2008-2009

Northern New Mexico College

Bachelor of Science

Applied Mathematics

The Bachelors of Science degree in Mathematics from Northern New Mexico College will teach the fundamentals of Mathematics and it's applications to real world problems. The focus of the program will be to model problems from a variety of areas including engineering, business and all areas of science; including chemistry, biology, physics, geology, astrophysics, and economics among the many. Mayors of Mathematics will improve their mathematical, computational and communication skills. The Bachelors degree in Mathematics will emphasize knowledge in the following areas

GENERAL EDUCATION REQUIREMENTS (35 CRS)	**COMPLETED**	**Planned Timeline (By Semester)**
Communications (9 crs)		
Choose from:		
ENG 111 English Composition I (3)	_____	_____
Pre-requisite: ENG 109 or adequate score on the Course Placement Evaluation		
SPCH 130 Public Speaking (3)	_____	_____
Pre-requisite: ENG 109 or adequate score on the Course Placement Evaluation		
Choose **one** of the following:		
ENG 112 English Composition II (3)	_____	_____
Pre-requisite: ENG 111		
ENG 116 Technical Writing (3)	_____	_____
Pre-requisite: ENG 111		
Mathematics (3 crs)		
MATH 145 Introduction to Probability and Statistics (3)	_____	_____
Pre-requisite: MATH 130 or adequate score on the Course Placement Evaluation		
MATH 150 College Algebra (3)	_____	_____
Pre-requisite: MATH 130 or adequate score on the Course Placement Evaluation		
Laboratory Sciences (8 crs)		
Choose **two** of the following:		
ASTR 110/L Introduction to Astronomy with lab (4)	_____	_____
Pre-requisites: ENG 109N and MATH 100N		
BIOL 110/L Current Topics in Biology with lab (4)	_____	_____
CHEM 110/L Introduction to Chemistry with lab (4)	_____	_____
Pre-requisite: MATH 102N or adequate score on the Course Placement Evaluation		
ES 112/L Introduction to Environmental Science (4)	_____	_____
GEOL 101/L Physical geology with lab (4)	_____	_____
GEOL 102/L Historical Geology with lab (4)	_____	_____
Pre-requisite: GEOL 101/L		
PHYS 110/L Introduction to Physics with lab (4)	_____	_____
Social/Behavioral Sciences (6-9 crs)*		
Pre-requisite: ENG 109 or adequate score on the Course Placement Evaluation		
PSY 105 General Psychology (3)	_____	_____
SOC 101 Introduction to Sociology (3)	_____	_____
Select at least **two** different disciplines from the following:		
ANTH 101/L Physical Anthropology with lab (4)	_____	_____
ANTH 102 Introduction to Social/Cultural Anthropology (3) (Fall)	_____	_____
ANTH 110 Indian Culture of the Southwest (3)	_____	_____
ANTH 207 Cultures of New Mexico (3)	_____	_____
ECON 200 Macroeconomics (3)	_____	_____
ECON 201 Microeconomics (3)	_____	_____
GEOG 111 World Geography (3)	_____	_____
PSCI 110 The Political World (3)	_____	_____
PSCI 120 Contemporary Political Issues (3)	_____	_____
PSCI 200 American Politics (3)	_____	_____

PSCI	210	State and Local Government (3)	_____	_____
PSCI	212	The American Presidency (3)	_____	_____
PSY	210	Theories of Personality (3)	_____	_____
PSY	229	Adolescent Psychology (3)	_____	_____
PSY	230	Psychology of Adjustment (3)	_____	_____
PSY	232	Abnormal Psychology (3)	_____	_____
PSY	270	Social Psychology (3)	_____	_____
PSY	290	Developmental Psychology (3)	_____	_____
SOC	213	Deviant Behavior	_____	_____
SOC	216	Ethnic and Intercultural Relations (3)	_____	_____
SOC	220	Social Problems (3)	_____	_____
SOC	225	Marriage and the Family (3)	_____	_____

Plus topic courses with student advisor's approval

Humanities and Fine Arts (6-9 crs)*

Pre-requisite: ENG 109 or adequate score on the Course Placement Evaluation

Select from at least **two** different disciplines from the following:

