

**Informed Judgement**: An informed judgement is based on information, not personal opinion.

**DESIGN CONSIDERATIONS:**

**Public Health, Safety, and Welfare Factors:** The term ‘health’ can be defined as a state of well-being of people in both a physiological and psychological sense. ‘Safety’ can be defined as the absence of hazards and/or physical harm to persons. The term ‘welfare’ relates to the provision of the basic needs of people.

**Cultural Factors:** Culture encompasses the set of beliefs, moral values, traditions, language, and laws (or rules of behavior) held in common by a nation, a community, or other defined group of people.

**Economic Context/Factors** – Relating to the economy (the system of production, distribution, and consumption of goods and services).

**Environmental Context/Factors:** Concerned with the environment as it relates to living organisms and natural resources.

**Societal Context/Social Factors:** Relating to extended social groups having distinctive cultural, social, political, and/or economic organizations.

**Global Context/Factors:** Relating to world-wide contexts and factors, rather than only local ones

VIP Senior Design Reflection, Outcomes, and Rubric (ROR)

Student: Major: Sem of SD: \_\_\_ 1st \_\_\_\_ 2nd

Team/Project: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Term (Fall/Spring and Year): \_\_\_\_\_\_ Mid/Final: \_\_\_\_\_

***Section A: To be completed each semester at both mid-semester and final submission***

A.1 List your individual accomplishments to date (can add/delete rows as needed). Include when the work was completed and the location of the evidence:

|  |  |
| --- | --- |
| **Individual Accomplishments** | **Location of Evidence** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. To be completed at mid-semester: List your individual accomplishments and achievements that you will complete by the end of the semester (can add/delete rows as needed)

|  |  |
| --- | --- |
| **Accomplishment to be completed** | **When will it be completed?** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

A.2 List the Professional Development activities you have Professional Development activities have you completed to date?

|  |  |
| --- | --- |
| **Professional Development Activity** | **Date Completed** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. To complete at mid-semester: Do you expect to follow your original plan or need to adjust?

A.3 Describe anything that you are struggling with related to the project.

A.4 Describe your impact on the project overall.

A.5 Describe progress you have made on each of the course Learning Outcomes this semester to date. Include key learning(s) from your project and Professional Development activities where applicable. Your response to each item should immediately follow the prompt.

* 1. an ability to apply engineering design to create a product that meets the specified needs of this engineering design experience with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
  2. an ability to develop and conduct experimentation, analyze and interpret data, and use engineering judgment to draw conclusions related to the development of the product of this engineering design experience.
  3. an ability to identify, formulate, and solve complex engineering problems arising from this engineering design experience by applying principles of engineering, science, and mathematics.
  4. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives associated with this design experience
  5. an ability to communicate effectively with a range of audiences appropriate to this design experience in both a written report and oral presentation.
  6. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies to complete the engineering design experience associated with this course.
  7. an ability to recognize ethical and professional responsibilities associated with this engineering design experience and make informed judgments which must consider the impact of the product of this engineering design experience in global, economic, environmental, and societal contexts.

***Section B: To be completed for the only for the final submission each semester. Your reflection should consider all your accomplishments and learning throughout your senior design experience. Please keep this as a separate page or pages from the rest of the document and delete these instructions for the final submission.***

**Senior Design Final Reflection**

Student: Major: Sem of SD: \_\_\_ 1st \_\_\_\_ 2nd

Team/Project: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Term (Fall/Spring and Year): \_\_\_\_\_\_

1. Describe your **personal** contributions to the project.
2. Describe how **your** contributions to this project built on the knowledge and skills you acquired in earlier course work.
3. Describe how **you** acquired and applied new knowledge as needed to contribute to this project. What **learning strategies** did you employ to do so?
4. Discuss **your** ethical and professional responsibilities as they relate to this engineering design experience.
5. Consider what the **impact** of the product of this engineering design experience could have in economic, environmental, societal, and global contexts. Discuss how **you** would make (or did make) an **informed** **judgement** as to your product’s impact in each of these four contexts?
6. How has your learning from this semester contributed to and/or impacted your long-term professional and educational goals?

