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ACE 10 Course – ELEC 495 Electrical Engineering Senior Design Lab II

Mark Bauer

University of Nebraska - Lincoln, mbauer2@unl.edu

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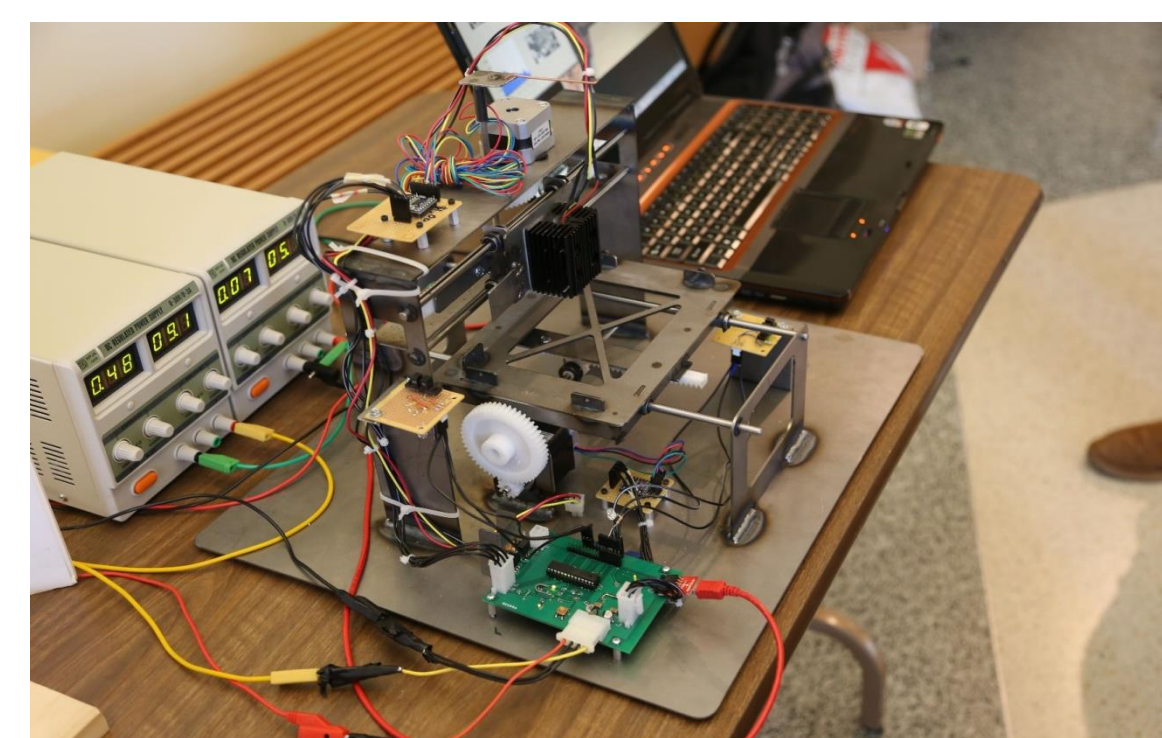
Instructor: Dr. Mark Bauer

Poster Presented by: Dr. Sohrab Asgarpour



Overview of ACE 10 Course

- Two capstone courses ELEC 494 (2 c.h.) and ELEC 495 (3 c.h.) - ELEC 495 is ACE 10 certified
- Both courses are taught by the same faculty
- Team-based (4-6 students per team), 4-5 teams
- Each student work approximately 100 hours over two semesters
- Each team has to design, build, and test a project that meets specifications
- The emphasis is on project management, timelines, meetings
- Department pays \$500 per team to cover expenses



ACE 10 Learning Outcomes

- An ability to function on multidisciplinary teams
- An ability to identify, formulate, and solve novel engineering problems including the planning, specification, design, and implementation of processes leading to a demonstrable product
- An ability to communicate effectively, especially technical topics, in writing and orally
- The recognition of the need for and ability to engage in lifelong learning
- A broad education and knowledge of contemporary issues necessary to understand the impact of technology in a global and societal context
- An understanding of ethical responsibility and professional conduct

ACE 10 Evaluation/Assessment

- The projects are assessed primarily based on how well the project is working
- How well does the project meet specifications?
- Two weekly meetings (one with instructor) – minutes for both meetings, timelines discussed
- Milestone check off
- Tracked email communications
- Final inspection presentation
- Attend lectures and write reports
- Engineering open house presentations with professional judging
- Student lab notebook
- Final Report

Sample Evaluation Form



Region 4
Project Evaluation Form
Project#2: Rideable Inverted Pendulum (RIP)
Team Members: XXXXXX

Number _____

Description:
The Rideable Inverted Pendulum (RIP) is an experimental transportation vehicle based on the classic inverted pendulum problem. The two wheeled vehicle is able to balance itself and its rider autonomously – the rider can simply shift his or her weight in an indicated direction and the vehicle will move. The complexity of the software is what allows the RIP to function properly; an array of accelerometers and gyroscopes interface with a microcontroller allow a software controller to adjust the speed of wheels, returning the center of mass of the platform and rider above the axis of the wheels. The simplicity of the use of the vehicle allows a user to natively control the RIP and travel with ease.

Please rate each aspect of the project from 1 to 10 for the maximum of 50 points. Ten is the highest score and one is the lowest

a. Technical Soundness (How well designed and has used/considered good technical design approaches?)	
b. Team Presentation and Documentation (How well the team presents the project and how well/clean/good/professional is the documentation of the project?)	
c. Project quality (How useful/important is the project?)	
d. Operational Sciences (Operation of the project was demonstrated, or stated that it was tested and it worked!)	
e. Overall Rating (In general, what is your overall impression of the project?)	

ACE 10 Findings

- Students will learn even more from the projects that have issues that force students to think
- Software development has improved to some degree, but more is to be done
- It is expected that enhancing lectures for prerequisite junior labs will affect the senior capstone course in a positive way
- Tracking number of hours student spend on the project help ensure students put their fair share
- Quality of final report as far as writing skills can be improved

Improving ACE 10 Learning

- Modifications to course requirements to enhance their communication (written and oral) abilities
- Changes in content of Electrical Engineering courses through the course subcommittees
- Modification to assessment and evaluation processes through Continuous Improvement of Teaching and Learning (CITL) subcommittee
- Changes in EE curriculum through the curriculum subcommittee

Student Work

Students propose processes to improve the design aspects throughout the course. Reflections are done individually as well as team-based.