

Aeronautical Engineering and Mechanical Engineering

Bachelor of Science Degrees

Daniel Webster College offers BS degrees in Aeronautical Engineering and in Mechanical Engineering. **Aeronautical engineering** focuses on the analysis, design, development, modification, manufacture, and implementation of flight vehicles. **Mechanical engineering** is one of the broadest of the engineering disciplines. It is concerned with the design, development, manufacture, and use of mechanical devices and systems, from the small-scale applications of nanotechnology to the large-scale world of aircraft and power plants.

The vision for the engineering program at DWC is for students to have an educational experience that is intense, personal, and exciting, that firmly grounds them in theory and design, and that makes them both competent and confident to take on any challenges they may face as practicing engineers.

Daniel Webster College is a collaborator in the international CDIO initiative (<http://www.cdio.org/>), “an innovative educational framework for producing the next generation of engineers [that stresses] engineering fundamentals set in the context of Conceiving, Designing, Implementing, and Operating real-world systems and products.”

CDIO states, “We know some interesting facts about how experiences affect learning. Engineering students tend to learn by experiencing the concrete and then applying the experience to the abstract. Hands-on experience is a vital foundation on which to base theory and science.” At DWC we embrace this philosophy of engineering education.

The four-year Aeronautical Engineering and Mechanical Engineering curricula both contain a five-semester design sequence emphasizing hands-on design projects that require students to work in, and manage, teams. Students apply the theories they are learning in the classroom to the solution of open-ended problems. Commitment and responsibility to the design team are required and continually emphasized. As a result of this experience students gain both the confidence and competence necessary to tackle open-ended design problems and to excel in a team environment. They will be able to learn quickly and efficiently and to think strategically about the multiple issues involved in a project. We believe these skills are of critical importance for today’s engineers.

In order to demonstrate their grasp of fundamental concepts, students do frequent presentations of their solutions to various problems. In many engineering courses, students will work in small teams and do these presentations bi-weekly.

The design sequence also provides students with systems integration experience that incorporates components such as vision systems, sensors, controls, and the software that ties them together. Examples of potential project work are unmanned flight applications, which could include aerospace, geographic and topographic exploration, atmospheric research and security, and the application of advanced technology to the design of robots,

automated systems, and medical devices. The College has acquired an ABB six axis industrial robot and COGNEX vision systems to facilitate this experience.

One of the highlights of the Aeronautical Engineering program occurs during the junior and senior years in the three-semester sequence of courses: Aerodynamics, Flight Dynamics I (Performance) and Flight Dynamics II (Stability and Control). Students develop test plans and perform in-flight experiments using an aircraft equipped with a Calspan Miniature Flight Data Recording System (MFDRS). This highly sophisticated system is used to record twenty-eight different parameters at the sample rate of two hundred times per second. These parameters include the six components of rectilinear and rotational acceleration, aileron, elevator, and rudder positions, calibrated airspeed, static and dynamic pressure, etc. Once collected, the students analyze the data for comparison with theoretical predictions and published aircraft data. This level of in-flight experience is exceptional in undergraduate aeronautical engineering programs. Also, students majoring in mechanical engineering have the opportunity to take these three courses as their three technical electives, if desired.

Finally, the faculty at DWC is dedicated to student success. We believe that a key contributor to student success is the faculty mentoring of students outside of the classroom. We assure prospective students that if they are willing to work hard, we will do all we can to help them succeed.