**Course description**

CPEN 499W: Computer Engineering Capstone Project: Capstone Design project where senior student completes a practical computer engineering project, including probabilistic aspects of the design, by applying the engineering knowledge and judgment they have acquired during their college career.

PCSE 499W: Independent Study in Applied Physics and Computer Science: Directed research or projects in applied physics or computer science under the direction of a faculty advisor.

**Pre-requisite**

CPEN 499W: ENG101-102 or 123; CPEN 371W (or consent), 414, CPSC 410, PHYS340, senior standing, and permission of the department.

PCSE 499W: ENG101-102 or 123; CPEN 371W (or consent).

**Course Schedule**

Prior to, or soon after, registering for this course, the student should identify his/her desired project, find a mentor from the department, and work with the mentor to submit a project proposal abstract in writing, no later than the second week of classes in the semester in which the student registered for the course. If the student is working with a mentor outside CNU he/she must still have a PCSE faculty advisor. The project proposal has to be approved by the CNU mentor before its submission.

Within one week of submission, project proposals will be reviewed by the instructor and approved or denied. If a project proposal is denied the student must restart the project proposal development and submission process. If a project proposal is approved the student may:

- Begin work on the approved project under the instructor’s supervision. This may be done over one or two semesters, depending on the scope of the project;
- Submit project reports based on the guidelines and schedule; and,
- Submit a formal report of his/her project implementation or results, in hard copy as well as in web-ready document format; and,
- At a time to be scheduled by the instructor, make an oral presentation of his/her work before an audience of faculty, guests, and other students.

**The Project Proposal**

A proposal document shall include the following:

- A project title: no more than forty (40) words long, that conveys the nature of the proposed work;
- Student's name, major and project course number;
- Student's mentor's (or advisor's) name(s) and organizational affiliation(s);
- Proposed start and finish dates; and
- A short abstract of no more than 400 words, which provides a statement of the work to be done, as well as tools and/or facilities that may be needed to complete the work.
- A budget: cost consideration for the hardware and/or software needed for the project.
Duration of Work

The proposed work must be completed in no more than two (2) consecutive semesters. If you have questions or need further guidance in the process of setting up for your project, contact the faculty member who administrates the class.

Deliverables

- Project proposal
- Mid-term progress reports.
- A CD containing the final report document of the work done (in Microsoft Office Word format as well as in web-ready format);
- Any artifacts (chips, constructions, program codes, etc) resulting from the work.
- The final report should be written in a format suitable for publication in a scientific journal. It should contain no less than 10 pages (with at least 300 words per page) excluding figures, appendices and bibliography. It may be written as a work report document consisting of the following sections:
  - Abstract: a overview of the project.
  - A introductory section: A clear and concise statement of the work to be done; that is, a complete specification of the project solution requirements (i.e., what needs to be done, the completion of which suffices as the problem solution). Possible solutions and available techniques.
  - Sections that provide a comprehensive description to your solution: A detailed description and discussion of what you did, including but not limited to hardware, software, procedures and tools involved in your project, with a presentation of the results you obtained. In addition, two separate aspects of your solution need to be addressed in the report:
    - Design alternatives and constraints: address the following questions if they apply to your project. What changes would you make if you had 25% more money? What changes would you make if you had 25% less? What are the manufacturability issues under all three budget scenarios? What are the safety implications of your design?
    - Engineering standards: standards that your project involves. These could be the standards that you adopted, or the standards that were followed by the software, hardware, or tools you employed in your project.
  - Evaluation, conclusions or summaries: A thorough examination, test or comparative analysis of what you did and the results you obtained, on the one hand, and what you said you were going to do, on the other hand. Explain any discrepancies and propose any further work required. In addition, discussion on future work is encouraged.
  - Appendices: Attach any notes, special description of tools, facilities, etc. that were only of secondary importance to your work.
  - Bibliography: Include all resources that you have used to help you complete your work.

Oral Presentation

The PCSE Senior Theses presentations are scheduled twice a year: the last Friday before spring semester final exams, and the last Friday before fall semester final exams. If you have completed your work and wish to be scheduled for a presentation, you must contact the faculty member who administrates the class at least two weeks in advance of the presentation date. It is suggested that
you rehearse your presentation at least three times prior to the formal presentation day. As a general rule, if a student fails to prepare, he or she is likely prepared to fail. Presentation attire for the presenter is business formal.

Exit Interview and Major Field Test
All students who are computer engineering majors and are enrolled in CPEN499W course must go through an exit interview with their faculty advisor in order to receive credit for the class. The advisor will contact the student to make an appointment for this interview.

The Grading System
The proposal and progress reports (50 points).
The technical content (150 points) of your final report will be graded by your mentor/advisor.
The final report (50 points):
Towards fulfillment of the CNU required writing component, your final report will be graded by your mentor. The accuracy of the technical writing will also be considered in evaluating the writing component of the project.
Presentation (50 points):
The oral presentation will be graded by the department faculty body.

Writing Center
As a writing-intensive class, writing becomes an important part of this course. You are encouraged to take advantage of the University Writing Center at any stage of the writing process. It is a policy of this course that your final report needs to be checked by the Writing Center before turning it in for grading.

Audit Grade
This course is not available for audit.

Late Work
Except for cases of demonstrable extenuating circumstances, an assigned work grade will linearly depreciated to zero over a period of seven (7) days from its due date.

Call for Papers
Paideia (pi-DAY-uh) is the classical Greek education of liberal learning, which was believed to develop the intellectual, moral and aesthetic capacities. Christopher Newport University's Undergraduate and Graduate Research Council (www.cnu.edu/ugrc) invites CPEN499W/PCSE499W students to submit abstracts for its annual conference dedicated to fostering undergraduate and graduate research and scholarship in all disciplines and institutions. See www.cnu.edu/ugrc/paideia.htm for the proceedings of previous years' conferences and www.cnu.edu/ugrc/callforpapers.htm for information on how to submit your research.

Other Policies
All other policies will be as contained in appropriate official University regulations, catalogs and handbooks. If you believe you have a disability, you should make an appointment to see me to discuss your needs. In order to receive an accommodation, your disability must be on record in Disability Services located in the Academic Advising Center, Room 125, Administration Building, (594-8763).