### Syllabus for EGR 498—Senior Design and Research I 2 Credit Hours Fall 2013

### I. COURSE DESCRIPTION

First part of a two-semester, project-oriented course. Topics include research techniques, time management, patent searches, and manufacturing. Oral and written presentations are required at various stages. Student teams apply the design process by developing a project from research and proposal through construction and testing. (Crosslisted with PHY 498.) Corequisites: EGR 461 and senior standing.

Prerequisite: Electrical Concentration: EE 322; Computer Concentration: CMPE 441; Mechanical Concentration: ME 321 and ME 444. Full admission to the engineering/physics program or at least 50 credit hours in the major and cognates. Course fee: \$55.

#### II. COURSE GOALS

The purpose of this course is to enable the student to do the following:

- A. Gain the opportunity to learn the fundamental skills, techniques, and procedures for conducting engineering projects.
- B. Gain the opportunity to participate in independent learning by discovery, synthesis, and analysis of acquired information.
- C. Become an authority on a small phase of a project.
- D. Gain valuable experience in the organization and writing of a scholarly engineering report.
- E. Have the opportunity to experience making technical presentations.
- F. Participate in the mechanism by which Engineering faculty members may assess the capabilities of Engineering majors for research, independent work initiative, writing, oral presentation ability, and other such factors desirable to know when writing recommendations for job placement, graduate school, and professional school applications.

# III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

As a result of successfully completing this course, the student will be able to do the following:

- A. Demonstrate, in a controlled environment, the knowledge and skills developed during the previous years of engineering study. The end goal of the course is proficiency not only in engineering ability but also in both written and oral communication ability.
- B. Work as a team member on a design project selected by him or her and approved by the advisor and Engineering faculty and perform a reputable job of design, implementation, execution, and testing of the project with continuous progress during the duration of the project.

C. Successfully complete the design project to satisfy the course requirements in the final written and oral report due on the date given in class.

#### IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

- A. Required Materials
  - 1. Textbooks
    - None
  - 2. Other None
- B. Optional Materials
  - 1. Textbooks
  - None
  - 2. Other
    - None

### V. POLICIES AND PROCEDURES

- A. University Policies and Procedures
  - 1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
  - 2. A fee of \$15.00 is assessed for all late exams. The university's late exam policy applies to all exams taken without notifying the professor prior to the regularly scheduled exam time and to all exams taken late without an administrative excuse.
  - 3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:
    - a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;
    - b. Failing to meet group assignment or project requirements while claiming to have done so;
    - c. Failing to cite sources used in a paper;
    - d. Creating results for experiments, observations, interviews, or projects that were not done;
    - e. Receiving or giving unauthorized help on assignments. By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.

- 4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
- 5. Students are to be in compliance with University, school, and departmental policies regarding Whole Person Assessment (WPA) requirements. Students should consult the WPA handbooks for requirements regarding general education and the students' majors.
  - a. The penalty for not submitting electronically or for incorrectly submitting an artifact is a zero for that assignment.
  - b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

# B. Course Policies and Procedures

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2.

| Evaluation Procedures  |     |
|--|-----|
| Oral Research Presentation (evaluated by course coordinator)   | 5%  |
| Written Research Report (evaluated by course coordinator)      | 5%  |
| Oral Project Proposal (evaluated by entire faculty)            | 10% |
| Written Project Proposal (evaluated by course coordinator)     | 10% |
| Resume   | 5%  |
| Design Process Quiz  | 5%  |
| Professional Ethics Quiz                                       | 5%  |
| Oral Project Progress Report (evaluated by course coordinator) | 10% |
| Written Project Progress Report (evaluated by course           |     |
| coordinator)   | 10% |
| Weekly Progress Reports  | 5%  |
| Project Progress (evaluated by project advisor)                | 15% |
| Individual Contribution to Project Progress (evaluated by      |     |
| project advisor)   | 15% |
| Whole Person Assessment Requirements                           |     |
| Resume   |     |

Resume Design Process Quiz Professional Ethics Quiz Research Report

### 3. Other Policies and/or Procedures

- a. There are two project deadlines. By the Wednesday of the 14th week of the first semester, each project must have achieved a predetermined amount of progress. This will partially determine the group grade. Each project must be **complete** before Spring Break. The term **complete** for projects in the area of electrical engineering implies that all wires are soldered at the terminals and the circuitry does not contain *bread-boards*. Project advisors in the area of mechanical engineering will help students define completeness.
- b. The course coordinator confers the final grade, but the project advisor and the entire Engineering faculty determine certain components of the grade.
- c. Weekly written progress reports are to be submitted to the project advisor and course coordinator. The evaluation of project progress and of individual contribution is determined by the project advisor and is based on the quality, timeliness, and thoroughness of the work. The evaluation of seminar presentations is determined by the entire faculty and is based on the quality, organization, clarity, and style of the

presentation. The evaluation of written reports is determined by the course coordinator and is based on the quality, organization, clarity, and style of the report.

