Iligan Institute of Technology
of the Mindanao State University
Quality Education for a better Mindanao

MASTER OF SCIENCE EDUCATION

Rationale

Appraisal of the MASE & MAME Programs as an integral part of its improvement was conducted by a group of faculty members from the different concerned colleges. A summary of the findings and synthesized suggestions have been considered to institute desired changes for an effective operation of the on-going program for dynamism and vision for excellence in science and technology. Moreover, these envisioned changes cater to the present and future needs of the learner and society. Thus, the new program is MASTER OF SCIENCE EDUCATION (MSciEd)

Objectives

The Master of Science Education program of the department of Science and Mathematics Education aims to upgrade teachers in the areas, namely; instruction, research and extension. Specifically, it is to:

1. enhance competence of science and mathematics teachers in content and pedagogy and make their training relevant to the needs of the community;
2. develop in them understanding of the relatedness of the sciences and their application to daily living; and,
3. enhance their leadership qualities and capabilities in Science and Mathematics education research.

Academic Requirements

1. Possession of:
   BEEd major in Science or Mathematics / BSEd major in Sciences – Biology, Chemistry, Physics, and Mathematics
   BS Science related degrees with at least 18 units of education subjects and 18 units of the undergraduate Science and Math courses in the major applied for,

2. Transcript of Records

3. A grade point average of 2.0 or its equivalent in the undergraduate Science and Math courses.

4. Complete application form of the MSU-IIT Graduate School

5. Two (2) letters of recommendation from former undergraduate faculty attesting to the student's intellectual capacity for graduate studies.

Degree Requirements

To qualify for the Master of Science Education, a student must have:

1. successfully completed at least 36 units of the course work specified in the program of study of the chosen option or specialization with a grade point average of 2.0 or better.
2. passed the comprehensive examination.
3. successfully defended the thesis and submitted the bound copies.

Types of Students

- Full-time student has semestral load of 9 to 12 units
- Part-time students has semestral load of less than 6 to 9 units

Classes are held on Friday 5:00 – 9:00 PM and on Saturdays
(To accommodate working students and those commuting from neighboring areas.)

Summary of Units

A. Education Courses	-	9 units
B. Research	-	6 units
C. Major Courses	-	21 units
TOTAL		**36 units**

Program of Study

A. EducationCourses:		**Units**
Educ 206	Methods of Research and Statistics	3
Educ	Foundations of Education	3
Sci. Ed 205	Curriculum Development in Science and Mathematics	3
		9

(Above courses are common to MSci. Ed. – Biology, Chemistry, Physics, Elem. Math and Sec. Math)
Sci Ed 209B Science Teaching Strategies & Techniques (for General Science and in lieu of Sci Ed 205)

B. Specialization Courses

Major in Biology		**Units**
Bio 211	Advanced Systematics	3
Bio 221	Advanced Ecology	3
Bio 241	Advanced Physiology	3
Bio 251	Advanced Genetics	3
Sci Ed 213	Special Topics in Biology	3
Bio Ed 300	Thesis	6
Electives:		(6 units)
Bio Ed 213	Multimedia Technology	3
Sci. Ed 228	Environmental Education	2
Chem 204	Advanced Biochemistry	3
Bio Ed 290	Seminar in Biology Ed	1
	Required number of units	27

Major in Chemistry **Units**

Chem 201	Analytical Chemistry	2
Chem. 202	Instrumental Method	3
Chem 203	Organic Chemistry	3
Chem 205	Inorganic Chemistry	3
Chem 207	Physical Chemistry	3
Chem 289	Environmental Chemistry	3
Chem Ed 253	Sec. School Chemistry	3
Chem Ed 290	Seminar in Chemistry Education	1
Chem Ed 300	Thesis	6
	Required number of units	27

Major in Physics **Units**

Phys 201	Classical Mechanics	3	
Phys 202	Classical Electromagnetism	3	
Phys 203	Thermodynamics & The Kinetic Theory	3	Phys 204
Modern Physics I 3			
Phy Ed 251	Selected Topics in Mathematical Physics	3	
Phy Ed 253	Secondary School Physics	3	
Phy Ed 257	Selected Topics in Physics	1	
Sci Ed 228	Environmental Education	2	
Phy Ed 290	Seminar in Physics Ed.	1	
Phy Ed 300	Thesis	6	

