

ECE 598 Directed M.S. Project

Course Description:

ECET 598 Directed M.S. Project, cr. 1 to 3

A formal investigation of a particular problem under the guidance of the advisory committee.

Not applicable to a thesis option plan of study. Enrolling during at least two consecutive terms of a total of three credits is required.

1. Course Justification

The Directed M.S. Project (Electrical & Computer Engineering Technology focus), a capstone/synthesis requirement, provides a technology specialization supervised experience through which M.S. technology students with an interest in Electrical & Computer Engineering Technology will demonstrate the knowledge and skills acquired from the Master of Science in Technology program to fulfill the graduation requirement.

The directed project is originally defined as an applied research project that was more extensive and sophisticated than a graduate-level independent study and less formal than a masters thesis. The overall objective of the requirement is to engage each graduate student in a study, typically industry or business focused, which is sufficiently involved as to require more than one semester to conceive, conduct, and report. The focus is to be placed on a topic with practical implications rather than original research.

2. Level of the Course:

This course is directed toward graduate students in the M.S. Technology (Electrical & Computer Engineering Technology focus)

3. Prerequisite:

Graduate status in the M.S. Technology AND

The major professor and Department approval are required.

4. Instructor(s):

Paul I-Hai Lin, Professor of Electrical and Computer Engineering Technology

5. Course Outline

This course will require at least two consecutive enrollments.

- The first enrollment is for 1 semester hour of credit in the next-to-last academic term (but earlier enrollment is permitted if appropriate). During this academic session, a proposal is developed and approved by the advisory committee.
- The subsequent registration in ECET 598 is not permitted until the approved and signed proposal has been filed in the M.S. Technology Graduate program office. The second ECET 598 enrollment is for 2 semester hours of credit, in which the study is conducted, the final written, and the study defended in an oral examination.

Topics include the following independent and overlapping building blocks:

- Project Identification and Inception
- Project Planning &, Proposal Writing
- Project Research, Analysis, Design, Data Collection & Evaluation, Action Plan Recommendation, Implementation, Results & Evaluation, Progress Reporting,

- Documentation, etc
- Project Report Writing
- Oral Examination: Project Presentation and/or Demonstration.

6. Course Outcomes

A student who successfully completes the course will demonstrate

- Ability to identify a business or industry relevant solution to a technology problem
- Ability to define and/or validate a business or industry relevant problem
- Addressing of a technological problem in a systematic and replicable manner
- Effective use of technical/professional research and/or development procedures
- Identifying criteria for success/solution of the problem
- Gathering information appropriate to the problem by employing business research procedures (e.g., 70% business/industry sources and 30% academic sources versus the reverse)
- Ability to document the research and development activity in a manner that permits replication and assessment of key decisions and alternatives
- Write effectively in a form customary to business and industry
- Prepare and deliver a presentation in a form customary to business and industry

7. Course Grading

The student's work in the following categories will be evaluated:

- Project proposal (follow the Project Proposal Format specified by the IPFW M.S. Technology Program Office)
- Progress reports and presentation
- Final project report (use the Project Format specified by the IPFW M.S. Technology Program Office)
- Final project review and presentation
- Final oral examination (follow the Post-Project Activities guidelines specified by the IPFW M.S. Technology Program Office)

Performance in ECET 598 Directed Project course is graded using the following scale:

- Pass – used where the student has met or exceeded requirements.
- No Pass – used where the student has not yet met requirements and has not yet investigated appropriate amounts of effort.
- Incomplete – used where the student has investigated appropriate amounts of satisfactory effort but the project is not yet finished.

8. Class Activities:

The student will meet at least once a week to discuss project research, progress report, project review, etc. There will be additional assignments in the form of literature review and reading. A student needs to prepare the analytical summary and his or her thoughts on the topic of discussion. The tentative class activities are as follows.

