ECET 590 Special Problems in Electrical & Computer Engineering Technology
(Design of Smart Sensor Systems)
Spring 2012

Course Description:
Independent study of a special problem under the guidance of a member of the staff. Does not substitute for either M.S. thesis or M.S. project credit.

1. Course Justification
This course is designed to prepare students enrolled in M.S. Technology for their Directed Master Project. In the MS Tech. program, the students are typically with diverse background and diverse research interest. Due to resources constraint, it is not practical to offer several courses that cover the all of student interest areas. This course aims to fill in this gap by allowing students to work on a semester long course which will help them to understand the state-of-the-art in their fields of technology. In other words, it will provide them with the opportunity to explore their potential research areas for their MS Project. Furthermore, having an additional course in the same area as their field of interest will provide them with sufficient time to accomplish a scholarly work. Consequently, it will better equip them for post graduation career in the today's competitive world.

This course is designed as a research oriented variable credit independent study for M.S. Tech students. In order to qualify for this course, a student must have completed at least 9 credits hours of Graduate level course. It will be under the guidance of a certified ECET (Electrical & Computer Engineering Technology) graduate faculty member who will serve as the student's academic advisor. A typical study starts with several weeks of intensive investigation and analysis of related literature. The initial exploratory study will be followed by a formulation of research problem based on the findings. Even though the course is independent study, student will be expected to document the time invested in the study. A student will be expected to spend a minimum of 3 to 9 number of hours per week (depending upon the registered credits hours) to successfully complete the study.

While the list of topics covered in the course can vary depending upon the areas of interest, typical problem areas include the best practices and implementation gaps in quality, project management, reliability, facility management, and operations management of industrial and manufacturing systems.

2. Level of the Course:
This course is directed toward graduate students in the M.S. Technology (for both IT/Advanced Computer Application track and Industrial Technology)

3. Prerequisite:
Must complete 9 credits of graduate level courses and approve by the academic advisor, AND Graduate status in the M.S. Technology (IT/Advanced Computer Application track or Industrial Technology track).

4. Instructor(s):
Paul I-Hai Lin, Professor of Electrical and Computer Engineering Technology

5. Course Outline
The list of topics covered in the course can vary depending upon the areas of interest. The typical independent study topics include the best practices and gaps in
- Quality and performance improvements of electrical & computer application and Systems
- Techniques in electrical & computer applications project management and control
- Design and reliability studies of electrical & computer technological systems
- Operations and security management of electrical & computer applications and systems
- Integrating of technology (electrical & computer applications) and competitive strategies in business, manufacturing, service industry and government enterprises
- Review of the best and state-of-the-art practices in the electrical & computer applications and technology

6. Course Outcomes:

A successful student will be able to:
- Synthesize his or her ideas to narrow down his applied research project leading to M.S. Directed Project problem (electrical & computer applications).
- Appreciate and evaluate the state-of-the- art and best practices in the domain of electrical & computer applications Technology
- Find the gaps in the literature or in the current industry practice, and hence identify the opportunities for improvement
- Apply scientific and structured approach to address the electrical & computer technology problems
- Prepare a professional report based on his or her exploratory study and make a professional presentation.
- Articulate the importance of the topic and benefits of the study to improve the performance of the industrial enterprise under question.

7. Course Grading

Class Activities and Grading Policy

The student will meet at least once a week for two to three hours depending upon the credit registered. There will be series of homework in the form of literature review and reading assignments. A student needs to prepare the analytical summary and his or her thoughts on the topic of discussion. The final product of the course would be a presentation and professionally written research report.

Grading policy:

Weekly Study, Reports and Briefing: 40%
Research Proposal/Presentation: 20%
Final Research Report/Presentation: 40%

Performance in ECET 590 is graded using the following scale: A, B, F, and I.
- A – used where the student has exceed requirements.
- B – used where the student has met requirements.
- F - used where the student has not yet met requirements and has not yet investigate appropriate amounts of effort.
- Incomplete – used where the student has investigated appropriate amounts of satisfactory effort but the project is not yet finished.

8. Reading List:
Reading will be required from scholarly journals and periodicals. Course instructor will suggest the reading list after discussing the research interest of the student. Sample resources (but not limited to) are listed below:
- IEEE Computer Magazine
- IEEE Internet Computing
- IEEE Transactions on Education
- IEEE Transactions on Instrumentation and Measurement
- IEEE Transactions on Industrial Informatics
- IEEE Transactions on Industrial Electronics
- IEEE Transactions on Power Electronics
- IEEE Transactions on Power Engineering
- IEEE Industry Application Magazines
- IEEE Vehicular Technology Magazine
- IEEE - IT Professional
- IEEE Multimedia
- IEEE Pervasive Computing
- IEEE Security & Privacy
- IEEE Spectrum
- IEEE Communications
- IEEE Intelligent Systems
- IEEE Network
- IEEE Software
- IEEE Technology & Society Magazine
- IEEE Transactions on Mobile Computing
- IEEE Transactions on Wireless Communications
- IEEE Transactions on Knowledge & Data Engineering
- IEEE Transactions on Engineering Management

- IEEE Engineering Management Review
- IEEE Systems Journal
- ACM Digital Library
- International Journal of Production Research
- Quality and Reliability Engineering International
- Operations Research and Management science Journals
- ASEE Conference Proceedings
- Journal of Engineering Technology
- Technology Interface
- International Journal of Production Economics
- International Journal of Production Research
- Quality and Reliability Engineering International
- Operations Research and Management science Journals
- ASEE Conference Proceedings
- Industrial Engineering Research Conference Proceedings
- American Society of Engineering Management Conference
- Engineering Management Journal
- Quality Engineering
- Edited Textbooks with case studies
- Computers and Industrial Engineering
- Technical Reports published by government and other research institutes
- Company internal reports