

**Ateneo de Manila University**  
**Mathematics Department, School of Science and Engineering**  
**MASTER OF SCIENCE IN MATHEMATICS EDUCATION**  
**(Effective June, 2016)**

**0. Prerequisite Non-Credit Courses (6 units)**

(Depending on the Graduate Admission Test Verbal Subtest Score of student)

En 212.3 Effective Communication Skills	(3)
En 212.7 Oral Presentation Skills for Teachers	(3)

**I. Core Courses (9 units)**

Stat 210	Basic Statistical Analysis	3
Ed 201	Methods and Materials of Research	3
MathEd 210	Curriculum and Instruction in Mathematics	3

**II. Major Courses (18 units)**

1. Any four (4) graduate level courses in mathematics (based on the content preparation of the student)

Ma 204	Introduction to the Foundations & Structure of Mathematics	3
Ma 206	Modern Concepts in Mathematics	3
Ma 212	High School Geometry from an Advanced Viewpoint I	3
Ma 215	Modern Algebra and Trigonometry	3
Ma 220	Analysis for Teachers I	3
Ma 221	Analysis for Teachers II	3
Ma 224	Linear Algebra and Matrix Theory	3
Ma 226	An Introduction to Probability	3
Ma 230	Elementary Statistics	3
Ma 234	Elementary Number Theory	3
Ma 240B	Seminar in Topics in Algebra	3
Ma 240F	Seminar in Combinatorics	3
Ma 240G	Seminar in Methods of Proof	3
Ma 240H	Seminar in Finite Mathematics	3
Ma 240J	Seminar in Discrete Mathematics	3
Ma 240K	Seminar in Contemporary Mathematics	3
Ma 240T	Seminar in Abstract Algebra	3
Ma 241	Seminar in Linear and Abstract Algebra	3

2. Any one (1) course under any of the MathEd 295 courses

MathEd 295c	Strategies on Classroom Teaching in Mathematics	3
MathEd 295d	Seminar on Research in Mathematics Education	3
MathEd 295e	Seminar on Testing and Evaluation in Mathematics	3
MathEd 295h	Seminar on Technology in Mathematics Education	3
MathEd 295p	Seminar on Psychology of Mathematics Instruction	3

3. Psych 255.12 Seminar in Human Development: Learning Processes in Mathematics and Science, 3 units

### III. Electives (6 units)

One MathEd 295 course, 3 units

One from any of the 200-level Mathematics courses, the suggested courses offered by the Education Department or SA 206 Research Techniques, 3 units

### IV. Comprehensive Examination

Upon satisfactory completion of the 9 units Core/Foundation courses, 18 units Major courses and 3 units of Elective courses, the student may formally apply to take the comprehensive examination divided into 3 sets:

CE 1: Mathematics Content (12 or 15 units)

CE 2: Mathematics Education (MathEd 210, MathEd 295 courses, Education Elective)

CE 3: Research and Related Fields (Psych 255.12, Stat 310, Ed 201, SA 206)

### V. Thesis (6 units)

The first 3 units of thesis may be taken before or in the same semester as the student takes the comprehensive examination. The candidate may pursue one of two types of thesis:

TH A: Full educational research study

TH B: 3-paper thesis consisting of a teaching module, a math content expository paper, and a discussion paper on a current mathematics education issue

### TOTAL NUMBER OF UNITS: 39 (6)

#### Summary of Units

0.	Prerequisite Non-Credit	(6)
I.	Core/Foundation	9
II.	Major Courses	18
III.	Cognates/Electives	6
IV.	Comprehensive Examination	0
V.	Thesis	6
<b>TOTAL:</b>		<b>39 (6)</b>

#### Requirements for Graduation

1. Passing grade in all courses
2. Passing grade in Comprehensive Examination
3. Bound Thesis
4. Proof of a paper presentation in a national conference in mathematics education (while enrolled in the program)

## **Guidelines on the Thesis for the M.S. MATHED Program**

The thesis is a master's student's ultimate proof of scholarly achievement in his or her chosen field of specialization. For students of the M.S. in Mathematics Education program, two options are available: a 3-Paper Thesis or a full educational research study.

### *TH A: Full Educational Research Study*

The first type is a full educational research that attempts to answer questions about the teaching and learning of mathematics. As such, this type of thesis requires the following:

- a clearly articulated problem;
- a theory and conceptual framework from which to view the problem
- a well-researched literature related to the problem;
- an organized methodology for collecting and analyzing data
- a thorough discussion of the merits and implications of the research results

This is a master's level thesis. As such, the document is not expected to generate a new theory in mathematics education. It deals with problems that can be investigated over a period of 2 academic terms. This type of research will be evaluated according to the following:

- Quality of the problem – The problem is real and important to mathematics education
- Usefulness of the related literature – The literature should enlighten the problem at hand
- Appropriateness of data collection and analysis methods
- Correctness of the interpretation of results
- Depth in the discussion of the implications of results

### *TH B: 3-Paper Thesis*

The student has the option to produce 3 short papers that reflect the same level of scholarly achievement as the full thesis. The three papers must consist of the following:

- 1 teaching module;
- 1 content paper;
- 1 discussion paper

#### i. Teaching Module

This paper presents a set of extended lesson plans on a topic (e.g. matrices) or a set of skills (e.g. graphing). The teaching module should consist of activities or problems that are novel, illuminating, useful, practical, and can be implemented. The module should reflect a high degree of planning and thought by the student. This paper should contain the following:

- Module description
- Theoretical or conceptual framework
- Pre-test and Post-test
- The teaching modules
- Answers to exercises

- This paper will be evaluated according to the following:
- Appropriateness and clear discussion of the theoretical or conceptual framework
  - Correctness and quality of the Pre-test and Post-test
  - Quality of the teaching modules (using the criteria above)

#### ii. Content Paper

This paper presents an extensive discussion on any content topic in mathematics. The paper requires the following:

- a clearly articulated problem;
- a well-researched literature related to the chosen topic;
- a thorough presentation of preliminary concepts, and;
- a deep discussion of the topic leading to a complete solution of the stated problem or, at the very least, to a variety of hints that would lead to a solution of the problem.

This paper will be evaluated on the following criteria:

- nature of the topic – The chosen topic must not be self-limiting. It leads to further knowledge in mathematics.
- quality of the discussion of preliminary concepts – The discussion is logical and meaningful.
- correctness of the solution or approach to the problem – The solution or hints to the solution of the problem are illuminating
- sense of completeness of thought – The paper should reflect a complete work, with implications for possible extensions.

#### iii. Discussion Paper

This paper presents a clear and thorough discussion of a problem or issue in mathematics education. The problem or issue must be current and real and may be in areas such as curriculum, assessment, pedagogy, and cognition. A literature review must be included. The intent of the paper is to discuss the various solutions that have been proposed including other solutions that the student recommends. It is not expected that the problem or will be completely resolved in this paper but it is hoped that this paper will enlighten mathematics educators with regard to the problem or issue. This paper must contain:

- a clear statement of the problem or issue
- literature review
- a discussion of proposed solutions
- summary, conclusions, recommendations.

The paper will be evaluated on the basis of the following:

- significance of the problem
- quality of the literature review
- depth of the discussion
- correctness of conclusions and recommendations