Elective

Phys 205	Modern Physics II	3
	Required number of units	31

Major in General Science **Units**

Sci. Ed. 220	Selected Topics for Mathematics Teacher	2
Sci. Ed. 230	Conceptual Physics	4
Sci. Ed 240	Conceptual Chemistry	4
Sci. Ed. 250	Earth and Space Science	4
Sci. Ed. 260	Concepts in Biology and Ecology	4
Sci. Ed. 264	Anatomy, Physiology & Herbal Medicine	3
Sci. Ed. 300	Thesis	6
	Required number of units	27

Major in Elementary Mathematics **Units**

Math Ed 230	Fundamental Concepts of Elementary Math	3
Math Ed 231	Geometry	3
Math Ed 232	Algebra	3
Math Ed 233	Trigonometry	3
Math Ed 290	Seminar in Math Education	1
Sci Ed 228	Environmental Ed.	2
Math Ed 300	Thesis	6

Electives: (6 units)

Math 206	Theory of Numbers	3
Math 201	Set Theory	3
Math Ed 238	Intermediate Statistics	3
Math 275	Graph Theory	3
Math Ed 240	Computer Education	3
Math Ed 241	Basic Analysis	3

	Required number of units	27

Major in Secondary Mathematics **Units**

Math Ed 234N	Selected Topics in Algebra & Trigonometry	3	
Math Ed 235	Selected Topics in Geometry	3	
Math 201N	Logic and Set Theory	3	
Math Ed 241	Basic Analysis I	3	
Math Ed 290	Seminar in Math Ed.	1	
Sci Ed 228	Environmental Education	2	
Math Ed 300	Thesis	6	

Electives: (6 units)

Math 206	Theory of Numbers	3	
Math 201	Set Theory	3	
Math Ed 238	Intermediate Statistics	3	
Math 275	Graph Theory	3	
Math 221.1	Fundamental of Linear Algebra	3	Math 225.1
Fundamental of Abstract Algebra		3	
Math Ed 240	Computer Education	3	

	Required number of units	27	

MAJOR IN BIOLOGY

(LIST OF COURSES BY SEMESTER)

(For Full Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Bio 221		3	2	3	3	
Bio 241		3	2	3	3	
Bio Ed 213 or Sci Ed 213		3	2 1	3 6	3	
	Total	12	9 or 8	9 or 12	12	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
SciEd 205		3	3	0	3	
Bio 211		3	2	3	3	
Bio 251		3	2	3	3	
Sci Ed 228		2			2	
	Total	11	9	6	11	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Chem 204		3	3	0	3	
Educ 206		3	3	0	3	
Bio Ed 290		1	1	0	1	
	Total	7	7	0	7	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Bio Ed 300		6			6	
	Total	6			6	

(For Part Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Bio 221		3	2	3	3	
	Total	6	5	3	6	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 205		3	3	0	3	
Bio 211		3	2	3	3	
	Total	6	5	3	6	

First Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Bio 241		3	2	3	3	
Educ 206		3	3	0	3	
	Total	6	5	3	6	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Chem 204		3	3	0	3	
Bio Ed 213 Or Sci Ed 213		3 3	2 1	3 6	3	
	Total	6	5 or 4	3 or 6	6	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Bio 251		3	2	3	3	
Sci Ed 228		2	2	0	2	
Bio Ed 290		1	1	0	1	
	Total	6	5	3	6	

Second Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
	Comprehensive Examination					
	Total					

Third Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Bio Ed 300		6			6	
	Total	6			6	

Third Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Bio Ed 300		3			3	
	Total	3			3	

MAJOR IN CHEMISTRY

(LIST OF COURSES BY SEMESTER)