ART	105	Introduction to Art (3)	_____	_____
ART	107	History of Art I (3)	_____	_____
ART	211	History of Art II (3)	_____	_____
DANC	240	Dance Appreciation (3)	_____	_____
ENG	262	Southwest Literature (3)	_____	_____
Pre-Requisite: ENG 112				
ENG	265	Native American Literature I (3)	_____	_____
Pre-Requisite: ENG 111				
ENG	266	Native American Literature II (3)	_____	_____
Pre-Requisite: ENG 111				
ENG	270	Children's Literature (3)	_____	_____
Pre-Requisite: ENG 111				
ENG	280	Readings in Literature (3)	_____	_____
Pre-Requisite: ENG 111				
ENG	290	Study of Literature (3)	_____	_____
Pre-Requisite: ENG 111				
ENG	294	Mythology (3)	_____	_____
Pre-Requisite: ENG 111				
HIST	101	Western Civilization I (3)	_____	_____
HIST	102	Western Civilization II (3)	_____	_____
HIST	161	History of the US to 1877 (3)	_____	_____
HIST	162	History of the US from 1877 (3)	_____	_____
HIST	200	History of World Religions (3)	_____	_____
HIST	220	Southwestern Women's History (3)	_____	_____
HIST	230	Chicano Experience in the US (3)	_____	_____
HIST	250	American Indian History (3)	_____	_____
HIST	260	History of New Mexico (3)	_____	_____
HUM	105	Humanities and the Southwest (3)	_____	_____
HUM	311	Why Social Sciences Matter (4)	_____	_____
Pre-requisite: ENG 112				
HUM	414	Humanity and Creativity (4)	_____	_____
Pre-requisite: ENG 112				
HUM	421	History, Literature, Art and Philosophy (4)	_____	_____
Pre-requisite: ENG 112				
MUS	102	Music Theory I (3)	_____	_____
MUS	105	Music Appreciation (3)	_____	_____
MUS	240	Music History (3)	_____	_____
PHIL	110	Introduction to Philosophical Problems (3)	_____	_____
PHIL	111	History of Philosophy (3)	_____	_____
PHIL	220	Ethics (3)	_____	_____
PIS	200	Introduction to Pueblo Indian Studies (3)	_____	_____
THE	120	Introduction to Theater I (3)	_____	_____

Plus topic courses with student advisor's approval

* You must complete at least 15 hrs between these two areas, maintaining at least two disciplines in each area.

HEALTH, PHYSICAL EDUCATION AND RECREATION (1 CRS)
Elective (1) _____

PROGRAM REQUIREMENTS
Required supporting courses in Physics and Chemistry (8 crs)
Choose ***one*** of the following:
CHEM 121/L General Chemistry I with Lab (4) _____ _____
Pre-requisite: MATH 130, high school chemistry or ACT score of 19 or higher in Natural Science
CHEM 122/L General Chemistry II with Lab (4) _____ _____
or
PHYS 121/L Applied Physics I (4) _____ _____
Pre-requisite: MATH 130 or adequate score on the Course Placement Evaluation
PHYS 122/L Applied Physics II (4) _____ _____
or
CHEM 121/L General Chemistry I with Lab (4) _____ _____
Pre-requisite: MATH 130, high school chemistry or ACT score of 19 or higher in Natural Science
PHYS 121/L Applied Physics I (4) _____ _____
Pre-requisite: MATH 130 or adequate score on the Course Placement Evaluation

Required supporting course in Computing Science (3 crs)
CS 142 Computer Science I (3) _____ _____
Pre-requisites: CS 132 or IT 110, and MATH 130

Core Curriculum (19 crs)
MATH 162 Calculus I (4) _____ _____
Pre-requisite: MATH 150 and MATH 155 or MATH 160
MATH 163 Calculus II (4) _____ _____
Pre-requisite: MATH 155 and MATH 162
MATH 264 Calculus III (4) _____ _____
Pre-requisite: MATH 163
MATH 314 Linear Algebra with Applications (3) _____ _____
Pre-requisite: MATH 163
MATH 401 Advanced Calculus I (4) _____ _____
Pre-requisite: MATH 264 and MATH 311

