Admission requirements: 1) Completion of the General Education Common Core, plus an additional 13 credit hours which must include Calculus I and 2) a cumulative GPA of at least 2.50.

**GENERAL EDUCATION REQUIREMENTS (35 CRS)**

<table>
<thead>
<tr>
<th>Area I: Communications (9 crs)</th>
<th>COMPLETED</th>
<th>Planned Timeline (By Semester)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 111 English Composition I (3)</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>Pre-requisites: ENG 109 or adequate score on the Course Placement Evaluation</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>SPCH 130 Public Speaking (3)</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>Pre-requisites: ENG 109 or adequate score on the Course Placement Evaluation</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td><strong>Choose one of the following two courses:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 112 English Composition II (3)</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>Pre-requisite: ENG 111</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>ENG 116 Technical Writing (3)</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>Pre-requisite: ENG 111</td>
<td>___</td>
<td>___</td>
</tr>
</tbody>
</table>

| Area II: Mathematics (3 crs) | | |
|-------------------------------| | |
| Choose one course from the following list. | | |
| MATH 145 Introduction to Probability & Statistics (3) | | |
| Pre-requisite: MATH 130 | | |
| MATH 150 College Algebra (3) | | |
| Pre-requisite: MATH 130 or adequate score on the Course Placement Evaluation | | |
| MATH 151 Conceptual Mathematics* | | |
| MATH 155 Trigonometry (3) | | |
| Pre-requisite: MATH 150 or adequate score on the Course Placement Evaluation | | |
| MATH 162 Calculus I (4) | | |
| Pre-requisite: MATH 155 or MATH 160 | | |
| MATH 163 Calculus II (4) | | |
| Pre-requisite: MATH 162 or adequate score on the Course Placement Evaluation | | |
| MATH 264 Calculus III (4) | | |
| Pre-requisite: MATH 163 or adequate score on the Course Placement Evaluation | | |
| *Conceptual mathematics will satisfy the mathematics requirement for all AA/BA/BBA/BM degrees | | |

| Area III: Laboratory Sciences (8 crs)* | | |
|-------------------------------| | |
| Choose two courses (with their labs) from the following list: | | |
| ASTR 110/L Introduction to Astronomy w/Lab (4) | | |
| Pre-requisites: ENG 109 and MATH 100 | | |
| BIOL 110/L Current Topics in Biology w/Lab(4) | | |
| CHEM 110/L Introduction to Chemistry w/Lab (4) | | |
| Pre-requisite: MATH 102 | | |
| ES 112/L Environmental Science w/Lab (4) (Fall) | | |
| GEOL 101/L Physical Geology w/Lab (4) | | |
| GEOL 102/L Historical Geology w/Lab (4) | | |
| Pre-requisite: GEOL 101 | | |
| PHYS 110/L Introduction to Physics w/Lab (4) | | |
| | | |
| *This area can also include courses designed for students pursuing science majors: e.g. BIOL 210/L, CHEM 121/L. | | |

| Area IV: 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) | | |
| Elective (3-6) | | |
| You must select courses from one other discipline area from the following: | | |
ANTH 101/L  Physical Anthropology w/Lab (4)
ANTH 102  Intro to Social & Cultural Anthropology (3) (Fall)
ANTH 111  Language and Culture (3)
ANTH 207  Cultures of New Mexico (3)
ANTH 110  Indian Culture of the Southwest
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 Behavior (3)
PSY 270  Social Psychology (3)
PSY 290  Developmental Psychology (3)
SOC 213  Deviant Behavior (3)
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

Area V: Humanities and Fine Arts (6-9 crs)*
Pre-requisite: ENG 109 or adequate score on the Course Placement Evaluation
You must select courses from at least two different discipline areas from the following list:

ART 105  Introduction to Art (3)
ART 107  History of Art I (3)
ART 208  History of NM Art & Architecture (3)
ART 211  History of Art II (3)
DANC 240  Dance Appreciation (3)
ENG 270  Children’s Literature (3)

Pre-requisite ENG 111
ENG 262  Literature of the Southwest (3)
ENG 265  Native American Literature I (3)

Pre-requisite ENG 111
ENG 266  Native American Literature II (3)

Pre-requisite: ENG 111
ENG 280  Readings in Literature (3)

Pre-requisite: ENG 111
ENG 290  Study of Literature

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 U.S. to 1877 (3)
HIST 162  History of the U.S. from 1877 (3)
HIST 200  History of the 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 of the Southwest (3)
HUM 311  Why the Social Sciences Matter ** (3)
HUM 414  Humanity and Creativity ** (3)
HUM 421  History, Literature, Art & Philosophy ** (3)
MUS 103  Music History & Literature I (3)
MUS 105  Music Appreciation (3)
MUS 218  Music History & Literature II (3)
PHIL 110  Intro to Philosophical Problems (3)
PHIL 111 History of Philosophy (3)  
PHIL 150 Critical Thinking (3)  
PHIL 220 Ethics (3)  
PIS 200 Introduction to Pueblo Indian Studies (3)  
THE 120 Introduction to Theatre I (3)  
THE 130 History of Theatre (3)  
Plus, topic courses with advisor’s approval

* If your major is in the area of the Humanities/Fine Arts, unless otherwise regulated by a given department, you should select 9 hrs from Area V and 6 hrs. from Area IV; if in the Social/Behavioral Sciences, you should select 9 hrs from Area IV and 6 hrs from Area V. Consult your major advisor. In any case, you must complete a minimum spread of 15 hrs between Areas IV and V.

