

CURRICULUM
Bachelor of Science in Mathematics (BS Mathematics)

Academic Year 2018-2019

Reference CMOs: CMO #48 S. 2017, CMO #4 s. 2018 and CMO No. 20. s. 2013

Curriculum Description

The curriculum for BS in Mathematics is built around a traditional base of foundational and core courses in the major areas of mathematics with the inclusion of specialized courses in mathematics, applied mathematics, relevant disciplines, and emerging areas. There is a provision for elective courses that will allow for flexibility and accommodate the department's special interest.

It is composed of a total of 49 courses equivalent to 148 units, a combination of general education courses, core mathematics courses, non-math foundational courses, elective courses, and mandated courses. This curriculum is 13 units more than the minimum requirements stated in CMO #48, S. 2017.

Program Objectives

The following are the objectives of the BS Mathematics program:

1. to produce competent graduates to meet the demands for jobs or research work requiring very high analytical thinking and quantitative skills;
2. to train students who plan to pursue a career in the academe;
3. to produce graduates equipped with knowledge and skills essential for advanced studies in mathematics and related fields; and
4. to cultivate attitudes and dispositions such as confidence in one's own mathematics skills and knowledge and deeper appreciation and understanding of the dynamic role of mathematics in science, history and the modern world.

Program Outcomes

Graduates of BS Mathematics program are expected to be able to:

1. articulate the latest developments in their specific field of practice (PQF level 6 descriptor);
2. effectively communicate orally and in writing using both English and Filipino languages;
3. work effectively and independently in multi-disciplinary and multi-cultural teams;
4. demonstrate professional, social and ethical responsibility, especially in practicing intellectual property rights and sustainable development;
5. preserve and promote "Filipino historical and cultural heritage." (based on RA 7722);
6. demonstrate broad and coherent knowledge and understanding in the core areas of physical and natural sciences;
7. apply critical and problem solving skills using the scientific method;
8. Interpret relevant scientific data and make judgments that include reflection on relevant scientific and ethical issues;
9. carry out basic mathematical and statistical computations and use appropriate technologies in the analysis of data;
10. communicate information, ideas, problems and solutions both orally and in writing to other scientists, decision makers and the public;
11. relate science and mathematics to the other disciplines;
12. design and perform safe and responsible techniques and procedures in laboratory or field practices;
13. critically evaluate inputs from others;
14. appreciate the limitations and implications of science in everyday life;
15. commit to the integrity of data;
16. gain mastery in the core areas of mathematics: algebra, analysis and geometry;
17. demonstrate skills in pattern recognition, generalization, abstraction, critical analysis, synthesis, problem solving and rigorous argument;
18. develop an enhanced perception of the vitality and importance of mathematics in the modern world including inter-relationship within math and its connection to other disciplines;
19. appreciate the concept and role of proof and reasoning and demonstrate knowledge in reading and writing mathematical proofs;
20. make and evaluate mathematical conjectures and arguments and validate their own mathematical thinking; and
21. communicate mathematical ideas orally and in writing using clear and precise language.

Curriculum Components

| Courses | No. of Courses | Units | Total Units |
|---|----------------|-------|-------------|
| A. General Education Courses (CMO No. 20, s. 2013) | 12 | | 36 |
| B. Core Courses | 17 | | 54 |
| Abstract Algebra I | | 3 | |
| Advanced Calculus I | | 3 | |
| Calculus I, II, III** | | 12 | |
| Complex Analysis | | 3 | |
| Differential Equations I | | 3 | |
| Fundamental Concepts of Mathematics | | 3 | |
| Fundamentals of Computing I | | 3 | |
| Linear Algebra | | 3 | |
| Modern Geometry | | 3 | |

| | | | |
|---|-----------|----|------------------|
| Statistical theory | | 3 | |
| Probability | | 3 | |
| Set Theory | | 3 | |
| Elementary Number Theory | | 3 | |
| Numerical Analysis | | 3 | |
| Real Analysis | | 3 | |
| C. Non-math Foundational Courses | 3 | | 11 |
| General Physics (Mechanics) with Laboratory | | 4 | |
| General Physics II (with laboratory) | | 4 | |
| Database Management | | 3 | |
| D. Electives | 10 | | 30 |
| Math Electives | 6 | 18 | |
| Qualified electives /Cognates | 2 | 6 | |
| Free Electives | 2 | 6 | |
| E. Thesis/Special Problem | 1 | | 3 |
| F. Mandated Courses | 6 | | 14 |
| Physical education (PE) | 4 | 8 | |
| National Service Training Program (NSTP) | 2 | 6 | |
| TOTAL | | | 148 units |

| SUMMARY | |
|-------------------------------|------------------|
| Courses | Number of Units |
| General Education | 36 |
| Core Courses | 54 |
| Non Math Foundational Courses | 11 |
| Electives | 30 |
| Thesis/Special Problems | 3 |
| Mandated Courses | 14 |
| Total | 148 units |

