ENMA 490: Capstone Design Course (Required) – 3 credits

**Class Schedule:** Mondays and Wednesdays from 12:00-14:50

**Instructor:** Prof. Ray Phaneuf

**Textbook:** NA

**Catalog Description:** Capstone design course. Students work in teams on projects evaluating a society or industry based materials problem and then design and evaluate a strategy to minimize or eliminate the problem; includes written and oral presentations.

**Course Description:** Capstone senior level design course. Students will work in teams to evaluate a society or industry based problem in Materials Science and Engineering and then design and evaluate a strategy to address the problem. The course will include written and oral presentations of the design strategy, implementation and evaluation.

**Prerequisites:** Senior standing in Materials Science and Engineering

**Course goals:**

The main objective is to allow students the opportunity to gain experience in: critical analysis of complex problems; design of materials systems and/or processes to address relevant problems; and teamwork. A student who takes this course should learn (1) to work as a team to apply fundamental knowledge of materials to a design problem, (2) about techniques for fabrication related to the specific project, (3) to produce written and oral design reports as a team, and (4) the role of ethics in engineering design.

**Student Outcomes covered by the Course:**

- ABET A: Ability to apply mathematics, science and engineering principles;
- ABET B: Ability to design and conduct experiments, analyze and interpret data.
- ABET C: Ability to design a system, component, or process to meet desired needs.
- ABET D: Ability to function on multidisciplinary teams.
- ABET E: Ability to identify, formulate and solve engineering problems.
- ABET F: Understanding of professional and ethical responsibility
- ABET G: Ability to communicate effectively;
- ABET H: The broad education necessary to understand the impact of engineering solutions in a global and societal context;
- ABET I: Recognition of the need for and an ability to engage in life-long learning;
- ABET J: Knowledge of contemporary issues
- ABET K: Ability to use the techniques, skills and modern engineering tools necessary for engineering practice