(For Full Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Chem 201		2	2	0	2	
Chem 202		3	2	3	3	
Chem Ed 253		3	2	3	3	
	Total	11	9	6	11	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci. Ed 205		3	3	0	3	
Chem 203		3	3	0	3	
Chem 205		3	3	0	3	
Chem. 289		3	3	0	3	
	Total	12	12	0	12	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 206		3	3	0	3	
Chem 207		3	3	0	3	
Chem Ed 290		1	1	0	1	
	Total	7	7	0	7	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Chem Ed 300		6			6	
	Total	6			6	

(For Part Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Chem 202		3	2	3	3	
	Total	6	5	3	6	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci. Ed 205		3	3	0	3	
Chem 203		3	3	0	3	
	Total	6	6	0	6	

First Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Chem 205		3	3	0	3	
Chem Ed 206		3	3	0	3	
	Total	6	6	0	6	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Chem 207		3	3	0	3	
Chem Ed 253		3	2	3	3	
	Total	6	5	3	6	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Chem 201		2	2	0	2	
Chem. Ed 290		1	1	0	1	
Chem 289		3	3	0	3	
	Total	6	6	0	6	

Second Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
	Comprehensive Examination					
	Total					

Third Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Chem Ed 300		6			6	
	Total	6			6	

MAJOR IN PHYSICS
(LIST OF COURSES BY SEMESTER)

(For Full Time Students)
First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Phy Ed 253		3	2	3	3	
Phys 204		3	3	0	3	
Phy Ed 251		3	3	0	3	
	Total	12	11	3	12	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 205		3	3	0	3	
Phys 201		3	3	0	3	
Phys 202		3	3	0	3	
Sci Ed 228		2	2	0	2	
	Total	11	11	0	11	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 206		3	3	0	3	
Phys 203		3	3	0	3	
Phy Ed 290		1	1	0	1	
Phy Ed 257		1	1	0	1	
Phys 205		(3)	(3)	0	3	
	Total	8 or (11)	8 or (11)	0	11	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Phy Ed 300		6			6	
	Total	6			6	

(For Part Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/ 202/203		3	3	0	3	
Phys 204		3	3	0	3	
	Total	6	6	0	6	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 205		3	3	0	3	
Phys 202		3	3	0	3	
	Total	6	6	0	6	

First Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 206		3	3	0	3	
Phys 201		3	3	0	3	
	Total	6	6	0	6	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Phys Ed 253		3	2	3	3	
Phys Ed 251		3	3	0	3	
Phys Ed 257		1	1	0	1	
	Total	7	6	3	7	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 228		2	2	0	2	
Phys Ed 290		1	1	0	1	
Phys 203		3	3	0	3	
	Total	6	6	0	6	

Second Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
	Comprehensive Examination					
	Total					

Third Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
PhyEd 300		6			6	
	Total	6			6	

MAJOR IN GENERAL SCIENCE
(LIST OF COURSES BY SEMESTER)

(For Full Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
SciEd 220		2	2	0	2	
SciEd 230		4	3	3	4	
SciEd 260		4	3	3	4	
	Total	10	8	6	10	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Sci Ed 240		4	3	3	4	
Sci Ed 250		4	3	3	4	
	Total	11	9	6	11	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 206		3	3	0	3	
Sci Ed 209B		3	3	0	3	
Sci Ed 264		3	3	0	3	
	Total	9	9	0	9	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
	Comprehensive Examination					
	Total					

Third Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 300		6			6	
	Total	6			6	

(For Part Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Sci Ed 230		4	3	3	4	
	Total	7	6	3	7	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 240		4	3	3	4	
Educ 206		3	3	0	3	
	Total	7	6	3	7	

First Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
SciEd 260		3	3	0	3	
	Total	3	3	0	3	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
SciEd 250		4	3	3	4	
Scied 209B		3	3	0	3	
	Total	7			7	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 220		2	2	0	2	
Sci Ed 264		3	3	0	3	
	Total	5	5	0	5	

Second Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
	Comprehensive Examination					
	Total					

Third Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 300		6			6	
	Total	6			6	

MAJOR IN ELEMENTARY MATHEMATICS

(LIST OF COURSES BY SEMESTER)