PROGRAM OF STUDY

| FIRST YEAR | | | | | | |
|----------------|---|-----------|-----------|----------|---------------|--------------|
| FIRST SEMESTER | | | | | | |
| Code | Course Title | Units | Lec | Lab | Pre-requisite | Co-requisite |
| MATH 301 | Calculus I | 4 | 4 | - | - | - |
| MATH 302 | Fundamentals of Computing I | 2 | 2 | - | - | MATH 302 L |
| MATH 302 L | Fundamentals of Computing I Lab | 1 | - | 3 | - | MATH 302 |
| GEd 102 | Mathematics in the Modern World | 3 | 3 | - | - | - |
| GEd 106 | Purposive Communication | 3 | 3 | - | - | - |
| GEd 109 | Science, Technology and Society | 3 | 3 | - | - | - |
| PE 101 | Physical Fitness, Gymnastics and Aerobics | 2 | 2 | - | - | - |
| NSTP 111 | National Service Training Program 1 | 3 | 3 | - | - | - |
| | TOTAL | 21 | 20 | 3 | | |

| FIRST YEAR | | | | | | |
|-----------------|-------------------------------------|-----------|-----------|-----|---------------|--------------|
| SECOND SEMESTER | | | | | | |
| Code | Course Title | Units | Lec | Lab | Pre-requisite | Co-requisite |
| MATH 300 | Set Theory | 3 | 3 | - | - | - |
| MATH 303 | Calculus II | 4 | 4 | - | MATH 301 | - |
| MATH 304 | Fundamental Concepts of Mathematics | 3 | 3 | - | - | - |
| GEd 101 | Understanding the Self | 3 | 3 | - | - | - |
| GEd 105 | Readings in Philippine History | 3 | 3 | - | - | - |
| PE 102 | Rhythmic Activities | 2 | 2 | - | - | - |
| NSTP 121 | National Service Training Program 2 | 3 | 3 | - | - | - |
| | TOTAL | 21 | 21 | | | |

| SECOND YEAR | | | | | | |
|----------------|--------------------------|-------|-----|-----|---------------|--------------|
| FIRST SEMESTER | | | | | | |
| Code | Course Title | Units | Lec | Lab | Pre-requisite | Co-Requisite |
| MATH 305 | Calculus III | 4 | 4 | - | MATH 303 | - |
| MATH 306 | Elementary Number Theory | 3 | 3 | - | MATH 304 | - |
| PHY 301 | General Physics I lec | 3 | 3 | - | - | PHY 301 L |
| PHY 301 L | General Physics I lab | 1 | - | 3 | - | PHY 301 |

| | | | | | | |
|----------|---|-----------|-----------|----------|---|---|
| DB MNGT | Database Management | 3 | 3 | - | - | - |
| FILI 101 | Kontekstwalisadong Komunikasyon sa Filipino | 3 | 3 | - | - | - |
| LITR 102 | ASEAN Literature | 3 | 3 | - | - | - |
| PE 103 | Individual and Dual Sports | 2 | 2 | - | - | - |
| | TOTAL | 22 | 21 | 3 | | |

| SECOND YEAR | | | | | | |
|------------------------|------------------------|--------------|------------|------------|-----------------------|---------------------|
| SECOND SEMESTER | | | | | | |
| Code | Course Title | Units | Lec | Lab | Pre-requisite | Co-requisite |
| MATH 307 | Advanced Calculus I | 3 | 3 | - | MATH 305 | - |
| MATH 308 | Linear Algebra I | 3 | 3 | - | MATH 300, MATH 304 | - |
| MATH 309 | Abstract Algebra I | 3 | 3 | - | MATH 300 | - |
| | Math Elective 1 | 3 | 3 | - | - | - |
| PHY 302 | General Physics II | 3 | 3 | - | PHY 301, PHY 301 L | PHY 302 L |
| PHY 302 L | General Physics II lab | 1 | - | 3 | PHY 301, PHY 301L | PHY 302 |
| GEd 107 | Ethics | 3 | 3 | - | - | - |
| PE 104 | Team Sports | 2 | 2 | - | - | - |
| | TOTAL | 21 | 20 | 3 | | |

| THIRD YEAR | | | | | | |
|-----------------------|----------------------------------|--------------|------------|------------|----------------------|---------------------|
| FIRST SEMESTER | | | | | | |
| Code | Course Title | Units | Lec | Lab | Pre-requisite | Co-requisite |
| MATH 310 | Differential Equations I | 3 | 3 | - | MATH 307 | - |
| MATH 311 | Probability | 3 | 3 | - | MATH 305 | - |
| | Math Elective 2 | 3 | 3 | - | - | - |
| GEd 104 | The Contemporary World | 3 | 3 | - | - | - |
| | *Free Elective 1 | 3 | 3 | - | - | - |
| FILI 102 | Filipino sa Ibat-ibang Disiplina | 3 | 3 | - | - | - |
| | TOTAL | 18 | 18 | | | |