** Students in associate degree programs are advised that upper-division courses are not covered under financial aid.

### 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 121/121L and CHEM 122/122L**  
*Pre-requisite: MATH 130 or adequate score on the Course Placement Evaluation*

Or

**PHYS 121/121L and PHYS 122/122L**  
*Pre-requisite: MATH 130 or adequate score on the Course Placement Evaluation*

Or

**CHEM 121/121L and PHYS 121/121L**  
*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 (27 crs)

#### Applied Mathematics (24 crs)

- **Math 311 Vector Analysis (3)**  
  *Pre-requisite: MATH 264*

- **Math 312 Partial Differential Equations for Engineering (3)**  
  *Pre-requisites: MATH 264 and MATH 316*

- **Math 313 Complex variables for Engineering (3)**  
  *Pre-requisite: MATH 264 is recommended: Math 311*

- **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 Applied Stats and Prob. Theory (3) or**  
  *Pre-requisite: MATH 163*

- **Math 375 Introduction to Numerical Computing (3)**  
  *Pre-requisite: MATH 163 and a Computing Language*

- **Math 466 Mathematical Methods in Science and Engineering. (3)**  
  *Pre-requisites: MATH 311, 312, 313 and 316*
Choose one of the following (3):
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 your 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 42 crs of upper-division coursework.

**General Engineering (21 crs)**
CE 202 Engineering Statics (3)
  Pre-requisite: MATH 162
CE 302 Mechanics of Materials (3)
  Pre-requisites: PHYPS 216/L and MATH 163
EE 203L Circuit Analysis I (3)
  Pre-requisites: CS141, MATH 163 Co-requisites: PHY 161, MATH 316
ME 160L Mechanical Engineering Design I (3)
  Co-requisite: MATH 162
ME 301 Thermodynamics (3)
  Pre-requisites: CE 202
ME 306 Dynamics (3)
  Pre-requisites: ME 202 and MATH 163
ME 317 Fluid Mechanics (3)
  Pre-requisites: ME 301 and 302

**Minor in Information Technology (23 crs)**
IT 150 Unix OS and Scripting (4)
  Pre-requisite: IT 110; Co-requisite: IT 130
IT 210 Information Technology (3)
  Pre-requisites: CS 132, ENG 111, IT 101 and MATH 145
IT 220 Network and Server Software (4)
  Pre-requisites: IT 150, 160, 210 and MATH 160
IT 330 Networking (3)
  Pre-requisites: ENG 116, IT 150 and 220
IT 341 Distributed systems (3)
  Pre-requisite: IT 330
IT 342 Wireless and Mobile Computing (3)
  Pre-requisites: IT 330 and 350
IT 350 Database Management (3)
  Pre-requisite: CS 210

**Minor in Chemistry (20 crs)**
CHEM 121/L General Chemistry I with Lab (4 credits)*
  Pre-requisite: MATH 130, high school chemistry, or an ACT score of 19 or higher in Natural Science
CHEM 122/L General Chemistry II with Lab (4 credits)*
CHEM 121/L
CHEM 301/L Organic Chemistry I with Lab (4)
  Pre-requisite: CHE M122/L
CHEM 302/L Organic Chemistry II (4 credits)
  Pre-requisite: CHEM 301/L
CHEM 311/L Physical Chemistry (4 credits)
  Pre-requisites: CHEM122/L, MATH 163 and PHYS 122/L

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

**Minor in Physics (20 crs)**
PHYS 215/L Engineering Physics (4 credits)
  Pre-requisite: MATH 162
PHYS 262/L General Physics (4 credits)
  Pre-requisites: PHYS 122/L or PHYS 216/L
PHYS 331 Thermodynamics and Statistical Mechanics (3)
  Pre-requisites: MATH 311 and 314
PHYS 302 Optics (3 credits)
  Pre-requisite: PHYS 262/L
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 330 Introduction to Modern Physics</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisite: PHYS 262/L; Co-requisite: PHYS 330L</td>
<td></td>
</tr>
<tr>
<td>PHYS 405 Electricity and Magnetism</td>
<td>3</td>
</tr>
<tr>
<td>Pre-requisite: MATH 311 and 312</td>
<td></td>
</tr>
</tbody>
</table>

11 crs of approved upper-division courses for non-minors

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

TOTAL CREDITS 128