(For Full Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Sci Ed 205		3	3	0	3	
Math Ed 230		3	3	0	3	
Math Ed 231		3	3	0	3	
	Total	12	12	0	12	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 206		3	3	0	3	
Math Ed 232		3	3	0	3	
Math Ed 290		1	1	0	1	
Sci Ed 228		2	2	0	2	
	Total	9	9	0	9	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math Ed 233		3	3	0	3	
Elective I		3	3	0	3	
Elective II		3	3	0	3	
	Total	9	9	0	9	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math Ed 300		6			6	
	Total	6			6	

(For Part Time Students)

First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/ 202/203		3	3	0	3	
Math Ed 230		3	3	0	3	
	Total	6	6	0	6	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 206		3	3	0	3	
Math Ed 231		3	3	0	3	
	Total	6	6	0	6	

First Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math Ed 232		3	3	0	3	
	Total	3			3	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math Ed 233		3	3	0	3	
Elective I		3	3	0	3	
	Total	6			6	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 228		2	2	0	2	
Math Ed 290		1	1	0	1	
Elective II		3	3	0	3	
	Total	6	6	0	6	

Second Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
	Comprehensive Examination					
	Total					

Third Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math Ed 300		6			6	
	Total	6			6	

MAJOR IN SECONDARY MATHEMATICS
(LIST OF COURSES BY SEMESTER)

(For Full Time Students)
First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/202/203		3	3	0	3	
Sci Ed 205		3	3	0	3	
Math Ed 234		3	3	0	3	
Elective I		3	3	0	3	
	Total	12	12	0	12	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 206		3	3	0	3	
Math Ed 235		3	3	0	3	
Math Ed 290		1	1	0	1	
Sci Ed 228		2	2	0	2	
	Total	9	9	0	9	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math 201		3	3	0	3	
Math 241		3	3	0	3	
Elective II		3	3	0	3	
	Total	9	9	0	9	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
	Comprehensive Examination					
	Total					

Third Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math Ed 300		6			6	
	Total	6			6	

(For Part Time Students)
First Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 201/ 202/203		3	3	0	3	
Math Ed 234		3	3	0	3	
	Total	6	6	0	6	

First Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 205		3	3	0	3	
Elective I		3	3	0	3	
	Total	6	6	0	6	

First Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Educ 206		3	3	0	3	
Elective II		3	3	0	3	
	Total	6	6	0	6	

Second Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math Ed 235		3	3	0	3	
Math 201		3	3	0	3	
	Total	6	6	0	6	

Second Year, Second Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Sci Ed 228		2	2	0	2	
Math Ed 290		1	1	0	1	
Math Ed 241		3	3	0	3	
	Total	6	6	0	6	

Second Year, Summer

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
	Comprehensive Examination					
	Total					

Third Year, First Semester

Course No.	Course Title	Units	Hrs./Wk.			Prerequisite(s)
			Lec	Lab	Total	
Math Ed 300		6			6	
	Total	6			6	

CATALOGUE OF COURSES

EDUCATION COURSES

EDUC 206 METHODS OF RESEARCH AND STATISTICS

Research process, research design, statistics and computer applications. Students are required to submit research proposal at the end of the course.

Credit : 3 units

EDUC. ___ FOUNDATIONS OF EDUCATION

A credit of 3 units is given to any of the following foundation courses:
Educ 201 - Philo. Foundations of Education
Educ. 202 - Psycho. Foundations of Education
Educ. 203 - Socio-Antrho. Foundations of Education

SCI.ED 205 CURRICULUM DEVELOPMENT IN SCIENCE AND MATH

A study of the changing concepts of the curriculum with advance point determinants, composition and curriculum development with planning, designing and evaluation stressed. The role of administrators and teachers for curriculum improvement included.

Credit : 3 units (3 hours lecture/week)

SPECIALIZATION COURSES

MAJOR IN BIOLOGY

BIO 211 ADVANCED SYSTEMATICS

Principles and methods of classification and nomenclature in various living forms.

Credit : 3 units (2 hours lecture and 3 hours lab/week)

BIO 221 ADVANCED ECOLOGY

Principles and concepts underlying ecosystem structure and function in natural environments.

