Department of MATHEMATICAL AND ENGINEERING SCIENCES

Faculty:

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Majors:

Engineering and Management
Mathematics
Mathematics Education
Math/Physics (Engineering 3-2 Program)

The Department of Mathematical and Engineering 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

As a reflection of the Author of Creation, our universe teems with order. Science is the study of that created order and mathematics is the language humanity uses to facilitate that study. Moreover, through engineering our understanding is made practical as we exercise our stewardship of the physical world in which we live (Gen 1:28). Thus, the mission of the Department of Mathematical and Engineering Sciences is to equip students at every level to use quantitative reasoning and critical thinking as tools for deeper understanding of the physical world and in their own discipline. To this end, the department seeks to instill an essential balance of logical reasoning, conceptual understanding, technological proficiency, and computational skill appropriate to students' diverse needs.

The department offers programs in a variety of mathematical and related sciences, including minors in computer science and physics. For students interested in actuarial science and/or data analysis, we recommend the mathematics major with a minor or second major in economics. For students interested in engineering, note that the Math/Physics degree is part of a cooperative 3-2 Engineering program offered in coordination with the University of Notre Dame and Trine University.

Computer Science Minor

The minor in computer science is designed to complement a variety of majors in the arts and sciences, teaching the fundamentals of programming, web design, and networking which are in increasingly high demand in our technology-driven world.

			HOURS
MATH	210	Discrete Mathematics	3
ITSC	121	Computer Programming I	3
ITSC	122	Computer Programming II	3
ART	267	Web Design I	3
CSC	230	Networks	3
CSC	310	Special Topics in Computer Science	3
Total credits			**18**

Engineering & Management

Many small to midsize industrial employers are in need of individuals with both engineering and management skills. This degree offers the right balance of science, business, management, and hands-on experience to prepare engineers for the varied world of working in a small- to medium-sized company.

Bethel Core			**HOURS**
BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
CHEM	163	General Chemistry I	4
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters, or	6
		1 semester at 200 (Intermediate) level	(3)
		History Elective	3
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)
		Literature	3
MATH	131	Calculus I	4
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
THEO	110	Exploring the Christian Faith	3
			50-53

Content Courses			
CHEM	164	General Chemistry II	4
ENGR	101	Introduction to Engineering	3
ENGR	225	Statics	3
ENGR	327	Solid Mechanics	4
ITSC	121	Computer Programming	3
MATH	111	Basic Probability & Statistics	3
MATH	132	Calculus II	4
PHYS	121	General Physics I	4
PHYS	122	General Physics II	4
		Any 200+ CHEM, PHYS, MATH or BIOL	4
		Any 200+ CHEM, PHYS, MATH, ENGR, CSC, or ITSC122, excluding ENGR350	6-8
ENGR	350	Internship in Engineering	1-4
			43-46

Business Minor			
ACCT	203	Fundamentals of Accounting I	3
BADM	222	Business Communications	3
BADM	321	Principles of Management	3
BADM	322	Principles of Marketing	3
BADM	334	Human Resource Management	3
		Any 200 + ACCT, BADM, ECON	3
			18

	HOURS
Electives needed to complete degree	3-9
Total credits	**120**

MATH/PHYSICS (Engineering 3-2 Program)

Bethel offers a cooperative engineering program in coordination with the University of Notre Dame and with Trine University. A student enrolled for either program completes three years of study at Bethel College (as outlined below) and two additional years at either Notre Dame or Trine. Upon successful completion, the student is awarded a B.S. in Math/Physics from Bethel College, and a B.S. in Engineering from the cooperating institution.

To participate in the program, Bethel College requires that each engineering student maintain a 3.0 cumulative grade point average, earn a "C" or better in all major courses, receive a favorable recommendation from the Engineering Program Coordinator, and be accepted by one of the cooperating institutions. Students should consult with their Bethel engineering program advisor about the current requirements of the cooperating institutions. Application to a cooperating institution should (typically) be made in the third year of study at Bethel College.

Bethel Core			
BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
CHEM	163	General Chemistry I	4
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music, or	3
		Literature	(3)
		Economics/History Elective	3
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)
MATH	131	Calculus I	4
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology, or	3
SOC	151	Principles of Sociology	(3)
THEO	110	Exploring the Christian Faith	3
			41

Major			
CHEM	164	General Chemistry II	4
ENGR	101	Introduction to Engineering	3
ITSC	121	Computer Programming	3
MATH	132	Calculus II	4
MATH	231	Calculus III	4
MATH	242	Linear Algebra & Differential Equations	4
MATH	252	Probability & Statistics	3
PHYS	121	General Physics I	4
PHYS	122	General Physics II	4

			HOURS
PHYS	222	General Physics III	4
PHYS	301	Quantum Physics	4
			41

Choose one of the following concentrations:

For those interested in Mechanical or Civil Engineering

ENGR	225	Statics	3
ENGR	226	Dynamics	3
PHYS	310	Thermodynamics	3
ENGR	327	Solid Mechanics	4
			13

