Program Assessment Plan

Program: Mechanical Engineering

Department: Aerospace & Mechanical Engineering

College/School: Parks

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Note: Each cell in the table below will expand as needed to accommodate your responses.

#	Program Learning Outcomes What do the program faculty expect all students to know, or be able to do, as a result of completing this program? ▪ *Note: These should be measurable, and manageable in number (typically 4-6 are sufficient).*	Assessment Mapping From what specific courses (or other educational/professional experiences) will artifacts of student learning be analyzed to demonstrate achievement of the outcome? Include courses taught at the Madrid campus and/or online as applicable.	Assessment Methods What specific artifacts of student learning will be analyzed? How, and by whom, will they be analyzed? ▪ *Note: the majority should provide direct, rather than indirect, evidence of achievement.* Please note if a rubric is used and, if so, include it as an appendix to this plan.	Use of Assessment Data How and when will analyzed data be used by faculty to make changes in pedagogy, curriculum design, and/or assessment work? How and when will the program evaluate the impact of assessment-informed changes *made in previous years*?
1	Graduates will be able to apply knowledge of i) math, ii) science, iii) engineering and iv) empirical data to solve engineering problems.	**i) Math** MENG 2000 Intro to Mechanical Eng ESCI 2100 Statics ESCI 3200 Fluid Dynamics ESCI 3150 Linear Vibrations **ii) Science** ESCI 2150 Dynamics ESCI 2300 Thermodynamics ESCI 3200 Fluid Dynamics **iii) Engineering** MENG 3010 Machine Design MENG 4004 Design I	**Artifacts: Math, Science, Engineering** Specific Homework problems Specific problems on midterm and final exams Final presentations (Design I and Design II) **Artifacts: Empirical Data** Lab reports **How, and by Whom** Instructors for each course will identify/craft the specific problems (problem types) to assign and will evaluate against the rubric. ***Note for all outcomes***: *The courses*	The results will be peer reviewed (another faculty member in the program) and a written assessment created. The results will then be discussed in the end-of-semester review, and action plans developed as needed. For any action plan, the assessment depends on the implementation; for example, if we identify a topic that isn't covered adequately in Math, it may take 12 months for the new cohort of students to make it to one of our assessed courses. Therefore, the action plan will include the date for the new assessment; until then, we will continue

		MENG 4014 Design II MENG 4450 Principles of Mechatronics **iv) Empirical data** ESCI 3201 Fluid Dynamics Lab ESCI 3101 Mechanics of Solids Lab MENG 3001 Mechanical Eng Lab	*used in assessment are a subset of the required courses in the curriculum (see attached); our program has complete control over these courses, which gives us the best opportunity to define/collect assessment data. We may implement changes in other courses as well.*	to track the information under the old approach. Special for Design I/II: at the end of each semester, an external review board (engineering alumni, Industrial Affiliates) participates in the final presentations. These reviewers are given a rubric/scoresheet for each design team using the assessment criteria. They provide a score and a set of comments for each team. These reviews are compiled by the course instructor and presented in the end-of-semester review.
2	Graduates will be able to function on multi-disciplinary teams.	MENG 1001 Intro to Aero & Mech Eng MENG 4004 Design I MENG 4014 Design II	**Artifacts** Student survey/evaluation collected after each group activity (1001) or at midterms/finals (4004/4014) Instructor survey/assessment **How, and by Whom** Both surveys will be developed in collaboration with the program coordinator; the surveys ask for students to reflect on their contributions and those of others, looking for successes and opportunities for improvement. Multiple reflection points will happen during the semester, giving students an opportunity to demonstrate learning over the term.	Same as Outcome 1.
3	Graduates will demonstrate an understanding of professional and ethical responsibility.	MENG 1001 Intro to Aero & Mech Eng MENG 2000 Intro to Mechanical Eng PHIL 3400 Engineering Ethics MENG 4004 Design I MENG 4014 Design II	**Artifacts** Individual review of a case study in ethics (MENG 1001) In-class discussions of professional responsibility and ethics, with a student paper (MENG 2000) Course assignments (PHIL 3400) Final reports (MENG 4004 and 4014) **How, and by Whom**	Same as Outcome 1.

			The assignments listed above involve (in whole or in part) issues of professional responsibility and ethics. The student reflections will be assessed by the instructor according to the rubric.	
4	Graduates will be able to effectively communicate in writing, speech and visual media.	MENG 1001 Intro to Aero & Mech Eng MENG 2000 Intro to Mechanical Eng MENG 2600 Manufacturing Processes MENG 3010 Machine Design MENG 4004 Design I MENG 4014 Design II	**Artifacts** Student written reports (all) Student presentations (1001, 4004, 4014) Student visual media assignment (2600, 4004, 4014) **How, and by Whom** Separate from the grading rubric, a specific rubric is established to assess the student's communication skills. This worksheet-style assessment will be used by the instructor, teaching assistants and invited guests (other faculty and/or industry experts).	Same as Outcome 1.
5	Graduates will be able to solve problems in aerospace engineering using i) engineering skills and tools, and ii) empirical measurements.	MENG 2600 Manufacturing Processes AENG 3100 Computer Aided Eng MENG 4450 Mechatronics MENG 4004 Design I MENG 4014 Design II ESCI 3201 Fluid Dynamics Lab ESCI 3101 Mechanics of Solids Lab MENG 3001 ME Lab	**Artifacts: Engineering skills and tools** Specific Homework problems Specific problems on midterm and final exams Final reports (Design I and Design II) **Artifacts: Empirical Data** Lab reports **How, and by Whom** Instructors for each course will identify/craft the specific problems (problem types) to assign and will evaluate against the rubric.	Same as Outcome 1.

Additional Questions

1. On what schedule/cycle will faculty assess each of the above-noted program learning outcomes? *(It is <u>not recommended</u> to try to assess every outcome every year.)*

We will assess on a three-year cycle, with subsets of outcomes 1 and 5 assessed each year, and a rotating assessment among outcomes 2-4. We meet twice per year as a faculty body to assess the outcomes, identify deficiencies and develop action plans.

2. Describe how, and the extent to which, program faculty contributed to the development of this plan.

These outcomes are based on the ABET outcomes that the AE faculty adopted many years ago, and review/re-approve every three years. This particular implementation will be reviewed (edited as needed) and approved at our February department meeting.

3. On what schedule/cycle will faculty review and, if needed, modify this assessment plan?

We will formally review on a three-year cycle (which corresponds to our ABET cycle of 6 years, allowing us two reviews between visits). During the twice-annual assessment review (see above), we will make note of any challenges in the assessment plan itself. As needed we can review this plan before the three-year cycle is up.

IMPORTANT: Please remember to submit any assessment rubrics (as noted above) along with this report.