Department of MATHEMATICAL SCIENCES

Faculty:

Kevin Drury, Ph.D.	Adam Hammett, Ph.D.
Alice Ramos, Ph.D.	Robert K. Myers, Ph.D.

Majors:

Mathematics — Mathematics Education

The Department of Mathematical Sciences at Bethel College is a community of Christian scholars and educators committed to preparing minds for action within the Kingdom of God (1 Peter 1:13).

Department Mission

"The truth is that we encounter mathematicians everywhere, every day, but we hardly ever know it… It simply doesn't occur to us that our bank manager might have a degree in math, or that the people who invent or manufacture DVDs and MP3 players employ large numbers of mathematicians, or that the technology that transmits those stunning pictures of the moons of Jupiter relies heavily on math… Your entire life bobs like a small boat on a vast ocean of mathematics." (Ian Stewart, *Letters to a Young Mathematician*)

As a reflection of the Author of Creation, our universe is teeming with order. Science is the study of that created order; mathematics is the language humanity uses to facilitate that study. The mission of the Department of Mathematical Sciences is to equip students at every level to use mathematics as a tool for deeper understanding of the natural world as well as their own discipline. To this end, the department provides an essential balance of logical reasoning, conceptual understanding, and computational skills appropriate to students' diverse needs.

Department Objectives

In accordance with our mission, as well as the mission and vision of Bethel College, every course and program in our department aims to instill (in a manner appropriate to level of study):

- **Problem solving** and **logical reasoning** skills – Mathematical study teaches students to construct precise and concise arguments, and analyze the merits of a claim.
- **Experience in mathematical application** – Because of the wide range of mathematical applications, students must learn where and how mathematics can be applied within their discipline.
- **Quantitative literacy** – Applications of mathematics often involve large amounts of numerical data. Students must be proficient at analyzing such data, including any relevant technology.
- **Communication skills** – Mathematics is a very precise language. People that utilize mathematics must communicate it clearly, effectively, and precisely through both oral and written means.
- **Ethics** – Students must learn to grapple with ethical issues presented in such areas as statistical analysis.

- **Research skills** – Mathematics students must learn how to formulate and test mathematical hypotheses, and how to utilize content knowledge and research tools to justify these.

Please note:

- Any students considering a major in the mathematical sciences should plan on taking MATH 131 (Calculus 1) during their first semester freshman year. Students who do not have credit for MATH 131 and MATH 132 by the end of their freshman year will have a more difficult time completing a mathematical science major in a total of four years.
- Students who have passed the A.P. Calculus AB exam will receive credit for MATH 131 only, and will need to take MATH 132 during the spring semester of their freshman year. Those students who have taken and passed the A.P. Calculus BC exam will receive credit for both MATH 131 and MATH 132, and should plan on taking MATH 231 during their first semester freshman year.

Mathematics Major

The Bachelor of Science in Mathematics program is designed to prepare students for either graduate studies in mathematics or applied mathematics in industry, including modeling, simulation, risk analysis (actuarial science), program development, cryptography, and statistical analysis. Because of the wide variety of opportunities for graduates, the program does not focus on any one specific career, but instead equips the student with fundamental critical thinking, logical reasoning skills, as well as the foundational technological and mathematical tools, necessary for pursuing any of these choices. Internships in specific areas of applied mathematics or summer research experiences are strongly encouraged.

For more information on opportunities for employment, visit the department website at http://www.bethelcollege.edu/academics/undergrad/mathcomp/.

Mathematics Major

General Education			HOURS
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
		Foreign Language (two semesters)	6
		History Elective	3
		Art/Drama/Music	3
		Literature	3
PHIL	150	Logic & Critical Thinking	2
PHIL	250	Introduction to Philosophy	3
THEO	110	Exploring the Christian Faith	3
PHIL	452	Senior Experience	1
KINE	252	Fitness/Wellness	1
KINE	117	On the Ball Training, or	1
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness, or	(1)

			HOURS
KINE	135	Weight Training	(1)
			47
Cognates			
ITSC	121	Computer Programming I	3
PHYS	121	General Physics I	4
		Science with Lab	4
			11
Major			
MATH	110	Introductory Seminar in Math	1
MATH	131	Calculus I	4
MATH	132	Calculus II	4
MATH	231	Calculus III	4
MATH	242	Linear Algebra and Differential Equations	4
MATH	252	Probability and Statistics	3
MATH	293	Mathematical Theory and Proof	3
MATH	341	Abstract Algebra	3
MATH	361	Real Analysis	3
Select nine hours from the following			**9**
MATH	210	Discrete Mathematics	(3)
MATH	221	Number Theory and History Mathematics	(3)
MATH	225	Problem Solving Seminar	(1-3)
MATH	301	Preparation for the Actuarial Exams	(1-3)
MATH	329	Special Topics in Mathematics	(3-6)
MATH	331	Modern Geometry	(3)
MATH	354	Numerical Analysis	(3)
MATH	357	Mathematical Modeling	(3)
MATH	351	Complex Analysis	(3)
MATH	352	Advanced Statistical Methods	(3)
MATH	364	Ordinary and Partial Differential Equations	(3)
MATH	401	Preparation for the Math Subject GRE	(1)
ITSC	122	Computer Programming II	(3)
***Select a capstone course from the following:**			**1-3**
MATH	395	Undergraduate Research Experience	(1-3)
MATH	396	Internship	(1-3)
			39-41
Electives needed to complete the degree			25-27

*Credit for an internship under another prefix may be granted toward the MATH396 requirement. Students must petition for and receive written consent for this substitution from the department.

