

APPLIED MATHEMATICS (GRADUATE CERTIFICATE)

Award: Graduate Certificate
Program of Study: Applied Mathematics
Program Code: 7441

This program is no longer accepting new students.

This program leads to a Graduate Certificate in Applied Mathematics with an option to complete a Master of Arts degree in Education. This 18-credit hour program is designed to be completed in a two-year cycle, and serves several purposes:

1. The program is intended to provide licensed secondary mathematics teachers the credentials required by the Higher Learning Commission to teach concurrent college or university mathematics courses.
2. The program enables professionals interested in enhancing their knowledge of applied mathematics an opportunity to take individual courses and/or earn a graduate certificate in the subject area.
3. The program provides an opportunity for post-graduates to take courses that serve as a bridge between a baccalaureate degree and a master's degree in mathematics or related field. In this case the transferability of the courses towards a specific master's degree (other than the Master of Arts in Education) is not guaranteed and would depend on the individual masters programs.

Important information about this program

- A bachelor's degree from an accredited college is required, preferably in mathematics, mathematics education, or an area with a significant mathematics requirement.
- It is strongly recommended that applicants have completed 18-24 hours of undergraduate mathematics courses, including at least two semesters of calculus, a course in probability and statistics, and a course that includes writing mathematical proofs. Each applicant should address how their background relates to these recommendations in their letter of intent (see below), and discuss any particular strengths if they do not meet these recommendations.
- A fully completed application including official transcripts is required prior to beginning the program, two letters of recommendation (one page in length) and a letter of intent that provides information about the student's background, interests, and aspirations, and how they relate to the Graduate Certificate in Applied Mathematics.
- For additional information on applicable policies, please refer to the Graduate Policies and Procedures Manual.

Graduate certificates will, at a minimum, align with either two Masters student learning outcomes or two Doctoral student learning outcomes, depending on certificate level. Certificates may choose to use more than two student learning outcomes, if desired. In addition to these campus-wide student learning outcomes, all recipients of this Graduate Certificate will be able to:

1. Employ mathematical, computational and/or statistical methods to address topics in applied mathematics (specialized knowledge/applied learning, quantitative fluency);
2. Create oral and written arguments, well-grounded in theories and methods of applied mathematics (communication fluency, quantitative fluency);

3. Formulate and evaluate hypotheses related to applied problems, issues, concepts, and perspectives (critical thinking, quantitative fluency).

Requirements

Each section below contains details about the requirements for this program. Select a header to expand the information/requirements for that particular section of the program's requirements.

To print or save an overview of this program's information, including the program description, learning outcomes, requirements, suggested course sequencing (if applicable), and advising and graduation information, scroll to the bottom of the left-hand navigation menu and select "Print Options." This will give you the options to either "Send Page to Printer" or "Download PDF of This Page." The "Download PDF of This Page" option prepares a much more concise presentation of all program information. The PDF is also printable and may be preferable due to its brevity.

Institutional Graduate Degree Requirements

The following institutional requirements apply to all CMU graduate-level degrees. Specific programs may have different requirements that must be met in addition to institutional requirements.

- Graduate certificates consist of a minimum of 5 credit hours. Master's degrees consist of a minimum of 30 credit hours. Doctoral degrees consist of a minimum of 60 credit hours.
- All credits in a graduate program must be minimally at the 500-level.
- At least fifty percent of the credit hours must be taken at CMU.
- Students must achieve a 3.00 cumulative GPA or higher in all CMU coursework.
- Students may not apply coursework with a grade lower than a "B" toward graduation requirements.
- A course may only be used to fulfill one requirement for each degree/certificate.
- Capstone exit assessment/projects (e.g., Major Field Achievement Test) requirements are identified under Program-Specific Requirements.
- The Catalog Year determines which program sheet and certificate requirements a student must fulfill in order to graduate. Visit with your advisor or academic department to determine which catalog year and program requirements you should follow.
- See "[Graduate Degree Requirements](#)" in this catalog for a complete list of graduation requirements.
- All policies for graduate certificates are outlined in the [Graduate Policies and Procedures Manual](#), which is provided on the [Graduate Studies website](#).

Program Specific Requirements

(18 semester hours, must pass all courses with a grade of "B" or better.)

| Code | Title | Semester Credit Hours |
|-------------------------|---|-----------------------------|
| Required Courses | | |
| MATH 500 | Introduction to Graduate Studies in Applied Mathematics | 3 |
| MATH 510 | Applied Probability and Statistics | 3 |

| | | |
|--|---|-----------|
| MATH 520 | Applied Numerical Methods | 3 |
| Restricted Elective Courses | | |
| Select 9 credits from the following courses: | | 9 |
| MATH 530 | Applied Mathematical Modeling | |
| MATH 540 | Applied Audio and Image Processing | |
| MATH 550 | Mathematical Logic and Foundations in Mathematics | |
| MATH 560 | Applied Number Theory | |
| MATH 570 | Applied Cryptography | |
| MATH 596 | Topics | |
| Total Semester Credit Hours | | 18 |

Suggested Course Plan

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|------------------------------------|---|------------------------------|
| First Year | | |
| Summer Semester | | Semester Credit Hours |
| MATH 500 | Introduction to Graduate Studies in Applied Mathematics | 3 |
| Semester Credit Hours | | 3 |
| Fall Semester | | |
| MATH 510 | Applied Probability and Statistics | 3 |
| Semester Credit Hours | | 3 |
| Spring Semester | | |
| MATH 520 | Applied Numerical Methods | 3 |
| Semester Credit Hours | | 3 |
| Second Year | | |
| Summer Semester | | |
| Restricted Elective | | 3 |
| Semester Credit Hours | | 3 |
| Fall Semester | | |
| Restricted Elective | | 3 |
| Semester Credit Hours | | 3 |
| Spring Semester | | |
| Restricted Elective | | 3 |
| Semester Credit Hours | | 3 |
| Total Semester Credit Hours | | 18 |

Advising and Graduation

Advising Process and DegreeWorks

Documentation on the pages related to this program is intended for informational purposes to help determine what courses and associated requirements are needed to earn a certificate. Some courses are critical to complete in specific semesters while others may be moved around. Meeting with an academic advisor is essential in planning courses and discussing the suggested course sequencing. It is ultimately the student's responsibility to understand and fulfill the requirements for their intended certificate.

DegreeWorks is an online degree audit tool available in MAVzone. It is the official record used by the Registrar's Office to evaluate progress towards a certificate and determine eligibility for graduation. Students are responsible for reviewing their DegreeWorks audit on a regular basis and should discuss questions or concerns with their advisor or academic department head. Discrepancies in requirements should be reported to the Registrar's Office.

Graduation Process

Students must complete the following in the first two months of the semester prior to completing their certificate requirements (for one-semester certificates, complete in the first week of class):

- Review their DegreeWorks audit and create a plan that outlines how unmet requirements will be met in the final semester.
- Meet with their advisor and modify their plan as needed. The advisor must approve the final plan.
- Submit the "Intent to Graduate" form to the Registrar's Office to officially declare the intended graduation date and commencement ceremony plans.
- Register for all needed courses and complete all requirements for each degree sought.

Submission deadlines and commencement details can be found on the [Graduation](#) web page.

If a student's petition for graduation is denied, it will be their responsibility to apply for graduation in a subsequent semester. A student's "Intent to Graduate" does not automatically move to a later graduation date.