Capstone I AY16 Program Review: Program Outcomes and Capstone Assignment Alignment
MATHEMATICS

Program Learning Outcomes (PLOs)

Graduates from the Mathematics Program will have demonstrated proficiency in the following four areas:
- Content Knowledge: demonstrate a broad-based knowledge of mathematical content and technique.
- Problem Solving: demonstrate problem-solving skills in the context of mathematics, and the ability to apply techniques learned in the study of specific topics in new areas.
- Inquiry and Analysis: employ the skills of independent, careful analysis of mathematical exposition.
- Communication: use written and oral communication.

Capstone Assignment

MATH 407: Capstone
Students complete an original written project that demonstrates proficiency in Mathematical Notation, Depth and Accuracy, Concise Writing and Organization, Logical Flow, and Referencing. Capstone students also present their research orally, demonstrating proficiency in Organization, Verbal Communication, Depth of Content, Accuracy of Understanding, and Use of Media.

The following rubric is used to assess students' written capstone paper:

MATH 407 Rubric – Written Communication

Criteria	Proficient	Competent	Developing
Use of Mathematical Notation & Definitions (COMMUNICATION)	The paper uses accurate and appropriate mathematical notation, definitions, and terminology	Most, but not all, the notation, definitions, and terminology is used accurately. Errors are identifiable and correctable by a reader of experience similar to the author.	Notation, terminology, and/or definitions are frequently misused. The writer may use personal rather than standard notation. Missing definitions compromise the paper beyond repair.

Criteria	Proficient	Competent	Developing
Depth and Accuracy of Content (INQUIRY/ANALYSIS)	Selected topic was of a depth appropriate for a senior undergraduate math major, not duplicated in EOU course curriculum, and analyzed to a depth appropriate for the undergraduate level. Attempts at original mathematical research were clearly present.	Topic had modest overlap with EOU course curriculum, was at a depth appropriate for an undergraduate math major, but not at the senior level, or was analyzed to a depth that was somewhat lacking.	Topic had significant overlap with EOU course curriculum, or lacked depth or analysis appropriate for an undergraduate math major.
Concise Writing and Organization (COMMUNICATION)	The paper is well-organized and succinct, without inclusion of irrelevant definitions, theorems, or examples.	The paper is generally well-organized but includes some unnecessary definitions, irrelevant examples and/or theorems which distract from the overall flow.	The paper has multiple disconnected ideas with no clear flow or purpose.
Logical Flow (INQUIRY/ANALYSIS)	The paper presents a topic with a clear flow from introduction through examples and necessary proofs	The paper generally has a clear flow, but would be more comprehensible if topics had been reordered.	The paper is missing important topics to make its flow clear and understandable.
References (COMMUNICATION)	The paper accurately references necessary prior works.	Some references necessary to the deductions are missing, misused, or stated inaccurately.	References are generally lacking, or the theorems in question are stated inaccurately.

The following rubric is used to assess students' oral capstone presentation:

MATH 407 Rubric – Oral Communication

Criteria	Proficient	Competent	Developing
Organization (COMMUNICATION)	Presentation was well organized. The order and flow of the concepts	Presentation had a degree of organization, but multiple	Presentation lacked organization to a degree where even the foundational concepts of the

Criteria	Proficient	Competent	Developing
	and examples made the content easy to follow.	significant changes would have made the presentation more clear.	content were difficult to understand.
Effectiveness of Verbal Communication (COMMUNICATION)	Speech was clear and articulate. Mathematical terms were used accurately and appropriately.	Speech lacked some clarity, but not enough to disrupt understanding. Mathematical terms were, with few exceptions, used accurately and appropriately.	Speech was awkward to a point where it distracted from understanding. Mathematical terms were consistently misused.
Depth of Content (ANALYSIS/INQUIRY)	The content of the presentation was at a level that was both accessible and new to senior math majors at EOU.	The content of the presentation either had substantial overlap with content that would already be familiar to senior math majors at EOU or was at a level beyond what such an audience could be expected to understand with their prior knowledge.	The content of the presentation was entirely material routinely covered in EOU courses.
Accuracy of Understanding (ANALYSIS/INQUIRY)	Presenter demonstrated a complete understanding of all major concepts and minor details in the talk and was able to give clear answers to audience questions.	Presenter demonstrated a complete understanding of all major concept in the talk, but lacked significant understanding of some minor details and/or was unsure of answers to audience questions.	Presenter had a lack of understanding of at least one major concept in the talk and was unable to accurately answer listener questions.
Effective Use of Media (COMMUNICATION)	Use of classroom media (chalkboard, transparencies, Beamer slides, etc.) were clear and used effectively to convey the content of the presentation.	Use of classroom media was generally effective, but additional efforts in this regard would have made the presentation more clear.	The use of media was ineffective and distracted from the clarity of the presentation.

Closing the Loop Statement

The Written Communication and Oral Communication Rubrics used to assess capstone projects ensure students demonstrate proficiency (or adequacy) all program outcomes. Mathematics PLOs are perfectly aligned with the capstone assignment.

Action Plan: N/A