

Spring 2014



Engineering Technologies Department

TCN 291 Spring 2015 Interdisciplinary Capstone Project
3 credits: 1 hour lecture/4 hours laboratory – 5 hours/week total
MW 9:30-11:40

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Office hours M,W 1-2:30PM F 1-2 PM or by appointment

Consultants

Professor Donnelly jdonnelly@lasertechonline.org
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Professor Gentry

Course Description:

This course provides students the opportunity to apply the concepts, theories, and practices developed throughout their course of study in a one semester capstone course. This is the capstone of your education at TRCC. Students will investigate aspects of project development and management including project research, development of design specifications, project scheduling using project scheduling software, design simulations, component selection, construction and manufacturing prototype development, design verification and testing, design improvement and performance modeling. They will also explore team concepts, personality profiles, group decision processes. You should be using what you have learned. If you need a drawing or model then use your CAD or Solid modeling skills to produce the necessary information. If you need computations then use your Matlab Excel or Labview to perform the analysis.

In addition we will present the following skills to improve your ability to work in teams.

Myers Briggs personality Indicator
Team work skills
Group decision/ consensus decision making.
Project planning and scheduling
Project write up

This will include the use of blackboard in group mode to maintain a project notebook.

Course Outcomes:

- Students will demonstrate the ability to work together in teams to determine an engineering problem and solve that problem.
- Students will illustrate an ability to think critically and identify, evaluate research and solve complex technical problems.
- Students will illustrate the ability to develop and apply team skills
- Students will develop and illustrate the ability to use and apply project management skills.

Course Criteria:

The above outcomes will be assessed using these performance criteria:

- Engineering problem solving skills.-

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- ✓ Develop a complete yet concise description of the problem/ project.
- ✓ Pursue solutions in a methodical, logical manner with results correctly explained with sufficient detail and properly documented
- Critical thinking-
 - ✓ Show the ability to evaluate the credibility of sources of information
 - ✓ Demonstrate the ability to refine generalizations, establish rational & pertinent assumptions, and avoid oversimplifications
 - ✓ Exhibit the ability to generate, analyze / evaluate, and assess multiple engineering problem solution options
 - ✓ Produce documentation that reflects organization and application of engineering principles in specifying solution to an engineering problem
- Team skills
 - ✓ Demonstrate an awareness of team dynamics.
 - ✓ Develop a team charter / mission with goals, rolls processes and interpersonal method.
 - ✓ Develop a plan appropriate to the project
 - ✓ Conduct the project
- Project management skills
 - ✓ Development a project schedule with contingencies, critical Path
 - ✓ Document all work as individuals and a group in a blackboard group. This needs to be real time and will be monitored and evaluated weekly.
 - ✓ Develop a team charter / mission with goals, rolls and processes and interpersonal method.
 - ✓ Develop a plan appropriate to the project
 - ✓ Conduct the project
 - ✓ Document the project in a professional report.

Description.

This course provides students the opportunity to apply the concepts, theories, and practices developed throughout their course of study in a one-semester capstone interdisciplinary project. Students will investigate key aspects of project development and management including project research, development of design specs, project scheduling using Gantt charts, preliminary design/simulation, component selection, construction considerations, prototype development, design verification & testing, and design improvement and performance monitoring. They will be introduced to the concept of personality as an aid to group work, teambuilding. A major portion of the course will be dedicated to hands-on lab time during which students will work on their projects.

Throughout the course, faculty members will serve as consultants to guide the students and provide formative feedback. Weekly status meetings, designed to emulate weekly staff meetings common in business & industry, will be held to discuss progress on project work and other course-related issues. Presentations will be required to help develop students' written and oral presentation and communication skills. Students will be required to keep a journal to document all work performed on their projects, which will be periodically reviewed by faculty. The course will culminate with a final posterboard presentation to faculty, students and invited industry guests.

Required texts. None, but class handouts and referenced websites will be used to introduce the concepts of personality type indicator, team behavior, group dynamics, project management.

Attendance The class meets twice per week. You are expected to attend each session. If you must be absent, you are expected to contact the instructor and any teammates you may be working with. The lab may be open extended hours, subject to supervisor availability, so you

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will have time to work on your project. Although the course runs for 5 contact hours per week, you should expect that more time than this is needed to complete a project.

Choosing a Project

Ideas will be provided, or you may choose a project of your own with instructor approval. You will work in teams of three members *however* you will be graded on your own contribution as evidenced by your journal, group products and instructor observation. Team members will also be asked to evaluate each other's contributions to the effort using a provided rubric.

Students with Disabilities

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact the Disabilities Counseling Services at 383-5240. To avoid any delay in the receipt of accommodations, you should contact the counselor as soon as possible. Please note that I cannot provide accommodations based upon disability until I have received an accommodation letter from the Disabilities Counselor.

On line Portfolio (Digication)

All students are required to maintain an online learning portfolio in Digication that uses the college template. Through this electronic tool students will have the opportunity to monitor their own growth in college-wide learning. The student will keep his/her learning portfolio and may continue to use the Digication account after graduation. A Three Rivers General Education Assessment Team will select and review random works to improve the college experience for all. Student work reviewed for assessment purposes will not include names and all student work will remain private and anonymous for college improvement purposes. Students will have the ability to integrate learning from the classroom, college, and life in general, which will provide additional learning opportunities. If desired, students will have the option to create multiple portfolios.

Project Requirements (See additional document for details)

Each team is required to submit the following works throughout the project:

- Proposal- problem statement, plan of action, resources, calendar (Gantt chart)
- Status reports- weekly summary
- Project report- due at the end of the project. This comprehensive report details the project's objectives, method, management plan, results and conclusions. Teams will also submit individual team member evaluations including a self evaluation..
- Poster- a poster session will be held in May for students, faculty and invited industry guests demonstrating the features of your project

Grading method:

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| • Proposal document | 15% |
| • Status reports 1 per week after proposal | 20% |
| • Journal, project meetings | 20% |
| • Final report | 20% (includes team evaluation) |
| • Poster presentation | 15% |
| • Resource Utilization, attendance | 10% |