Credit : 3 units (2 hours lecture and 3 hours laboratory/week)

BIO 241 ADVANCED PHYSIOLOGY

Recent developments in general physiology including biosynthetic and metabolic

pathways pertaining to both plants and animals.

Credit : 3 units (2 units lecture and 1 unit laboratory/week)

BIO 251 ADVANCED GENETICS

Biochemical and molecular basis of heredity, biotechnology.

Credit : 3 units (2 hours lecture and 3 hours laboratory/week)

BIO ED 213 MULTIMEDIA TECHNOLOGY

Computer Aided instructional technology development

Credit : 3 units (2 hours lecture/week, 3 hours laboratory/week)

BIO ED 290 SEMINAR IN BIOLOGY EDUCATION

Special seminar topics related to Biology Education.

Credit : 1 unit1 hour /week seminar session

BIO ED 300 THESIS

A research study to be conducted by the master'sstudent related to Science Education/Biology Teaching.

Credit : 6 units

CHEM 204 (CHEM 145) ADVANCED BIOCHEMISTRY

Latest developments in Biochemistry are discussed. Topics include metabolism, nucleic acid, enzymology, biokenetics, and other trends.

Credit : 3 units; 3 hours lecture
Prerequisite(s) : Chem 45

SCIED 213 SPECIAL TOPICS IN BIOLOGY

Recent biological and ecological breakthrough applied to Biology Education

Credit : 3 units (3 hours lecture/week)

SCI.ED. 228 ENVIRONMENTAL EDUCATION

Rationale of Environmental education, curriculum development, teaching strategies, designing projects and then demonstrating them. Reports, classroom experiences, and other devices provide feedback on the implementation of the strategies.

Credit : 2 units (2 hours lecture/week)
Prerequisite(s) : Educational Psychology and methods of Teaching.

MAJOR IN CHEMISTRY

CHEM 201 ANALYTICAL CHEMISTRY

Topics of current interest will be discussed, specifically new methods of qualitative & quantitative analysis. The content of this course shall be taken from current analytical chemistry periodicals.

CHEM. 202 INSTRUMENTAL METHODS

Fundamentals of Chemical Instrumentation, theory and application of electro-analytical spectroscopic and other relevant instrumental methods.

Prerequisite(s) : Chem 28

CHEM 203 ORGANIC CHEMISTRY

Major reactions in organic synthesis: stereochemistry, mechanism, and applications in industry, environment, biosynthesis of natural products and medicine.

CHEM 205 INORGANIC CHEMISTRY

Principles in bonding and structure of inorganic compounds, transition metal complexes, ligand field theory, molecular orbital theory and inorganic reactions.

Prerequisite(s) : Chem 16

CHEM 207 PHYSICAL CHEMISTRY

This course discusses the law of thermodynamics and their applications to chemical systems. Topics include: Gases: First, second and third Laws of Thermodynamics, Thermochemistry, Phase Transformation, Solutions, Chemical Equilibrium, and Electrochemistry.

Prerequisite(s) : Math 61, Physics 11 and Chem 28

CHEM 289 ENVIRONMENTAL CHEMISTRY

The course deals with the nature of air and water pollution; pollutants and their effects on the physical, chemical, & biological processes and interrelationships between man and his environment. It also includes pollution monitoring, control and abatement.

CHEM ED 253 SECONDARY SCHOOL CHEMISTRY

A critical discussion of the approaches by which the fundamentals of chemistry can best be introduced. The course covers the content of the general chemistry

used in secondary schools.

Credit : 3 units

CHEM ED 290 SEMINAR IN CHEMISTRY EDUCATION

Special seminar topics related to Chemistry Education.

Credit : 1 unit (1 hour/week seminar session)

CHEM ED 300 THESIS

A research study to be conducted by the masteral student related to Science Education/Chemistry teaching.

MAJOR IN PHYSICS

PHYS 201 CLASSICAL MECHANICS

A calculus treatment of classical mechanics covering introductory vector analysis, forces, potential energy, gravitation, central forces and planetary motion and dynamics of rigid bodies.