Project Identification and Inception

During this phase, students are encouraged to collaborate on M.S. Directed Projects with

industry, government agencies, university departments, or community institutions. Effective Directed Project Practices as listed below are observed:

- Directed projects require students to select and employ an effective Research & Development procedure(s) to address the problem.
- A directed project generates a new solution, product or procedure. It may involve “proof of concept” and it must be of direct value to business or industry or to the education for business or industry.
- Directed projects should incorporate a strategic financial overview component depicting such characteristics as cost, ROI (Return on Investment), etc.
- A component of the directed project should be an Implementation Plan (i.e., recommendations for deploying the developed solution). This plan should include the suggested near and mid term steps.
- Industry partners are encouraged for validation or other involvement.
- Teams of students working on larger projects are permissible as long as each has a unique and significant contribution and that there is a high degree of independence so that one student’s success is not predicated on another’s.
- Employ either a) business or industry style manuals such as the Chicago Manual of Style, b) other relevant business/industry writing style manual, or c) the APA manual when required by the advisor.

Tentative activities include:

- Define the project questions and scopes
- Identify project sponsor(s)
- Refine the research questions and scopes
- Work with the Directed M.S. Project advisor to form a project review committee
- Weekly meeting & discussion

Project Planning and Proposal Structuring

- Project Planning:
 - Type, Purpose, Time frame, Scope, Environment
 - Data collection design
 - Instrument development
 - Project request and proposal
- Weekly meeting and discussion
- Progress report & review
- Project Proposal Structuring
 - Executive summary
 - Problem statement
 - Project/Research Objectives
 - Literature Review
 - Benefits of the Study
 - Project Design
 - Data Analysis
 - Nature and Form of Results
 - Qualification of Project Investigator
 - Budget

- Schedule
- Facilities and Special Resources
- Project Management
- Bibliography
- Appendixes
- Progress report & review

Project Implementation/Management

- Simulation, emulation, and/or project design & prototyping (hardware/software based)
- Data collection & preparation (quantitative, qualitative, etc), and/or project testing (hardware/software based)
- Data analysis, interpretation, presentation, and/or project evaluation and validation (hardware/software based)
- Weekly meeting and discussion
- Biweekly progress reports and progress reviews

Project Report Writing

Formal Presentation and Oral Examination

9. Directed M.S. Project Course Procedure

Enrollment

Exact enrollment timing can vary, but at least two consecutive enrollments in ECET 598 are required.

- The first enrollment is for 1 semester hour of credit in the next-to-last academic term (but earlier enrollment is permitted if appropriate). During this academic session, a proposal is developed and approved by the advisory committee.
- The subsequent registration in ECET 598 is not permitted until the approved and signed proposal has been filed in the M.S. Technology Graduate program office. The second ECET 598 enrollment is for 2 semester hours of credit, in which the study is conducted, the final written, and the study defended in an oral examination.

Should the student not complete the project in the two enrollment periods described above, s/he is required to enroll for 1 semester hour of credit each term until the project has been completed. The candidate must be enrolled in ECET 598 for at least 1 semester hour of credit in the academic session in which the degree is awarded.

Directed M.S. Project Advisory Committee

Directed M.S. Project Advisory Committee, chosen by the student and the faculty advisor, will be comprised of at least three members.

- One member is the project advisor
- One member is appointed by the IPFW M.S. Technology Graduate Committee to represent the department
- The third member is chosen by mutual agreement of the student and the project advisor

A co-advisor may be designated when advantageous to the student and where it can be build faculty experience. If a student's Directed Project

Appointment of the Examining Committee and Scheduling the Final Oral Examination

The Directed M.S. Project examining committee will usually be the same as the Directed M.S. Project Advisory committee. The major professor and student are jointly responsible for finding a common date, time, and period when all advisory committee members can meet for the examination and this must occur within the deadlines established by the M.S. Technology Program Office. The major professor is expected to take initiative in assisting the student with this procedure. The date, time, period, facilities, and equipment needs for the meeting are to be transmitted to the M.S. Technology Program Office by the major professor.

Following the notice of final examination date, the M.S. Technology Program Office will schedule an appropriate meeting room (equipment other than standard equipment offered by IPFW Learning Resource Center is the responsibility of the student to arrange), prepare the necessary oral examination and/or evaluation forms.

10. 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 - IT Professional
- IEEE Multimedia
- IEEE Pervasive Computing
- IEEE Security & Privacy
- IEEE Spectrum
- IEEE Communications
- IEEE Industry Application Magazines
- IEEE Intelligent Systems
- IEEE Network
- IEEE Software
- IEEE Technology & Society Magazine
- IEEE Vehicular Technology Magazine
- IEEE Transactions on Mobile Computing
- IEEE Transactions on Wireless Communications
- IEEE Transactions on Industrial Informatics
- 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
- 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