MAT 492 Mathematics Capstone II

Department of Mathematics

Southern Connecticut State University

I. Catalog Description

In the second semester of the capstone project, senior-level mathematics majors explore an advanced topic and draw connections to the mathematics they learned in previous courses. Students work with a faculty mentor to finalize their written project and oral presentation.

II. Purpose

Regardless of the kind of capstone project undertaken, the capstone project must demonstrate that the student has confronted, interacted with, or done some substantial mathematics. The mathematics may consist of proving original theorems, solving research problems, verifying nontrivial details in published proofs, or devising original examples to illustrate concepts.

It's important to note the capstone project may not consist only of reproducing class notes from a course taken by the student, copying mathematics in an essentially verbatim fashion from sources, merely describing mathematical procedures without explaining their derivation, or some combination of these. No doubt some of the preceding will occur in some capstone projects (in some cases it may be appropriate), but the project cannot consist entirely of this kind of material.

III. Credit

MAT 492 carries three semester-hours of university credit. It is required of mathematics majors.

IV. Prerequisites

MAT 491

V. Format

MAT 492 meets for 2 contact hours per week throughout a standard academic semester and is conducted primarily in a discussion format. In addition, there will be weekly office hours for each student (to be arranged).

VI. Course Objectives

Upon completion of MAT 492 students should:

A. Read and learn mathematics independently;

B. Make rigorous mathematical arguments;

C. Precisely articulate (both in writing and orally) complicated and technical arguments

D. Submit a written project paper and revise the paper using the "referee's" report

E. Present the capstone project to the class and possibly at a local conference.

VII. **Outline**:

A. Weeks $1-2$: Finalize topic choice, in consultation with the instructor, by the end of Week 2.

B. Weeks $2-4$: Either find journal articles related to the topic or begin original research on the topic. This will require looking through relevant journals for articles and open problems.

C. Weeks $4-10$: Based on original research or the articles found, using LaTeX, write a mathematics paper with mathematical proofs, where the proofs are written in the student's original words.

D. Weeks $11-15$: Revise the mathematics paper and create a Beamer presentation, with the assistance of the supervisor.

E. Week 16: Presentations during final exams week

VIII. **Assessment**

To help ensure that the student is doing appropriate work and is maintaining progress in completing the project, the student and project advisor will meet regularly at mutually agreed upon times.

The grade for the capstone project is largely a reflection of how well this has been demonstrated and to what degree the above course objectives have been met.

Possible Grading Scheme:

Project Presentation	35%
Participation at other Presentations	6%
Capstone Project	40%
Attendance at Weekly Meetings	12%
Reflection Paper on Writing Project	7%

IX. **Recommended Texts**

None

X. **Waiver Policy**

This course may be waived.

XI. **Bibliography**

A. `https://www.hmc.edu/mathematics/wp-content/uploads/sites/49/2018/09/thesis_handbook_2019.pdf`

XII. **Preparation**

Proposed outline prepared by K. Kruczek and A. Clark, Fall 2022.

Approved by the MDCC, October 4, 2022.

Approved by the Mathematics Department, October 20, 2022.