Credit : 3 units (3 hours lecture).

PHYS 202 CLASSICAL ELECTROMAGNETISM

A calculus treatment of classical electromagnetism using vector analysis and partial differential equations. Topics include the concepts of electrostatics, electric fields and potentials, dielectrics, Laplace's equation, magnetic materials, ampere's Law, Faraday's Law of Induction and Maxwell's equation.

Credit : 3 units (3 hours lecture)

PHYS 203 THERMODYNAMICS, KINETIC THEORY AND OPTICS

A calculus treatment of the concepts of heat and temperature, laws of thermodynamics, kinetic theory of gases, Maxwellian molecular velocity, distribution, entropy, waves, geometrical and physical optics, lenses and optical instruments.

Credit : 3 units (3 hours lecture)

PHYS 204 MODERN PHYSICS I

An introduction to the concepts of Modern Physics. Topics include special relativity, Lorenz transformation, photo-electric effect, early atomic theories, Planck's radiation law, Rutherford's atom, de Broglie hypothesis, Bohr atom and

wave properties of matter.

Credit : 3 units (3 hours lecture)

PHYSICS 205 MODERN PHYSICS II

Continuation of Physics 204. Topics include Schroedinger Theory and its application to atomic and molecular physics, material science, nuclear physics and elementary particles.

Credit : 3 units (3 hours lecture)

PHY ED 251 SELECTED TOPICS IN MATHEMATICAL PHYSICS

This is a special course which tackles topics related to mathematics applied to physics, breakthrough/recent development on vector analysis, different equations and other related topics.

PHY ED 253 SECONDARY SCHOOL PHYSICS

Include Differential Equation Units and analytical Physics and Geometry. This course addresses problems in Physics Teaching in High school like misconceptions, etc. it includes lectures textbooks used by selected schools with emphasis in problem solving.

Credit : 3 units (2 hours lecture, 3 hours laboratory/week)

PHY ED 257 SELECTED TOPICS IN PHYSICS

This course includes designing of teaching emits at the high school level on the basic concepts such as laser, plasma, microelectronics, semactivity, photovoltaics and other topics not concerned in regular high school physics subject. It also includes community-based physics activities and teaching units.

Credit : 1 unit (1 hour/week seminar session)

PHY ED 300 THESIS

A research study to be conducted by the master's student related to Science Education/Physics education.

MAJOR IN GENERAL SCIENCE

SCI.ED. 220 SELECTED TOPICS IN MATHEMATICS FOR SCIENCE TEACHERS

Measurements, conversion factors, variables, relationships between variables,

scaling, construction of graphs, and interpretation of graphs.

Credit : 2 units

SCI.ED. 230 CONCEPTUAL PHYSICS

Basic ideas and concepts in Physics which includes mechanics, properties of matter, heat, sound and light, and electricity and magnetism.

Credit : 4 units (3 hours lecture and 3 hours laboratory/week)

SCI.ED. 240 CONCEPTUAL CHEMISTRY

Basic concepts in chemistry including the fundamentals of inorganic and organic chemistry.

Credit : 4 units (3 hours lecture and 3 hours laboratory)

SCI.ED. 250 EARTH AND SPACE SCIENCE

Physical geography, geology, hydrology, meteorology, and astronomy.

Credit : 4 units (3 hours lecture and 3 hours laboratory)

SCI.ED. 260 CONCEPTS IN BIOLOGY AND ECOLOGY

Chemistry of life, cell physiology, classification of organisms, and basic genetics. Ecological concepts include interactions in the biosphere, functions of trophic levels in an ecosystem, and structures of biotic communities.

Credit : 4 units (3 hours lecture and 3 hours laboratory)

SCI.ED. 264 ANATOMY, PHYSIOLOGY AND HERBAL MEDICINE

Structures and function of plants and animals with emphasis on human anatomy and physiology, their disorders and diseases. This also includes identification of
medicinal plants and their specific medicinal applications.

Credit : 3 units (3 hours lecture)

SCI.ED. 300 MASTER'S THESIS

Independent study on science education.

