Welcome to ENGR 128 Studio!

The Studio portion of ENGR 128 is designed to engage students in problem solving, project communications, and teamwork by following a very simple engineering design process. The Studio augments the Lecture and Lab portions of the course by providing a means to observe and apply the course concepts from engineering, mathematics, and physics in hands-on design projects.

Studio Activities

The Studio is allocated two hours each week of in-class time. Since Studio accounts for one credit hour of the ENGR 128 course, care is taken to provide a reasonable workload for students. The materials are designed to make as much use of the class time as possible and generally only require up to an hour a week of additional time to complete assignments.

As an instructor, you will have time at the beginning of each Studio session to present materials related to engineering design. PowerPoint presentations have been developed for each week of the course. Each presentation has already been saved as a PDF file for uploading to the course website. Instructors are free to adapt the course materials as they see fit, and certain slides in the PowerPoint presentations have been given a colored background to mark them as optional. These slides are not included in the PDFs and are excellent candidates for replacing or adapting based on your own instructional needs.

Electronic worksheets are also provided and recommended to be printed and handed out during Studio. These worksheets generally work through application of the week’s content and can serve as the assignment for most weeks. Once again, you have the choice of using the worksheets as provided, modifying them, or doing something entirely different.

The Studio features three projects over the course of the semester. The projects are completed by groups of students working in teams. You can choose to assign the teams or to let the students self-select their own teams. You can also choose whether teams should be reassigned from project to project. If you choose to assign teams yourself, a survey is provided for Week 1 to learn more about the background and capabilities of the students in your section(s).

As the semester continues, less time will be needed for instructor presentations and more time will be available for student work within their project teams. The benefit you provide as an instructor during these work times will be to provide guidance on projects and to answer questions related to the engineering topics.

While each project must end, there is not necessarily an emphasis on them being complete. As students experience design, they should understand that there is seldom a “best” solution and that design is an iterative process that requires learning as one proceeds. Students may need encouragement that not having a perfect design yet is understandable and does not impact their progress or their grades.

Course Timeline

The first two weeks of the semester are dedicated to understanding the design process by walking through an example design of a simple resistor circuit.

The first project, which starts in Week 3, requires students to develop and test a basic filter circuit based on provided requirements. For many students, ENGR 128 is their first exposure to both electrical circuits and engineering design so the project is kept quite simple with a lot of assistance to lead the way from the instructor.

The second project starts in Week 7, immediately following their first exam. The focus of this project is to develop a digital logic circuit from requirements given as a truth table. Each group will develop a design that will be integrated into an overall logic design at the end of the project.

The final project starts in Week 11 and is the longest of the projects in ENGR 128 Studio. In addition to giving the student teams the freedom to develop their own requirements, they will follow the structure provided by the earlier projects to manage their own project timeline and deliverables. Due to the increased scope of this project, it is generally advised to have no more than four project teams.

The timeline of projects in Studio is shown in Table 1.

Table 1 – Studio projects in relation to course events

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| Week(s) | Studio or Course Event | Project Topic |
| 1-2 | Introduction to Studio | Simple resistor circuit |
| 3-5 | Project 1 | Filter circuit design |
| 6 | Exam 1 (during Lab) |  |
| 6-9 | Project 2 | Digital logic design |
| 10 | Exam 2 (during Studio) |  |
| 11-15 | Project 3 | Sensor application design |
| 15 | Lab practical (during Lab) |  |
| 16 | Final exam |  |

Studio Grades

Grades for ENGR 128 Studio are based on students’ performance at three types of activities: exercises, reports, and presentations. Exercises are done almost each week, while reports and presentations are only done at the conclusion of projects.

The default grading scheme assigns 4 points for each exercise. Some exercises can be finished in class, while others require outside work (including such expectations as writing a technical memo). There are 12 planned exercises throughout the semester. There are no exercises during the exam proctored during Studio (i.e. Week 6) or during either of the presentation days. Most exercises are to be completed as a team, except for the first two weeks before project teams are formed.

Reports are used to summarize the end of a Studio project and practice technical writing. All three projects feature a report, but the expectations are lower for the first project. Hence, the default grading scheme assigns 8 points for the first report and 12 points each for the latter two reports. Grading rubrics for the reports are provided, as is an example good report using the design exercise from Weeks 1 and 2 as the design topic.

There are two presentations during the semester, each with a different purpose. The presentation for the second project is intended to be a technical presentation geared at peers, given before the end of the project to ensure successful integration of all the projects the following week. The presentation for the third project, however, is intended for potential project investors and should describe the benefits of the design along with a plan for taking the design through to completion. Generally, the first presentation is worth 8 points and the second is worth 12 points, with grading rubrics again provided. Example presentations are also provided, including a good presentation covering the first filter project and a presentation that needs some drastic improvement.

The projects and exercises attempt to track and tie into the progress of the whole course. Within the Studio, there are 100 points total available during the semester. The distribution of points and assignments can be modified, but it generally advised to decide so early in the semester. The Week 1 material describes the default grading scheme and should be updated accordingly