

UCO Department of Engineering and Physics Senior Engineering Design Project Guidelines

The **Senior Design Project** is a major experience in product realization – creating or improving a product, process, or system. Students must do the standard project assigned by the course instructor unless a UCO Department of Engineering and Physics faculty member agrees to oversee them in a sponsored project or a clinical project. Sponsored projects may be internally sponsored by on-going UCO research programs or externally sponsored by local industry. The externally sponsored and clinical projects require approval by the Senior Design course coordinator, the UCO faculty sponsoring the project who agrees to oversee the work, and an industrial sponsor who agrees to oversee work on their site. This document discusses the factors that are considered in approving Sponsored Design projects and clinical projects.

Factors Considered in Approving Sponsored Design Projects and Clinical Projects

- **Engineering Design Content** – The project must be nontrivial and open-ended, requiring the student(s) to define *objectives*, *scope of work*, *criteria for success*, and a *strategy for managing the project*. The project should require both *analysis* and *synthesis*.
Analysis – Application of the engineering sciences and mathematics to analyze elements of the design and support design decisions.
Synthesis – An integration of goals, constraints (physical, ethical, etc.) and methods that enhance the creative outcome resulting in a new or improved product, process, or system.
- **Multi/Interdisciplinary Elements** – The project should also require investigation beyond the subject matter of a student’s discipline (to encourage independent investigation and equip students for lifelong learning). Students are encouraged to seek expert advice both internal and external to UCO in these areas.
- **Team work** – All projects should have students working as part of a team of 2 to 4 members (to promote team work skills and ensure full participation). An individual student’s project supported by a faculty or industrial sponsor needs to have multi-disciplinary personnel that the student interacts with on a regular basis in completing the project. It is up to the individual student to fully document the team component of their project.
- **Faculty Sponsor** – Each sponsored project or clinical projects requires a UCO faculty member willing to fulfill the expectations described in *Advisor Guidelines* to help ensure the success of the project through adequate support and regular assessment.
- **Funding & Facilities** – It is expected that sponsored projects and clinical projects have adequate financial resources and facilities available for the project to be successful. It is up to the individual student to fully document this.
- **Deliverable** – Specific deliverable expectations are specified by the Faculty sponsor and approved by Senior Design course coordinator. The deliverable must be a design product that might be a part, a software application, a process, an integrated circuit, a control system, a device, a mechanism, etc., but there must be a significant design component. Projects that

culminate in a white-paper treatise or research paper do not meet the course requirements. Scale model prototypes may be permitted due to cost constraints. If the product is developed off campus, perhaps for a company, and it is not feasible to bring the product to campus, photographs and/or a videotape of the product may be presented. Exceptions may be granted when the scope of the project is particularly difficult or comprehensive. For example, an exception may be granted when the design requires extensive computer modeling, analysis and optimization. In this case, the outcome may be a solid model, detailed simulation results showing effects of design parameter changes, design decisions, and production drawings, or a detailed process design.

- **Effort & Schedule** – Projects should represent approximately six hours of work per student each week, and be do-able in the 9-month academic year.

Required Forms & Approvals

A *Sponsored Project Approval Form* must be submitted for all sponsored and clinical projects within the first few weeks of class, in the fall semester of the senior year. See the *Senior Design Process* document for the precise due date. This form must be signed by the faculty member of the UCO Department of Engineering and Physics who has agreed to serve as the Project Sponsor, and must be accompanied by a “*Preliminary Project Proposal*” (see *Reporting Guidelines & Required Elements*). For externally sponsored projects and clinical projects, an external sponsor must also sign the form.

The Senior Design sponsor(s) of each project along with the Senior Design course coordinator will review the *Preliminary Project Proposal* based on the above criteria and either approve the project, reject it completely, or request changes/clarifications from the team or advisor before approving the project. If a project is rejected, students will be given a reasonable amount of time to find an alternative project.

The Project Sponsor(s) or the Senior Design Coordinator for any program represented among the student team members may also require the *Project Exceptions Form*, typically when the:

- Team does not have 3-5 members (i.e., one member or more than five)
- The Deliverable is not typical
- Other – the sponsor or a program coordinator identify an issue requiring further explanation