Credit : 6 units

MAJOR IN ELEMENTARY MATHEMATICS

MATH 201 SET THEORY

Most known mathematics can be expressed in terms of sets and language of logic and sets is utilized in every mathematical discipline. It is important that a teacher of mathematics should have a fair background of its theories. The course content includes the use of the axiomatic system, language of the set theory, Truth of sentence, algebra of sets, Boolean algebra relations, order relations, equivalence relations, inverse relations, cardinal numbers, arithmetic of cardinal numbers, axioms of set theory.

Credit : 3 units (3 hours lecture/week)

MATH 206 THEORY OF NUMBERS

Elementary topics in number theory which include divisibility and division algorithm, prime numbers and composite numbers, unique factorization theorem, greatest common divisor and least common multiple, modular arithmetic.

Credit : 3 units; 3 hours lecture/week

MATH 275 GRAPH THEORY

This includes the graphs of paths, trees, cycles, complete graphs, planar graphs, bipartite graphs, Hamiltonian graphs, eulerian graphs, and the platonic solids. Colorability, chromatic polynomial and chromic number of graphs.

Credit : 3 units (3 hours lecture/week)

MATHED 230 FUNDAMENTAL CONCEPTS OF ELEMENTARY MATHEMATICS

This course offers a systematic analysis of arithmetic and a presentation of intuitive algebra and geometry. The topics included are symbols and numerals, place value and bases, rational numbers, decimals, irrational numbers, real numbers, sets and variables, solution sets for equations, two variables and graphs, fundamental principles of counting, permutation, combination, general principles of geometry, similar triangles and trigonometry.

Credit : 3 units; 3 hours lecture/week

MATH ED 231 GEOMETRY

Selected mathematics topics in plane and solid Geometry. It covers the following topics: Lines, plane, angles and triangles, geometric inequalities, perpendicular and parallel lines and planes. It includes also polygonal regions and their areas, circles and spheres and solids and their volumes.

Credit : 3 units (3 hours lecture/week)

MATH ED 232 ALGEBRA

Selected topics in Algebra. It covers the real number system, polynomials, product and factoring, the linear and quadratic functions, the complex number system. It also includes equation of the second degree in two variables, system of equations, polynomial equations, and sequence and series and mathematical induction.

Credit : 3 units (3 hours lecture/week)

MATH ED 233 TRIGONOMETRY

It deals with the comprehensive treatment on the analytical and computational aspects of plane and spherical trigonometric functions. It covers also inverse functions, and relationships among functions and their inverses.

Credit : 3 units (3 hours lecture/week)

MATH ED 238 INTERMEDIATE STATISTICS

This course includes counting principles, probability laws, probability distribution, sampling from normal distribution, simple linear regression, multiple regression, logistic regression, analysis of variance, Kruskalwallis Anova, correlation analysis.

Credit : 3 units (3 hours lecture/week)

MATH ED 240 COMPUTER EDUCATION

The study of computer programming language called BASIC. It deals with background information about computer center. It focuses on the ideas and techniques of structured and modular programming, program readability and program documentation.

Credit : 3 units (3 hours lecture/week)

MATH ED 241 BASIC ANALYSIS I

This course includes topics on function, limits of functions, continuity of functions, derivatives and its applications, and integration.

Credit : 3 units (3 hours lecture/week)

MATH ED 290 SEMINAR IN MATHEMATICS EDUCATION

Current trends in Mathematics teaching, readings on journals on Mathematics education and from other reports on recent innovations on updating curricula in Mathematics.

Credit : 1 unit (1 unit lecture/week)

MATH ED 300 THESIS

The masteral thesis must be a worthwhile contribution to knowledge involving Mathematics education before a panel of instructors appointed by the dean of SGS.

Credit : 6 units (conference to be arranged with adviser)

MAJOR IN SECONDARY MATHEMATICS

SCI.ED. 228 ENVIRONMENTAL EDUCATION

Rationale of Environmental education, curriculum development, teaching strategies, designing projects and then demonstrating them. Reports, classroom experiences, and other devices provide feedback on the implementation of the strategies.

