

UC San Diego - WASC Exhibit 7.1 Inventory of Educational Effectiveness Indicators

Academic Program	(2) What are these learning outcomes?	(3) Other than GPA, what data/evidence is used to determine that graduates have achieved stated outcomes for the degree? (e.g., capstone course, portfolio review, licensure examination)	(4) Who interprets the evidence? What is the process?	(5) How are the findings used?
	Where are they published? (Please specify)			
<p>Department: <i>Mechanical and Aerospace Engineering</i></p> <p>Major: <i>B.S. in Aerospace Engineering</i> <i>B.S. in Environmental Engineering</i> <i>B.S. in Mechanical Engineering</i></p> <p>(1) Have formal learning outcomes been developed? Yes</p> <p>(6) Date of last Academic Senate Review? 2012-2013</p>	<p>Students graduating with a degree should be able to:</p> <ol style="list-style-type: none"> 1. <i>Fundamentals: An ability to apply knowledge of mathematics (including multivariate calculus and differential equations), science, and engineering, to model and analyze physical systems, components or processes.</i> 2. <i>Experiment: An ability to design and conduct experiments, as well as to analyze and interpret data</i> 3. <i>Design: An ability to design and realize a physical system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</i> 4. <i>Teams: An ability to function on multidisciplinary teams</i> 5. <i>Problem Solving: An ability to identify, formulate, and solve engineering problems</i> 6. <i>Ethics: An understanding of professional and ethical responsibility</i> 7. <i>Communication: An ability to communicate effectively</i> 8. <i>Broad Education: The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context</i> 9. <i>Life Long Learning: A recognition of the need for, and an ability to engage in lifelong learning</i> 10. <i>Contemporary Issues: A knowledge of contemporary issues</i> 11. <i>Modern Skills/Tools: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</i> <p><i>ME14. Mechanical Systems: An ability to work professionally in mechanical systems areas</i> <i>ME15. Thermal Systems: An ability to work professionally in thermal systems areas.</i> <i>(AE12) Aeronautics (Primary): knowledge of aerodynamics, aerospace materials,</i></p>	<p>Data/Evidence:</p> <ul style="list-style-type: none"> • <i>Students complete the program by taking two-quarter capstone design course that integrates all of their engineering education into the design, development, and testing of the engineering product. Senior level capstone course sequence (MAE 156A,B for ME major; MAE 155A,B for AE major, and MAE 126A,B for ENV major) brings together engineering theory with application, through project based experiences. These projects are sponsored by industry with some sponsors from UCSD, including Medical School and Calit2. The success of the capstone design sequence is determined by the sponsor surveys.</i> • <i>Alumni Survey, Employer Survey, Placement and Employment Data, Graduate School Data, and FE/PE Exam Data are used to determine the level of achieved outcomes. The MAE Industrial Advisory Council, made up of local industry leaders in mechanical, aerospace, and environmental engineers, meet at least once a year to review objective and outcomes. Alumni and Employer Surveys are administered by JSOE. The survey results include employment and graduate school information, as well as polling graduates on the appropriateness and completeness of the program Educational Objectives, and the importance and level of preparation of each of the Program Outcomes. The surveys are conducted every 3-4 years. The Survey results are documented and displayed on our website http://abet.ucsd.edu.</i> • <i>Students are encouraged to have summer internships, participate in the UCSD education abroad program, engage in MAE and UCSD undergraduate research activities, and join professional engineering student organizations. After graduation, students are encouraged to take the Fundamentals of Engineering (FE) examination as the first step in becoming licensed as a professional engineer (PE).</i> 	<ul style="list-style-type: none"> • <i>The assessment and continuous improvement processes are based on two feedback cycles: Educational Objectives Cycle (every 3 years), and Program Outcomes Cycle (every year). The MAE Teaching Work Groups meet annually to carry out instructional planning, review assessment data, and evaluate each course. Recommendations are made to the UAC regarding course and/or curriculum changes.</i> • <i>The MAE Undergraduate Affairs Committee (UAC) interprets the evidence of educational effectiveness, and is responsible for reviewing and making recommendations to the faculty and administration on all aspects of the undergraduate programs.</i> • <i>UAC tasks and responsibilities include assessment and evaluation of Educational Objectives and Program Outcomes, recommending approval of new courses and course objectives, curriculum changes, and evaluating academic policies.</i> 	<ul style="list-style-type: none"> • <i>The evaluation feedback is implemented by UAC and appropriate faculty/instructors. The findings are used to further improve and modernize the academic program.</i> • <i>Individual course instructors at the teaching work group meetings use the feedback to modify their classes, or introduce new classes.</i> • <i>Internally the department adjusts requirements and course sequences for all majors.</i> • <i>All significant course and curriculum changes must be approved by UCSD Undergraduate Council.</i>

structures, propulsion, flight mechanics, and stability and control
(AE13) Astronautics (Secondary): knowledge of attitude determination and control, space structures, orbital mechanics, and rocket propulsion
(AE14) Integration: an ability to integrate knowledge of the fundamental topics in the design of aerospace systems.

Learning outcomes published:

- *Catalogue, brochures, University and department websites, course syllabi and course websites.*