For those interested in Computer Science

ITSC	122	Computer Programming II	3
MATH	210	Discrete Mathematics	3
ITSC or PHYS Electives			6
			12

For those interested in Chemical Engineering

CHEM	261	Organic Chemistry I	4
CHEM	262	Organic Chemistry II	4
CHEM	280	Analytical Chemistry, or	4
CHEM	461	Physical Chemistry I	(3)
			11-12

Credits transferred from Trine University or the University of Notre Dame	**25-27**
Total Credits	**120**

Mathematics Major

The Bachelor of Science in Mathematics is designed to offer students a well-rounded program which will prepare them well for continued study in pure or applied mathematics at the graduate level, but can also be tailored to allow students to prepare for a wide variety of careers in business, research, and industry.

In particular, for those interested in **actuarial science**, we recommend a double major in Mathematics and Economics/Finance. Completion of both programs should prepare the student to pass the initial actuarial exams (potentially during their junior year). In cooperation with the Department of Business, we have made this option attainable within four years.

Bethel Core

BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters, or	6
		1 semester at 200 (Intermediate) level	(3)
		History Elective	3
KINE	252	Fitness/Wellness	1
KINE	117	On the Ball Training, or	1

			HOURS
KINE	124	Aerobics, or	(1)
KINE	128	Physical Fitness, or	(1)
KINE	135	Weight Training	(1)
		Literature	3
MATH	131	Calculus I	4
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
		Science with Lab (PHYS, CHEM, BIOL)	4
THEO	110	Exploring the Christian Faith	3
			50-53
Cognates			
ITSC	121	Computer Programming I	3
		Applied course (additional PHYS, or CHEM With Lab, or ITSC course)	3-4
			6-7
Major			
MATH	110	Introductory Seminar In Math, or	1
MATH	109	Excursions in Math	(3)
MATH	132	Calculus II	4
MATH	210	Discrete Math	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 and Statistics	3
MATH	293	Mathematical Theory and Proof	2
MATH	341	Abstract Algebra	3
MATH	361	Real Analysis	3
MATH		Any MATH elective numbered 300 or above Except 395, 396, 481, 402	3
Select a capstone course from the following			1-3
MATH	395	Undergraduate Research Experience	(1-3)
MATH	396	Internship	(1-3)
MATH	481	Independent Study	(1-4)
			34-37
Electives needed to complete the degree			**23-30**
Total credits			**120**

Mathematics Minor

MATH	110	Introductory Seminar in Math	1
MATH	131	Calculus I	4
MATH	132	Calculus II	4
MATH	293	Mathematical Theory and Proof	2
Choose six hours for the following:			
MATH	210	Discrete Math	3
MATH	221	Number Theory and History of Math	3
MATH	231	Calculus III	4
MATH	242	Linear Algebra and Differential Equations	4

			HOURS
MATH	252	Probability and Statistics	3
MATH		Any MATH 300 or above	3
Total credits			**17**

Mathematics Education Major

The Bachelor of Science in Mathematics Education 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 program 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.

Bethel Core			
BIBL	215	Old Testament Literature	3
BIBL	216	New Testament Literature	3
COMM	171	Speech Communication	3
ENGL	101	Written Communication II	3
ENGL	102	Written Communication III	3
		Art/Drama/Music	3
		Foreign Language 2 semesters, or	6
		1 semester at 200 (Intermediate) level	(3)
		History Elective	3
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)
		Literature	3
MATH	131	Calculus I	4
PHIL	250	Introduction to Philosophy	3
PHIL	452	Senior Experience	1
PSYC	182	General Psychology	3
SOC	151	Principles of Sociology	3
		PHYS or CHEM w/Lab	4
THEO	110	Exploring the Christian Faith	3
			50-53
Cognates			
ITSC	121	Computer Programming I	3
			3
Major			
MATH	110	Introductory Seminar in Math	1
MATH	132	Calculus II	4
MATH	210	Discrete Math	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 and Statistics	3
MATH	293	Mathematical Theory and Proof	2
MATH	331	Modern Geometry	3
MATH	341	Abstract Algebra	3

			HOURS
MATH	361	Real Analysis	3
MATH		Any MATH elective, 300 or above	(1-3)
			34-36

Secondary Education Courses

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 Exceptional Learners	2
PSYC	285	Adolescent Growth and Development	2
SCED	446	Specific Methods in Math	3
SCED	448	Content Specific Literacy	3
EDUC	455	Student Teaching I	8
EDUC	441	Professional Education Seminar	(0-2)
			28-30

Electives needed to complete the degree	**0-5**
Total credits	**120**

See TEACHER LICENSURE (page 95) for program admission and other information.

Physics Minor

PHYS	121	General Physics I	4
PHYS	122	General Physics II	4
PHYS	222	General Physics II	4
PHYS	301	Quantum Physics (*)	3-4
PHYS/ENGR		Elective at the level of 200 or above	3-4
			18-20