CRN# 12497 CPET 49100-01 Senior Design Project, Phase II
CRN# 12496 ECET 49100-01 Senior Design Project, Phase II
Fall 2012

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Dept. of Computer, Electrical, and Information Technology
Indiana University-Purdue University Fort Wayne

Course Description
P: 490. Phase II includes, but is not limited to: (1) continued research and finalized design, (2) oral presentation to faculty and other interested parties, (3) standard-format written technical report.

Instructor Information:

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Course Web site: www.etcs.ipfw.edu/~lin
Office Hours:

- Monday 2:00 - 4:00 PM Tuesday 1:00-3:00 PM
- Wednesday 1:00 - 4:00 PM Thursday 4:30 - 5:30 pm
- Other weekday hours – by appointment

Class Meeting Dates/Time **Tuesday** 7:30-8:50 PM (ET 211)
Aug. 21, 28
Sept. 4, 11, 18, 25
Oct. 2, *9 (Fall break), 16, 23, 30
Nov. 6, 13, 20, 27
Dec. 4
Dec. 7 (Friday) - Senior Design Presentation

Important Dates:
Sept. 4 – Labor Day Holiday
Oct. 8 & 9 – Class suspended (Fall Break)
Nov. 21 – 25 - Thanksgiving Recess

Recommended Text Books
ECET 491 - ***System Engineering Management***, 4rd, 2008, by Banjamin S. Blanchard, from John Wiley & Sons, Inc, ISBN 978-0-161735-9
CPET 491 – ***Real Time UML***, 3rd, 2004, by Bruce Douglas, Addison Wesley, ISBN 0-321-16076-2

Grading Policy: (No late reports will be accepted)

Project Design (meeting & discussion, communications, project-specific technical details, knowledge and abilities, reports, etc) 50%
Project Implementation/Operation (reports) 20%
Oral Presentation 10%
Final Report 20%

Grading scale: A: 90 -100, B: 89 – 80, C: 79 – 70, D: 69 – 60, F: 59 and below.
* Purdue University's new grading scale with + and – will not be used.

Course Outcomes: (ETAC/ABET; Engineering Technology Accreditation Commission/Accreditation Board for Engineering Technology, Criteria for Accrediting Engineering Technology Programs, Oct. 29, 2011)

A student who successfully fulfils the course requirements of CPET/ECET 491 will have demonstrated the ability to:
1. Use of knowledge and skills:
1.1 Prototype product and assembly drawings (ETAC/ABET, Criterion 3 item a1)
1.2 System architecture/subsystem/PCB circuit layout and drawings (ETAC/ABET, Criterion 3 item a2)
1.3 Use of modeling/simulation (MATLAB, Multisim, etc.) techniques (ETAC/ABET, Criterion 3 item a3)
1.4 Use of project management (ETAC/ABET, Criterion 3 item a4)
1.5 Use of modern software and development methodologies (ETAC/ABET, Criterion 3 item a5)
1.6 Application of mathematics (ETAC/ABET, Criterion 3 item b1)
1.7 Application of system engineering and management concepts (ETAC/ABET, Criterion 3 item b2)
1.8 Use current and emerging knowledge (ETAC/ABET, Criterion 3 item b3)
1.9 Apply creativity in hardware system/subsystem/circuit design (ETAC/ABET, Criterion 3item d1)
1.10 Apply creativity in software system/subsystem/program design (ETAC/ABET, Criterion 3 item d2)
1.11 Problem solving knowledge and skills (ETAC/ABET, Criterion 3 item f1)

2. Conduct unit and system testing, collect testing data and interpret results
2.1 Valid and appropriate subsystem testing results (signal acquisition, processing, reporting, HMI, etc) ETAC/ABET, Criterion 3 item c1)
2.2 System construction and integration testing results (ETAC/ABET, Criterion 3 item f2)

3. Write progress and project reports - clear and concise technical content, well-organized, professional written report (ETAC/ABET, Criterion 3 item g1)

4. Make oral presentations - professionalism, preparation and use of visual aids (TAC/ABET, Criterion 3 item g2)

5. Demonstrate project performance
5.1 Experimental circuits setup and data analysis (ETAC/ABET, Criterion 3 item c2)
5.2 Creativity in design (ETAC/ABET, Criterion 3 item g2)
5.3 Teamwork - stakeholders: project sponsor, faculty advisor, etc (ETAC/ABET, Criterion 3 item e)
5.4 Project related research work (ETAC/ABET, Criterion 3 item h)
5.5 Application of ethics - health, safety, wellbeing, etc. (ETAC/ABET, Criterion 3 item i)
5.6 Diversity in knowledge & solution (ETAC/ABET, Criterion 3 item j1)
5.7 Knowledge of societal issues - economic, productive, growth, etc. (ETAC/ABET, Criterion 3 item j2)
5.8 Knowledge of global issues - environment, cultural needs, etc. (ETAC/ABET, Criterion 3 item j3)
5.9 A commitment to project quality (ETAC/ABET, Criterion 3 item k1)
5.10 A commitment to project timeliness - project progress, completion times, etc. (ETAC/ABET, Criterion 3 item k2)
5.11 Project is operational and meet or exceed specifications (ETAC/ABET, Criterion 3 item f3)
5.12 Familiarity with the project (include ability to answer questions) (ETAC/ABET, Criterion 3item f4)

