

Bachelor's Degree Program in Mathematics

Mission

The Mathematics and Statistics Department is committed to engaging a diverse range of students in the active study and creative application of the principles, ideas and methods that characterize the mathematical sciences and to provide students with the tools needed for life-long learning.

Vision

Our students gain the reputation, through employment success stories with regional corporations and educational institutions, as top-notch teachers and mathematicians, uniquely equipped with the skills needed to be leaders in their field.

Goals and Associated Outcomes for the Senior Assignment

Goal 1: Graduates will have acquired a firm foundation of knowledge of fundamental mathematical concepts, methods, language, and modes of reasoning sufficient to support further academic work or careers in fields that require mathematical understanding.

Outcomes: The student exhibits the ability to:

- (a) Use important definitions and results correctly.
- (b) Apply mathematical results and procedures to concrete problems.
- (c) Generate straightforward extensions of mathematical procedures and results.
- (d) Analyze quantitative data using appropriate mathematical tools.

Goal 2: Graduates will be able to communicate mathematical ideas and results clearly and with appropriate precision, both orally and in writing.

Outcomes: The student exhibits the ability to:

- (a) Use mathematical notation and terminology correctly.
- (b) Organize computations and proofs clearly and logically.
- (c) Explain the reasoning that supports solutions to mathematical problems.

Goal 3: Graduates will have acquired sufficient mathematical background and experience to use the professional literature to progress further on their own.

Outcomes: The student exhibits the ability to:

- (a) Use the professional literature (journal articles, articles available on the web, higher-level textbooks, etc.) to write a paper on a mathematical topic not covered in formal study.

W# stands for Written Part # and O# stands for Oral Part Question #

| Goals/Outcomes | Exceeds Expectations | Meets Expectations | Does Not Meet Expectations | Where are the Outcomes Assessed? |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| The student uses important definitions and results correctly. | Uses appropriate terms and results in a complete, clear, coherent manner. Presents strong supporting arguments with diagrams as needed. | Gives a fairly complete response that is reasonably clear and may include an appropriate diagram. | Fails to show complete understanding of ideas. Shows little understanding of problem situation. | W2 O3 O4 O6 |
| The student applies mathematical results and procedures to concrete problems. | Uses appropriate mathematical/statistical results and procedures to the problem at hand. Includes a precise explanation of why these apply. | Uses necessary approaches but some errors or omissions occur during the explanation process. | Completes project with incorrect or inappropriate results. Shows some minor understanding but errors/omissions make the project not satisfactory. | W6 O4 O7 |
| The student analyzes quantitative data using appropriate mathematical tools. | Uses correct methodology to answer the questions of interest. Assumptions are clearly stated and appropriate graphics (if necessary) provided. | Uses correct methodology to answer most questions of interest. Occasionally fails to state important assumptions and to provide relevant graphics. | Student did not apply the correct methodology to answer most questions or shows incoherent approach to questions of interest. | W4 O6 O7 |
| The student uses mathematical notation and terminology correctly. | Student uses proper notation throughout the paper. | Student makes only a minor number of mistakes with regard to notation. | Student shows a complete misunderstanding of notation to the point that the paper is unreadable. | W3 O3 O7 |
| The student organizes computations and proofs clearly and logically. | Student submits a professional looking report that is well-organized and easy to read. The paper provides adequate introduction. Theorems are clearly stated and proofs/derivations are explained in a way that the reader can easily follow. | Student makes only minor mistakes in the presentation of the project. Most of the information provided is clear and proofs/derivations are explained in such a way so minor or no misunderstandings occur. | Student fails to make the project clear to the reader and also fails to make the project well-organized and professional looking. | W1 O1 W4 O4 W6 O5 |

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| <p>The student explains the reasoning that supports solutions to mathematical problems.</p> | <p>Student gives a thorough interpretation of the results that is correct and appropriate for the questions of interest. Student uses clear and concise mathematical language to describe the results of the project.</p> | <p>Student gives a correct interpretation, but reasoning is not complete. This may occur when student gives bare-bones answers to questions and does not give complete answers.</p> | <p>Student makes sufficient mistakes concerning interpreting results and making conclusions.</p> | <p>W3 O2 W4 O3 O4 O7</p> |
| <p>The student exhibits the ability to use the professional literature to write a paper on a mathematical topic not covered in formal study.</p> | <p>Student submits a project displaying a complete response to the problem set forth. The general analysis and write-up is correct, clear and coherent, communicating the problem and the relevant mathematics effectively to the audience. Proofs/derivations are adequately explained and appropriate references are listed.</p> | <p>Student submits a project displaying a complete solution to the problem set forth, but the explanation may be unclear in places. There may be minor mathematical mistakes or understanding of the underlying concepts may not be displayed in a convincing manner. Appropriate references are listed.</p> | <p>Student does not provide a complete solution to the problem set forth. His/her explanations lack coherence and/or clarity. Big mathematical errors or major flaws in the proofs may be present.</p> | <p>W5 O1 O4 O5 O8</p> |

REFERENCES

1. An Assessment Program Built Around a Capstone Course, by Charles Peltier, MAA NOTES#49
2. Cleveland State University Assessment Report
3. 21st century education: a reference handbook, Vol. 1, by Thomas L. Good
4. Charles, Randall, Lester, Frank and O'Daffer, Phares. *How to Evaluate Progress in Problem Solving*. Reston, VA: National Council of Teachers of Mathematics, 1987.
5. Stenmark, Jean, *Mathematics Assessment: Myths, Models, Good Questions and Practical Suggestions*. Reston, VA: National Council of Teachers of Mathematics, 1991.
6. Assessing a Major in Mathematics, by Laurie Hopkins, MAA NOTES#49
7. New Mexico Higher Education Department, Core Competencies Assessment