



## COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

### Student Learning Outcomes Assessment

**CONTENT KNOWLEDGE** (Declarative Knowledge and Technical Skills): Students will demonstrate a broad knowledge of fundamental and applied engineering subjects: fluid and solid mechanics, dynamics, hydrostatics and buoyancy, thermodynamics, heat transfer, engineering materials, strength of materials, statistical methods, data analysis, oceanography, ocean wave mechanics, underwater acoustics, dynamic systems and control theory, networks and electronics and computer programming. Students will also demonstrate technical skills and know-hows needed to formulate and solve engineering problems, program computers for engineering solutions, design and conduct laboratory and field experiments, analyze data, and design engineering systems in the multi-disciplinary field of ocean engineering.

In EOC 4804 (Ocean Engineering System Design), students are required to have sound multi-disciplinary knowledge of engineering and science subjects through the completion of prerequisite courses in mathematics, science, and the ocean engineering core. Successful completion of the senior year capstone design project (EOC 4804L) also requires the engineering skills gained through coursework in engineering mathematics, ocean engineering laboratory, programming in c, fabrication of ocean engineering systems, ocean and environmental data analysis the students. A five-member committee of faculty and industry members, appointed by the Chair, assesses the students' knowledge of engineering and science subjects and their achievement of technical skills based on their performance in the senior design and final presentation. Specifically, the committee will assess the achievement of the following outcomes related to content knowledge and technical skills:

- Ability to apply mathematics, science and engineering principles.
- Ability to design and conduct experiments, analyze and interpret data.
- Ability to design a system, component, or process to meet desired needs.
- Ability to identify, formulate and solve engineering problems.
- Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

**COMMUNICATION SKILLS:** The students will demonstrate good oral and written communication skills which are required in engineering practice and teamwork.

The students will acquire formal written communication skills through coursework in college writing, social sciences and fine arts and technical writing skills through coursework in ocean engineering laboratory and senior-level courses which require report writing of term papers and projects; a portion of the grades in these courses is based on the quality of the written reports. The capstone design course involves both report writing and oral presentation of the project. The course grade is based on the final written report which is a compilation of each student's write-up of his/her contribution to the project which is evaluated by the instructor. Each student also makes an oral presentation of their contribution to the project(s). A five-member committee of faculty and industry members, appointed by the Chair, assesses the students' communication skills. Specifically, the committee will assess the achievement of the following outcomes related to the communication skills:

- Ability to communicate effectively (both oral and written form)
- Ability to function in multi-disciplinary teams;

**CRITICAL THINKING SKILLS** (Analytical Skills, Creative Skills, Practical Skills): Students will demonstrate the ability to identify, formulate, and solve engineering problems by applying knowledge of mathematics, science and engineering. Students will demonstrate the ability to design an engineering system or component to meet desired needs and requirements using appropriate engineering tools and techniques.

The critical thinking skills are developed through coursework and finally tested in the senior year capstone design EOC 4804L project. The course grade is indicative of the achievement of the skills. Also, the five member design-review committee (consisting of faculty members and industry/research laboratory representatives) evaluates the senior design projects and assess the following outcomes:

- Ability to apply mathematics, science and engineering principles.
- Ability to design a system, component, or process to meet desired needs.
- Ability to identify, formulate and solve engineering problems.
- Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

The assessment data are reviewed by the programs undergraduate committee and necessary steps are initiated for program improvement.