MAJOR
Applied Mathematics (27 crs)
MATH 311 Vector Analysis (3) _____ _____
Pre-requisite: MATH 264
MATH 312 Partial Differential Equations (3) _____ _____
Pre-requisites: MATH 264 and MATH 316
MATH 313 Complex Variables for Engineering (3) _____ _____
Pre-requisite: MATH 264 and Math 316
MATH 316 Applied Ordinary Differential Equations (3) _____ _____
Pre-requisite: MATH 163, MATH 264 is recommended
MATH 327 Discrete Structures (3) _____ _____
Pre-requisite: MATH 163
MATH 345 Elements of Mathematical Statistics/Probability Theory(3) _____ _____
Pre-requisite: MATH 163
MATH 375 Introduction to Numerical Computing (3) _____ _____
Pre-requisite: MATH 163 and a Computer Language
MATH 466 Mathematical Methods in Science and Engineering (3) _____ _____
Pre-requisites: MATH 311, 312, 313
Choose **one** of the following:
MATH 402 Advanced Calculus II (3) _____ _____
Pre-requisite: MATH 401
MATH 441 Probability (3) _____ _____
Pre-requisite: MATH 264
MATH 464 Applied Matrix Theory (3) _____ _____
Pre-requisite: MATH 314

Along with the major, you may complete a **minor** if you wish. For the BS in Mathematics, we suggest one of the following four minors. Should you choose not to pursue a minor, you must complete an additional 11 crs of approved upper-division courses in order to fulfill our requirement of at least 24 crs of upper-division coursework.

General Engineering (**21 crs**)

CE 202 Engineering Statics (3) _____ _____
Pre-requisite: PHYS 215/L and MATH 163

CE 302 Mechanics of Materials (3) _____ _____
Pre-requisite: PHYS 216/L and MATH 163

EECE 203/L Circuit Analysis I (3) _____ _____
Pre-requisite: PHYS 216/L and MATH 163

ME 160L Mechanical Engineering Design I (3) _____ _____
Pre-requisite: MATH 160

ME 301 Thermodynamics (3) _____ _____
Pre-requisite: CHEM 122/L, PHYS 216/L and MATH 163

ME 306 Dynamics (3) _____ _____
Pre-requisite: ME 202 and MATH 163

ME 317 Fluid Mechanics (3) _____ _____
Pre-requisite: ME 301 and ME 302

Information Technology (23 crs)

IT 130 Networking Fundamentals (3) _____ _____
Pre-requisite: CS 132

IT 210 Information Technology Systems (3) _____ _____
Pre-requisites: CS 152

IT 220 Network and Server Software (4) _____ _____
Pre-requisites: IT 130

IT 330 Networking (3) _____ _____
Pre-requisites: IT 130

IT 447 Routing and Switching (3) _____ _____
Pre-requisite: IT 330

IT 342 Wireless and Mobile Computing (3) _____ _____
Pre-requisites: IT 330 and IT 350

IT 350 Database Management (3) _____ _____
Pre-requisite: CS 241/L

Minor in Chemistry (20 crs)

CHEM 121/L General Chemistry I with Lab (4)* _____ _____
Pre-requisite: MATH 130, high school chemistry or ACT score of 19 or higher in Natural Science

CHEM 122/L General Chemistry II with Lab (4)* _____ _____

CHEM 302/L Organic Chemistry II (4) _____ _____
Pre-requisite: CHEM 301/L

CHEM 311/L Physical Chemistry (4) _____ _____
Pre-requisites: CHEM 122/L, CHEM 221/L, MATH 163 and PHYS 122/L

CHEM 421/L Biochemistry (4) _____ _____
Pre-requisite: CHEM 301/L, CHEM 302/L AND CHEM 311/L

No courses (*) can count more than once toward a degree at Northern. If you pursue this minor, you will not have taken CHEM 121/L and CHEM 122/L as part of the "supporting courses" (above).

Physics (20 crs)

PHYS 215/L Engineering Physics (4) _____ _____
Pre-requisite: MATH 162

PHYS 262/L General Physics (4) _____ _____
Pre-requisites: PHYS 122/L or PHYS 216/L

PHYS 301 Thermodynamics and Statistical Mechanics (3) _____ _____

PHYS 302 Optics (3) _____ _____

PHYS 330 Introduction to Modern Physics (3) _____ _____
Pre-requisite: PHYS 262/L

PHYS 405 Electricity and Magnetism (3) _____ _____
Pre-requisite: MATH 311 and 312

In order to fulfill the graduation requirement of 128 credit hours for the program, you will have to enroll in an additional 15-18 credit of approved elective.

TOTAL CREDITS 128

Educational Planning Form (Semester)

Name _____ Date _____
Major _____ Student ID _____

Fall Semester	Spring Semester	Summer
Total Units	**Total Units**	**Total Units**
Fall Semester	**Spring Semester**	**Summer**
Total Units	**Total Units**	**Total Units**
Fall Semester	**Spring Semester**	**Summer**
Total Units	**Total Units**	**Total Units**

Advisor's Signature _____

Student Signature _____