*Section C: To be completed by the VIP mentor:*

**Accomplishments and effort:**

\_\_Quantity of project accomplishments

\_\_ Quality of project accomplishments

\_\_ Initiative

\_\_ Work ethic

\_\_ Ability to overcome project setbacks

\_\_ Learning needed for the project

\_\_ Focuses effort on achieving goals

\_\_ Manages time and tasks well

**\_\_ Overall**

**Documentation:**

\_\_ Individual documentation (quality/quantity)

\_\_ Contributions to team documentation

(quality/quantity)

\_\_ Contributions to team poster and/or

presentations

\_\_ Use of appropriate tools (e.g., Git)

**\_\_ Overall**

**Teamwork and Interactions:**

\_\_ Participates fully in team (lab) meetings

\_\_ Participates fully in sub-team meetings

\_\_ Contributes fair share of team’s work with

acceptable quality

\_\_ Keeps commitments and completes

assignments on time

\_\_ Listens to teammates and respects their

contributions

\_\_ Communicates clearly. Shares information

with teammates

\_\_ Respects and responds to feedback from

teammates

\_\_ As appropriate, involves and assists others

in efforts

\_\_ Demonstrates leadership and/or project

management skills

**\_\_ Overall**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicators**  (rate each indicator on a scale from 1 to 4, where 4 is “Excellent”, 3 is “Good”, 2 is “Adequate/Acceptable”, and 1 is “Inadequate/Unacceptable” | **Overall Rating for Outcome** | **Weight** | **Rating x Weight** |
| 1. An ability to apply engineering design to create a product that meets the specified needs of this engineering design experience with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. |  | 30% |  |
| 1. An ability to develop and conduct experimentation, analyze and interpret data, and use engineering judgment to draw conclusions related to the development of the product of this engineering design experience. |  | 15% |  |
| 1. An ability to identify, formulate, and solve complex engineering problems arising from this engineering design experience by applying principles of engineering, science, and mathematics. |  | 15% |  |
| 1. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives associated with this design experience. |  | 10% |  |
| 1. An ability to communicate effectively with a range of audiences appropriate to this design experience in both a written report and oral presentation. |  | 10% |  |
| 1. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies to complete the engineering design experience associated with this course. |  | 10% |  |
| 1. An ability to recognize ethical and professional responsibilities associated with this engineering design experience and make informed judgments which must consider the impact of the product of this engineering design experience in global, economic, environmental, and societal contexts. |  | 10% |  |
| **Total** | | |  |

**Expected Grade Based on Current Performance:**

**Comments:**

**Senior Design Learning Outcomes Rubric – VIP (Completed at end of 2nd SD Sem)**

Student: Major: Course: \_\_VIP \_\_\_\_\_\_\_\_ Team: \_\_\_\_\_\_\_\_Term: \_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Outcome** | **Indicators**  (rate each indicator on a scale from 1 to 4, where 4 is “Excellent”, 3 is “Good”, 2 is “Adequate/Acceptable”, and 1 is “Inadequate/Unacceptable” | **Rating** |
| i. | An ability to apply engineering design to create a product that meets the specified needs of this engineering design experience with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. | Student was proficient at applying engineering design processes to create the product resulting from this senior design experience. |  |
| Careful consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors was evident. |  |
| ii. | An ability to develop and conduct experimentation, analyze and interpret data, and use engineering judgment to draw conclusions related to the development of the product of this engineering design experience. | Student demonstrated a strong ability to develop and conduct experimentation, analyze and interpret data in the context of this senior design experience. |  |
| Student demonstrated sound engineering judgment to draw conclusions related to the development of the product of this senior design experience. |  |
| iii. | An ability to identify, formulate, and solve complex engineering problems arising from this engineering design experience by applying principles of engineering, science, and mathematics. | This design experience contained elements associated with complex engineering problems (see definitions). |  |
| Student demonstrated ability to apply principles of engineering, science, and mathematics in the context of this senior design experience. |  |
| iv. | An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives associated with this design experience. | Student demonstrated leadership. |  |
| Student contributed to creating a collaborative and inclusive environment. |  |
| Student fully participated in establishing team goals, planning tasks, meeting objectives. |  |
| v. | An ability to communicate effectively with a range of audiences appropriate to this design experience in both a written report and oral presentation. | The quality of the student's contributions to the written report(s) associated with this senior design experience was excellent. |  |
| Student demonstrated effective oral presentation skills. |  |
| vi. | An ability to acquire and apply new knowledge as needed, using appropriate learning strategies to complete the engineering design experience associated with this course. | Student demonstrated an ability to acquire and apply new knowledge as needed, using appropriate learning strategies to complete the product of this senior design experience. |  |
| vii. | An ability to recognize ethical and professional responsibilities associated with this engineering design experience and make informed judgments which must consider the impact of the product of this engineering design experience in global, economic, environmental, and societal contexts. | Student demonstrated an ability to recognize ethical and professional responsibilities associated with this engineering design experience. |  |
| Student demonstrated an ability to make informed judgments in the context of this senior design experience. |  |
| Careful consideration of the impact of the product of this senior design experience in global, economic, environmental, and societal contexts was evident. |  |