Credit : 2 units (2 hours lecture/week)
Prerequisite(s) : Educational Psychology and Methods of Teaching.

MATH 201 SET THEORY

Most known mathematics can be expressed in terms of sets and language of logic and sets is utilized in every mathematical discipline. It is important that a teacher of mathematics should have a fair background of its theories. The course content includes the use of the axiomatic system, language of the set theory, "Truth, of sentence, algebra of sets, Boolean algebra relations, order relations, equivalence relations, inverse relations, cardinal numbers, arithmetic of cardinal numbers, axioms of set theory.

Credit : 3 units (3 hours lecture/week)

MATH 221.1 FUNDAMENTAL OF LINEAR ALGEBRA I

This course deals with vector spaces, bases subspaces, linear transformations, matrices, system of linear equations, determinants, adjoint, Hamilton-Gayley theorem, Jordan normal form, linear functions, Hermite normal form.

Credit : 3 units (3 hours lecture/week)

MATH 225.1 FUNDAMENTAL OF ABSTRACT ALGEBRA I

This course includes topics such as equivalence relations, functions and other relations from the standpoint of algebra of sets, elementary theory of graphs, rings and polynomial rings, ordered rings based on the study of rings of integers, and including the fundamental homomorphisms theorems, field of quotients of integral domains.

Credit : 3 units (3 hours lecture/week)

MATH 275 GRAPH THEORY

This includes the graphs of paths, trees, cycles, complete graphs, planar graphs, bipartite graphs, Hamiltonian graphs, eulerian graphs, and the platonic solids. Colorability, chromatic polynomial and chromic number of graphs.

Credit : 3 units (3 hours lecture/week)

MATH ED 234 SELECTED TOPICS IN ALGEBRA & TRIGONOMETRY

This course deals with topics in Algebra, linear algebra and trigonometry.

Credit : 3 units (3 hours lecture/week)

MATH ED 235 SELECTED TOPICS IN GEOMETRY

This course deals with selected topics in plane and solid geometry and non-Euclidean geometry.

Credit : 3 units (3 hours lecture/week)

MATH ED 238 INTERMEDIATE STATISTICS

This course includes counting principles, probability laws, probability distribution, sampling from normal distribution, simple linear regression, multiple
regression, logistic regression, analysis of variance, Kruskalwallis Anova, correlation analysis.

Credit : 3 units (3 hours lecture/week)

MATH ED 240 COMPUTER EDUCATION

The study of computer programming language called BASIC. It deals with background information about computer center. It focuses on the ideas and techniques of structured and modular programming, program readability and program documentation.

Credit : 3 units (3 hours lecture/week)

MATH ED 241 BASIC ANALYSIS I

This course includes topics on function, limits of functions, continuity of functions, derivatives and its applications, and integration.

Credit : 3 units (3 hours lecture/week)

MATH ED 242 BASIC ANALYSIS II

This is the second course in analysis for students in the secondary mathematics education. It includes topics on application of definite integral (area of a region, volume of a region and work), differentiation and integration of logarithmic, exponential, and trigonometric functions, inverse trigonometric functions, techniques of integration and sequences.

MATH ED 243 INTRODUCTORY COMBINATORICS

Pigeonhole principle, basic counting principle, permutations, combinations, binomial coefficients, multinomial theorem, the inclusion-exclusion, principle, recurrence relations, generating functions.

Credit : 3 units (3 hours lecture/week)

This course requires the student to conduct actual teaching to the different secondary/elementary/schools as decided by both teacher/instructor and student with the application to the different methods of strategies and contents in Mathematics.

MATH ED 290 SEMINAR IN MATHEMATICS EDUCATION

Current trends in Mathematics teaching, readings on journals on Mathematics education and from other reports on recent innovations on updating curricula in Mathematics.

Credit : 1 unit (1 unit lecture/week)

MATH ED 300 THESIS

The masteral thesis must be a worthwhile contribution to knowledge involving Mathematics education before a panel of instructors appointed by the dean of SGS.

Credit : 6 units (conference to be arranged with adviser)