- d. The grade for any late assignment will be reduced by 10%. No credit will be given for weekly progress reports that are more than 72 hours late. No credit will be given for other assignments that are more than seven days late. Failure to submit the written Project Progress Report on time will result in a 10% reduction in the course grade.
- e. The class is scheduled to meet every Monday and Friday at 4:30 p.m. Once project groups are formed, each group should plan to meet with their project advisor on a weekly basis. Friday at 4:30 p.m. is reserved for this purpose but may be rescheduled by mutual agreement of the group and their project advisor.
- f. Students are expected to participate in announced programs such as the following:
  - (1) ORU Engineering department display during National Engineers' Week.
  - (2) Presentations at ORU Engineering department seminar.
  - (3) Display of senior projects at ORU.
  - (4) Project presentations at local IEEE, ASME, etc.
  - (5) Other mutually agreed upon showings as opportunities arise.

# VI. COURSE CALENDAR

| Class     | Schedule  |
|-----------|---|
| Aug 15    | Introduction to course  |
| Aug 19    | Task list, time line, cost estimate, and definition of completeness |
| Aug 22    | Research and patent searching                                       |
| Aug 26    | Design process  |
| Aug 29    | Communication skills  |
| Sep 2     | Communications skills   |
| Sep 5     | Labor Day   |
| Sep 9     | Give oral research presentation in class                            |
| Sep 12    | Project proposal content  |
| Sep 16    | Technical writing   |
| Sep 19    | Teamwork and personality  |
| Sep 23    | Meet with project advisors  |
| Sep 26    | Practice proposal presentations                                     |
| Sep 28    | Project proposal presentation in seminar                            |
| Sep 30    | Feedback on proposal presentations                                  |
| Oct 3     | Lecture on interviewing   |
| Oct 8     | Lecture on job hunting and resumes                                  |
| Oct 10-16 | Fall Break  |
| Oct 17    | Weekly Progress Reports   |
| Oct 21    | Meet with project advisors  |
| Oct 24    | Professional ethics   |
| Oct 28    | Meet with project advisors  |
| Oct 31    | No class  |
| Nov 4     | Meet with project advisors  |
| Nov 7     | Lecture on Final Project Progress Report                            |
| Nov 11    | Meet with project advisors  |
| Nov 14    | No class  |
| Nov 18    | Meet with project advisors  |
| Nov 21    | Give oral project progress report in class                          |
| Nov 28    | Feedback on Oral Progress Report                                    |
| Dec 2     | No class  |

## Course Inventory for ORU's Student Learning Outcomes EGR 498—Senior Design and Research I Fall 2013

This course contributes to the ORU student learning outcomes as indicated below: *Significant Contribution* – Addresses the outcome directly and includes targeted assessment. *Moderate Contribution* – Addresses the outcome directly or indirectly and includes some assessment. *Minimal Contribution* – Addresses the outcome indirectly and includes little or no assessment. *No Contribution* – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

| <b>OUTCOMES &amp; Proficiencies/Capacities</b> | Significant  | Moderate     | Minimal      | No           |
|--|--------------|--------------|--------------|--------------|
|  | Contribution | Contribution | Contribution | Contribution |

| 1  | Outcome #1 – Spiritually Alive |  |   |
|----|--------------------------------|--|---|
|    | Proficiencies/Capacities       |  |   |
| 1A | Biblical knowledge             |  | Х |
| 1B | Sensitivity to the Holy Spirit |  | Х |
| 1C | Evangelistic capability        |  | Х |
| 1D | Ethical behavior               |  | Х |

| 2  | Outcome #2 – Intellectually Alert |   |   |   |  |
|----|-----------------------------------|---|---|---|--|
|    | Proficiencies/Capacities          |   |   |   |  |
| 2A | Critical thinking                 | X |   |   |  |
| 2B | Information literacy              |   | Х |   |  |
| 2C | Global & historical perspectives  |   |   | Х |  |
| 2D | Aesthetic appreciation            |   |   | Х |  |
| 2E | Intellectual creativity           |   | Х |   |  |

| 3  | Outcome #3 – Physically Disciplined<br>Proficiencies/Capacities |  |   |
|----|---|--|---|
| 3A | Healthy lifestyle   |  | Х |
| 3B | Physically disciplined lifestyle                                |  | Х |

| 4  | Outcome #4 – Socially Adept<br>Proficiencies/Capacities |   |   |   |
|----|---|---|---|---|
| 4A | Communication skills                                    | Х |   |   |
| 4B | Interpersonal skills                                    |   | Х |   |
| 4C | Appreciation of cultural & linguistic differences       |   |   | Х |
| 4D | Responsible citizenship                                 |   |   | Х |
| 4E | Leadership capacity                                     |   | Х |   |