



Central Washington University

Student Learning Outcome Assessment Plan

Department: Engineering Technology, Safety, and Construction
 Degree Program: MS-Engineering and Technology Systems

| Student Learning Outcome (performance, knowledge, attitudes) | Related CWU Strategic Outcome(s) http://www.cwu.edu/strategic-planning/ | Method(s) of Assessment (What is the assessment?)* | Who Assessed (Students from what courses - population)** | When Assessed (term, dates)*** | Standard of Mastery/ Criterion of Achievement (How good does performance have to be?) |
|---|--|--|--|--------------------------------|---|
| 1. Students will be able to identify and find sources of information for conducting reviews of literature. | 1.1.1 Students will achieve programmatic learning outcomes. 3.1.2 Sustain the number of courses that include research, scholarship, and creative expression skills as key outcomes. | Literature review portion of the research project prospectus paper (class term project). | IET 501: Industrial and Academic Research Methods | Fall quarter, annually | Students will identify and obtain a sufficient amount of credible information sources to justify the need for their proposed study and justify their selected research method. |
| 2. Students will be able to locate, interpret, and synthesize information about emerging technologies in various disciplines. | 1.1.1 Students will achieve programmatic learning outcomes. 3.1.2 Sustain the number of courses that include research, scholarship, and creative expression skills as key outcomes. | Class term project. | ETSC 523: Development of Emerging Technologies | Winter quarter, annually | Students will identify and obtain a sufficient number of information sources to foster ideas for the proposed innovations in their term projects and to support their plans for protecting the intellectual property that could result from their proposed innovations. |

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| 3. Students will be able to set up full- and fractional-2k industrial experiments using standard design of experiments procedures, conduct the experimental runs, and analyze the results. | 1.1.1 Students will achieve programmatic learning outcomes. 3.1.2 Sustain the number of courses that include research, scholarship, and creative expression skills as key outcomes. | Class design of experiments (DOE) assignments. | IET 501: Industrial and Academic Research Methods | Fall quarter, annually | The experimental design will assess the effects of the project's control factors, using the minimum amount of trial runs while maintaining the desired alpha level. |
| 4. Students will be able to write a research proposal and outline the body of a research report and a thesis paper according to university and APA style requirements. | 1.1.1 Students will achieve programmatic learning outcomes. 3.1.2 Sustain the number of courses that include research, scholarship, and creative expression skills as key outcomes. | Research project prospectus paper (class term project). | IET 501: Industrial and Academic Research Methods | Fall quarter, annually | The student's proposed research method will be correctly matched to the problem statement and will not contain any extraneous elements. |
| 5. Students will be able to present results of research in a clear and concise manner, both verbal and written. | 1.1.1 Students will achieve programmatic learning outcomes. 3.1.2 Sustain the number of courses that include research, scholarship, and creative expression skills as key outcomes. | Conduct a design of experiments (DOE) project, write a report, and present the results. | IET 501: Industrial and Academic Research Methods | Fall quarter, annually | The student's analysis will be presented in writing with tabulated summary results and supporting analytical graphs when necessary. The information flow will be logical, following standard procedures for DOE analysis. The oral presentation will be sufficiently clear so that every audience member understands the student's interpretation of the results. |

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| 6. Students will be able to describe the various mechanisms by which new technologies evolve, to differentiate between incremental and radical changes, and to apply these principles on demand, generating innovative ideas driven by need and/or by opportunity. | 1.1.1 Students will achieve programmatic learning outcomes. | Assignments, in-class activities, and term project | ETSC 523: Development of Emerging Technologies | Winter quarter, annually | As a condition of completing their course term project, students must successfully utilize lateral transfers of knowledge from outside disciplines and also generate incremental improvements to incorporate innovative improvements into the product or service concept they are developing. They must correctly describe which mechanisms led to each innovative idea, and they must logically tie each innovation to stated customer needs. |
| 7. Students will be able to describe how to identify customer needs and how to satisfy those needs by the development of an appropriate set of product or service features, by correct positioning in the market, and by employing appropriate pricing strategies. | 1.1.1 Students will achieve programmatic learning outcomes. | Assignments, term project | ETSC 523: Development of Emerging Technologies | Winter quarter, annually | The customer needs, identified as the basis for innovative ideas in the student's term project, must be logically connected to the target market, the target market must be clearly defined, and the target price must be appropriate for that market. |
| 8. Students will be able to model and simulate simple manufacturing, construction, and decision making problems using commercially available software. | 1.1.1 Students will achieve programmatic learning outcomes. | Simulation term project. | IET 525: Systems Analysis and Simulation | Spring quarter, annually | The student's simulation project will employ correct process modeling procedures, it will include all operations in the given production process, and it will function properly using Pro Model software. |
| 9a. Students will be able to design the layout of production workspaces and equipment, using the least amount of space that will still achieve optimum production workflow. 9b. When creating facilities layout designs, students will be able to | 1.1.1 Students will achieve programmatic learning outcomes. | Facilities design term project. | ETSC 540: Work Design and Facilities Layout | Winter quarter, annually | The student's design will contain the proper number of machines, adequate space and facilities space for the correct number of employees, and material handling systems for the factory's throughput, while also being able to achieve required production capacity, and to satisfy the given size constraints and adjacency requirements. |

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| incorporate adjacency requirements between and among administrative offices, production areas, and service departments. | | | | | |
| 10. Student will demonstrate the ability to establish budgets, assign resources, draft proposals, and implement plans. | 1.1.1 Students will achieve programmatic learning outcomes. | Project Management term project: Given a project scenario, along with requirements, constraints, and resource information, students will create a project baseline plan and budget. | IET 555: Engineering Project Management | Winter quarter, annually | The project's baseline plan will be able to accomplish all required technical objectives, within the time, budget, and resource constraints. |
| 11. Students will be able to identify how quality requirements such as ISO9001 and how engineering standards impact the collaboration between partners in a supply chain in terms of everyday operations and in terms of governing the product development process. | 1.1.1 Students will achieve programmatic learning outcomes. | Term paper assignment. | ETSC 541: Industrial Operations Management | Spring quarter, annually | The student's term paper will accurately depict the process required for production ramp-up and the activities required for everyday operations, when a company is producing goods as a supplier under the requirements of ISO 9001 and other directly-related engineering standards (e.g., the AIAG PPAP requirements, ASTM and IEEE standards, etc.). |

*Method(s) of assessment should include those that are both direct (tests, essays, presentations, projects) and indirect (surveys, interviews) in nature

**Data needs to be collected and differentiated by location (Ellensburg campus vs University Centers) and modality (face-to-face, online)

***Timing of assessment should ideally be at different transition points of program (i.e., admission, mid-point, end-of-program, post-program)

Assessment Cycle

Analysis and Interpretation: December
Improvement Actions: Completed by June
Dissemination: Completed by June

| Year SLOs | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 |
|-----------|-------|-------|-------|-------|-------|-------|
| 1 | x | x | x | x | x | x |
| 2 | x | x | x | x | x | x |
| 3 | x | x | x | x | x | x |
| 4 | x | x | x | x | x | x |
| 5 | x | x | x | x | x | x |
| 6 | x | x | x | x | x | x |
| 7 | x | x | x | x | x | x |
| 8 | x | x | x | x | x | x |
| 9 | x | x | x | x | x | x |
| 10 | x | x | x | x | x | x |
| 11 | x | x | x | x | x | x |

Assessment Oversight

| Name | Department Affiliation | Email Address | Phone Number |
|--------------|------------------------|------------------|--------------|
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