

CRN# 11845 CPET 49100-01 Senior Design Project, Phase II
CRN# 11846 ECET 49100-01 Senior Design Project, Phase II
Fall 2017

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

ECET/CPET 491 Senior Design Project Phase II - Course Description (2 cr hours)

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:

Paul I-Hai Lin, P.E. (EE)

Professor of Electrical and Computer Engineering Technology

Indiana University-Purdue University Fort Wayne

Office ET 205C Email: lin@ipfw.edu or pilin@purdue.edu

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

Office Hours:

- Tuesday 1:00 - 3:00 PM, 5:00PM-7:00 PM
- Wednesday 1:00 - 3:00 PM
- Thursday 5:00 - 7:00 PM
- Other weekday hours – by appointment

Class Meeting Dates/Time
Tuesday 7:30-8:50 PM (ET 211)
Aug. 22, 29
Sept. 5, 12, 19, 26
Oct 3, 10* (Fall break), 17, 24, 31
Nov. 7, 14, 21, 28
Dec. 5
Dec. 8 (Friday) 8:00 AM - 4PM - Senior Design Presentations (Room ET 346)

Important Dates:

Sept. 4 (Monday) – Labor Day Holiday

October 9 & 10 Class suspended (Fall Break)

November 22-26 Thanksgiving Holiday

Dec. 8 Senior Design Presentation

Recommended Text Books

ECET 491 - **System Engineering Management**, 4rd, 2008, by Benjamin 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)

Class, Team Participation/Engagement (Meeting, discussion, communications) – 10%

Project Design (project-specific technical details, knowledge and abilities, reports, etc) 40%

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.

Other Resources:

Microsoft Dreamspark Software Download: <http://e5.onthehub.com/d.ashx?s=29sevpmts> also can be found on the CEIT webpage <http://www.ipfw.edu/ceit/> under Student Resources.

ECET/CPET 491 Course Outcomes:

Each student must demonstrate that he/she has successfully fulfills the following CPET/ECET 491 course requirements:

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 tools (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 advanced 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 of current and emerging technological knowledge (ETAC/ABET, Criterion 3 item b3)
- 1.9 Apply creativity in hardware system/subsystem/circuit design (ETAC/ABET, Criterion 3 item 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, testing, 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 (including ability to answer questions) (ETAC/ABET, Criterion 3 item f4)

Accreditation Board of Engineering Technology (ABET/ETAC) 2015-2016 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. 22, in ET 211)

- Phase I Project Design review/update
 - An updated **progress report, due on Sept. 5 (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** (using MS Project 2010 or newer), and references.
 - Meet with your technical advisor and make a phase II meeting schedule
- 1st progress report due Sept. 5, your project schedule (MS Project format), and advisor meeting schedule due Sept. 5 – before 5:00 PM, send your report electronically to lin@ipfw.edu, and copy your Faculty advisors.**

2. Iterative Design Phase (Aug. 22 – Sept. 26)

- Detailed System Design
 - o 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
 - o Consider system usability (human factor), performance, reliability, supportability, off-the-shelf parts, assembly time, power, weight, size, cost, tradeoff, etc
 - o Design a System Architecture (software and/or hardware)
- Perform circuit simulation, system simulation, and/or mathematical modeling: MATLAB, PSpice, Multisim, 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 **Sept. 26, 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: (Sept. 27 – Oct. 24)

- 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 Oct. 24, before 5:00 PM

4. Testing and Evaluation (Oct. 25 – Nov. 21)

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

First testing report (4th report) due on Nov. 7

Second testing report (5th report) due on Nov. 21

5. Final Report – Draft (due Nov. 28)

- All ECET Faculty members and Industrial Advisory Committee Members are invited to attend your presentation.
- The ECET/CPET 491 Senior Design II Assessment Form will be used for evaluation.
one soft copy of your final report Draft is due on Tuesday, Nov. 28, 2017

6. Project Presentation (8:00am-2:00noon, Friday, December 8, 2017)

- 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 May 2 (Senior Design Portfolio CD)
- Final project presentation:
 - o 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