Graduate Study (Pure Math):
For students pursuing graduate studies in pure mathematics, it is recommended that the 9 major elective hours be selected from among the following courses (depending on the student's area of interest in graduate study):

MATH	210	Discrete Mathematics	3
MATH	225	Problem Solving Seminar	1-3
MATH	221	Number Theory and History of Mathematics	3
MATH	351	Complex Analysis	3

			HOURS
MATH	329	Special Topics in Mathematics	3
MATH	401	Preparation for the Math Subject GRE	1

Applied Math:
For students pursuing graduate studies or industrial work in applied mathematics, it is recommended that the major elective hours be selected from among the following courses:

MATH	354	Numerical Analysis	3
MATH	357	Mathematical Modeling	3
MATH	364	Ordinary and Partial Differential Equations	3
ITSC	122	Computer Programming II	3

It is also recommended that applied mathematics students find a secondary area of study (either as a double major or a minor) that ties in well with the application of mathematics.

Actuarial Science:
For students pursuing actuarial science, it is recommended that students include the following courses among the 12 major elective hours to be taken:

MATH	301	Preparation for the Actuarial Exams	1-3
MATH	352	Advanced Statistical Methods	3

Additionally, it is recommended that actuarial science students:
Take MATH 252 – Probability and Statistics during the second semester of their sophomore year in preparation for the first actuarial exam
Pass the first actuarial exam by the fall of their junior year
Participate in an internship in actuarial science during the summer between the junior and senior years
Attempt to study for and pass the second actuarial exam by the fall of their senior year
Consider taking elective courses in Business, Economics, Finance or Accounting

Mathematics Minor

MATH	110	Introductory Seminar in Math	1
MATH	131	Calculus I	4
MATH	132	Calculus II	4
MATH	242	Linear Algebra and Differential Equations	4
MATH	293	Mathematical Theory and Proof	3

Select 6 hours from the following:

MATH	210	Discrete Mathematics	3
MATH	231	Calculus III	4
MATH	252	Probability and Statistics	3
MATH	225	Problem Solving Seminar	1-3
MATH	221	Number Theory and History Mathematics	3
		300-level MATH course	3-6
			22

Mathematics Education Major

The Bachelor of Science in Mathematics Education program enables the student to combine the strengths of in-depth preparation in mathematics with the professional teacher education skills necessary for success in the secondary classroom. The pro-

gram involves practical experience inside and outside the classroom, as well as faculty mentoring throughout class study and student teaching. Students have the option of certification for either grades 9-12 or grades 5-12.

General Education			**HOURS**
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
THEO	110	Exploring the Christian Faith	3
BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
		Foreign Language (two semesters)	6
HIST		History Elective	3
LIT		Literature	3
		Art/Drama/Music	3
PHIL	150	Logic & Critical Thinking	2
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
KINE	252	Fitness/Wellness	1
KINE	117	On the Ball Training, or	1
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness, or	(1)
KINE	135	Weight Training	(1)
			47
Cognates			
ITSC	121	Computer Programming I	3
PHYS	121	General Physics I	4
			7
Major			
MATH	110	Introductory Seminar in Math	
MATH	131	Calculus I	4
MATH	132	Calculus II	4
MATH	210	Discrete Mathematics	3
MATH	221	Number Theory and History of Math	3
MATH	231	Calculus III	4
MATH	242	Linear Algebra and Differential Equations	4
MATH	252	Probability & Statistics	3
MATH	293	Mathematical Theory & Proof	3
MATH	331	Modern Geometry	3
MATH	341	Abstract Algebra	3
MATH	361	Real Analysis	3
MATH	402	Preparations for the Secondary Math Praxis II	1
			39
Professional Education			
EDUC	102	Foundations of Education	2
EDUC	204	Diversity in the Classroom	2
EDUC	205	Educational Pedagogy I	3
EDUC	305	Educational Pedagogy II	3
EDUC	308	Teaching Diverse Learners	2
PSYC	285	Adolescent Growth & Development	2
SCED	446	Specific Methods in Math	3
SCED	448	Content Specific Literacy	3

			HOURS
SCED	449	Student Teaching	8
EDUC	441	Professional Education Seminar	0-2
			28-30

Electives needed to complete the degree	8-10

See TEACHER EDUCATION (page 81) for program admission and other information.

Recommendation:
It is highly recommended that Mathematics Education majors take SCED 331 – Organization & Curriculum of the Jr. High/Middle School. This 2-hour class will extend the major's licensure from grades 9-12 to grades 5-12. It is also recommended that students take MATH 402 - Preparation for the Secondary Math Praxis II before attempting the Praxis II subject exam.