*Free Elective : any course in any discipline chosen by the student and approved by the program adviser

| THIRD YEAR | | | | | | |
|------------------------|---|--------------|------------|------------|----------------------|---------------------|
| SECOND SEMESTER | | | | | | |
| Code | Course Title | Units | Lec | Lab | Pre-requisite | Co-requisite |
| MATH 312 | Real Analysis I | 3 | 3 | - | MATH 307 | - |
| MATH 313 | Modern Geometry | 3 | 3 | - | MATH 304 | - |
| MATH 314 | Statistical Theory | 3 | 3 | - | MATH 311 | - |
| MATH 315 | Numerical Analysis | 3 | 3 | - | MATH 305 | - |
| | Math Elective 3 | 3 | 3 | - | - | - |
| MATH 316 | Cognate 1 – Graph Theory and Applications | 3 | 3 | - | - | - |
| | TOTAL | 18 | 18 | | | |

| FOURTH YEAR | | | | | | |
|-----------------------|------------------------------------|--------------|------------|------------|--------------------------------|---------------------|
| FIRST SEMESTER | | | | | | |
| Code | Course Title | Units | Lec | Lab | Pre-Requisite | Co-requisite |
| MATH 317 | Complex Analysis | 3 | 3 | - | MATH 307 | - |
| | Math Elective 4 | 3 | 3 | - | - | - |
| | Math Elective 5 | 3 | 3 | - | - | - |
| MATH 318 | Cognate 2 – Seminar in Mathematics | 3 | 2 | 3 | 3 RD YR standing | - |
| | Math Elective 6 | 3 | 3 | - | - | - |
| | TOTAL | 15 | 14 | | | |

| FOURTH YEAR | | | | | | |
|-----------------|--------------------------|-----------|-----------|-----|---------------|--------------|
| SECOND SEMESTER | | | | | | |
| Code | Course Title | Units | Lec | Lab | Pre-Requisite | Co-Requisite |
| | *Free Elective 2 | 3 | 3 | - | - | - |
| GEEd 103 | Life and Works of Rizal | 3 | 3 | - | - | - |
| GEEd 108 | Art Appreciation | 3 | 3 | - | - | - |
| MATH 319 | Thesis / Special Problem | 3 | 3 | - | MATH 318 | - |
| | TOTAL | 12 | 12 | | | |

*Free Elective: any course in any discipline chosen by the student and approved by the program adviser

D. LIST OF RECOMMENDED ELECTIVES

| COURSE CODE | DESCRIPTIVE TITLE | UNITS | | PRE-REQUISITES |
|-------------|---|-------|-----|-------------------------------|
| | | LEC | LAB | |
| MATH 321 | Abstract Algebra II | 3 | - | MATH 309 |
| MATH 322 | Advanced Calculus II | 3 | - | MATH 307 |
| MATH 323 | An Approach to the Study of Codes Using Association Schemes | 3 | - | - |
| MATH 324 | Coding Theory | 3 | - | - |
| MATH 325 | Design Theory | 3 | - | - |
| MATH 326 | Fundamentals of Algebraic Combinatorics | 3 | - | - |
| MATH 327 | Fundamentals of Computing II | 2 | 1 | MATH 302 |
| MATH 328 | Game Theory | 3 | - | - |
| MATH 329 | Selected Topics in Graph Theory | 3 | - | MATH 316 |
| MATH 330 | Group Theory | 3 | - | - |
| MATH 331 | History and Development of Fundamental Ideas in Mathematics | 3 | - | - |
| MATH 332 | Introduction to Chemical Reactions Network Theory | 3 | - | - |
| MATH 333 | Introduction to Gallois Theory | 3 | - | MATH 309 |
| MATH 334 | Introduction to Tilings and Patterns | 3 | - | 3 rd year standing |
| MATH 335 | Mathematical Finance | 3 | - | - |
| MATH 336 | Mathematical Modelling | 3 | - | - |
| MATH 337 | Operations Research I | 3 | - | MATH 308 |
| MATH 338 | Theory of Interest | 3 | - | - |
| MATH 339 | Topology | 3 | - | MATH 300 |
| MATH 340 | Special Topics in Mathematics | 3 | - | - |
| MATH 341 | Linear Algebra II | 3 | - | MATH 308 |