Accreditation Board of Engineering Technology (ABET/ETAC) 2012-2013 Criteria for Accrediting Engineering Technology: Criterion 3. Student Outcomes (a – k)

a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;

b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
d. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
e. an ability to function effectively as a member or leader on a technical team;
f. an ability to identify, analyze, and solve broadly-defined engineering technology problems;
g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
h. an understanding of the need for and an ability to engage in self-directed continuing professional development;
i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
j. a knowledge of the impact of engineering technology solutions in a societal and global context; and
k. a commitment to quality, timeliness, and continuous improvement.

Disabilities Statement: If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (Walb, room 113, telephone number 481-6658), as soon as possible to work out the details. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to me. For more information, please visit the web site for SSD at http://new.ipfw.edu/disabilities/

Tentative Schedule/Activities

1. ECET/CPET 491 First Meeting (7:30-8:50 p.m., Tuesday, Aug. 21, in ET 211)

- Phase I Project Design review/update
- An updated **progress report, due on Sept. 4 (before 5:00PM)**, including the following required sections: cover page (project title, student name, advisors, date, affiliation), problem statement, proposed solution (with appropriate block diagrams), **system requirement and specifications**, required resource and estimated cost, **project tasks and schedule** (MS Project 2007/2010), and references.
- Meet with your technical advisor and make a phase II meeting schedule

1st progress report due Sept. 4, your project schedule (MS Project format), and advisor meeting schedule due Sept. 4 – before 5:00 PM, send your report electronically to lin@ipfw.edu, and copy your Faculty advisors.

2. Iterative Design Phase (Aug. 21 – Oct. 2)

- Detailed System Design
  - Define detailed requirements and specifications (hardware/software subsystems and interface, I/O interface, timing, events, constraints, etc) and overall characteristics of your proposed project for implementation
  - Consider system usability (human factor), performance, reliability, supportability, off-the-shelf parts, assembly time, power, weight, size, cost, tradeoff, etc
  - Design a System Architecture (software and/or hardware)
- Perform circuit simulation, system simulation, and/or mathematical modeling: MATLAB, PSpice, Muitisim, etc; log and gather simulated data; analyze, and document the simulation and/or testing results
- System function modeling (flow chart, data flow diagram, state transition diagrams, activity diagrams, collaboration diagrams, block diagrams, etc); MS Visio, Unified Modeling Language (UML)
- Make sure all the needed hardware and/or software are ordered

The Design Report (**2nd report**) due to both your technical advisor and Prof. Lin on **Oct. 2, before 5:00 PM,** for critical review. **If the system design is incomplete and assessed that the student is not able to make significant progress toward the project objectives, a "F" course grade or withdraw from the course will be recommended by both your technical advisor and Prof. Lin**.

3. Design Project Prototyping and/or Development: (Oct. 2 – Nov. 6)

- Define/refine implementation plan and timeline for project management
- Prioritized hardware/software co-construction
- Incrementally build and test your prototype system
- Document your activity, unit testing results (signal measurement, observation, program running, etc)

System construction and unit testing report (**3rd report**) **due Nov. 6, before 5:00 PM**

4. Testing and Evaluation (Nov. 6 – Nov. 27)

- Complete the system construction
- Final testing and gathering testing results for final report

First testing report (**4th report**) **due on Nov. 13**
Second testing report (**5th report**) **due on Nov. 20**

5. Final Report (due Dec. 3)

- All ECET Faculty members and the ENGW421 professor are invited to attend your presentation.
- The ECET/CPET 491 Senior Design II Assessment Form will be used for evaluation.

One hard copy and one soft copy of your **final report** are **due on Monday, December 3, 2010**

6. Project Presentation (8:30am-2:00noon, **Friday, December 7, 2012**)

- Submit a CD contains all soft copies of project design meeting & communication memos, progress reports, testing reports, programs, data sheets, final project report, presentation slides, due **December 9** (Design Portfolio CD)
- Final project presentation:
    - Microsoft PowerPoint presentation is recommended. A soft copy of this presentation should also send to Prof. Lin.
- Best Senior Design Projects will be selected by faculty members