

# APPLIED MATHEMATICS - BS, CRYPTOGRAPHY EMPHASIS

## Program Requirements

### First Year

|   | Semester Credit Hours |
|---|-----------------------|
| <b>Fall</b>   |                       |
| ENGL 104 Composition and Rhetoric<br>or ENGL 103 or Introduction to Rhetoric and Composition  | 3                     |
| MATH 171 Calculus I   | 4                     |
| University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>1</sup> | 3                     |
| Freshman Science elective <sup>2</sup>  | 4                     |
| General elective <sup>3,4</sup>   | 1                     |
| <b>Semester Credit Hours</b>  | <b>15</b>             |

### Spring

|   |           |
|---|-----------|
| ECON 202 Principles of Economics<br>or ECON 203 or Principles of Economics  | 3         |
| MATH 172 Calculus II  | 4         |
| University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>1</sup> | 3         |
| Freshman Science elective <sup>2</sup>  | 4         |
| General elective <sup>3,4</sup>   | 1         |
| <b>Semester Credit Hours</b>  | <b>15</b> |

### Second Year

|  | Semester Credit Hours |
|--|-----------------------|
| <b>Fall</b>  |                       |
| MATH 221 Several Variable Calculus                                 | 4                     |
| MATH 300 Foundations of Mathematics                                | 3                     |
| STAT 211 Principles of Statistics I                                | 3                     |
| Select one of the following:                                       | 4                     |
| CSCE 110 Programming I   |                       |
| CSCE 111 Introduction to Computer Science Concepts and Programming |                       |
| CSCE 206 Structured Programming in C                               |                       |
| <b>Semester Credit Hours</b>                                       | <b>14</b>             |

### Spring

|   |           |
|---|-----------|
| CSCE 120 Program Design and Concepts  | 3         |
| MATH 308 Differential Equations   | 3         |
| MATH 323 Linear Algebra   | 3         |
| STAT 212 Principles of Statistics II  | 3         |
| University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>1</sup> | 3         |
| <b>Semester Credit Hours</b>  | <b>15</b> |

### Third Year

|  | Semester Credit Hours |
|--|-----------------------|
| <b>Fall</b>                              |                       |
| MATH 409 Analysis on the Real Line       | 3                     |
| MATH 470 Communications and Cryptography | 3                     |

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|---------------------|---|---|
| PHYS 206 & PHYS 226 | Newtonian Mechanics for Engineering and Science and Physics of Motion Laboratory for the Sciences | 4 |
|---------------------|---|---|

|   |   |
|---|---|
| University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>1</sup> | 3 |
| General Elective <sup>4</sup>   | 1 |

**Semester Credit Hours 14**

|   | Semester Credit Hours |
|---|-----------------------|
| <b>Spring</b>   |                       |
| MATH 415 Modern Algebra I <sup>5</sup><br>or MATH 433 or Applied Algebra  | 3                     |
| MATH 471 Communications and Cryptography II   | 3                     |
| Select one of the following:  | 4                     |
| OCNG 451 Mathematical Modeling of Ocean Climate   |                       |
| PHYS 207 & PHYS 227 Electricity and Magnetism for Engineering and Science and Electricity and Magnetism Laboratory for the Sciences |                       |

|   |   |
|---|---|
| University Core Curriculum ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>1</sup> | 3 |
| General elective <sup>4</sup>   | 3 |

**Semester Credit Hours 16**

### Fourth Year

|   | Semester Credit Hours |
|---|-----------------------|
| <b>Fall</b>   |                       |
| MATH 427 Introduction to Number Theory<br>or MATH 431 or Structures and Methods of Combinatorics  | 3                     |
| MATH 472 Elliptic Curve Cryptography  | 3                     |
| Select 3 hours from the following:  | 3                     |
| CSCE 210-470 ( <a href="http://catalog.tamu.edu/undergraduate/course-descriptions/csce/">http://catalog.tamu.edu/undergraduate/course-descriptions/csce/</a> ) <sup>6</sup> |                       |
| ISEN 320 Operations Research I  |                       |
| ISEN 340 Operations Research II   |                       |
| MATH 325 The Mathematics of Interest  |                       |

|  |  |
|--|--|
| MATH 407-499 ( <a href="http://catalog.tamu.edu/undergraduate/course-descriptions/math/">http://catalog.tamu.edu/undergraduate/course-descriptions/math/</a> ) |  |
| STAT 335-482 ( <a href="http://catalog.tamu.edu/undergraduate/course-descriptions/stat/">http://catalog.tamu.edu/undergraduate/course-descriptions/stat/</a> ) |  |

|   |   |
|---|---|
| Select one of the following:                            | 3 |
| COMM 203 Public Speaking (Select one of the following:) |   |

|  |  |
|--|--|
| COMM 205 Communication for Technical Professions |  |
| COMM 243 Argumentation and Debate (Elective)     |  |

|                               |   |
|-------------------------------|---|
| General elective <sup>4</sup> | 3 |
|-------------------------------|---|

**Semester Credit Hours 15**

|   | Semester Credit Hours |
|---|-----------------------|
| <b>Spring</b>   |                       |
| MATH 411 Mathematical Probability   | 3                     |
| MATH 437 Principles of Numerical Analysis   | 4                     |
| Select 3 hours from the following:  | 3                     |
| CSCE 210-470 ( <a href="http://catalog.tamu.edu/undergraduate/course-descriptions/csce/">http://catalog.tamu.edu/undergraduate/course-descriptions/csce/</a> ) <sup>6</sup> |                       |
| MATH 325 The Mathematics of Interest  |                       |

MATH 407-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/math/>)

Select 3 hours from the following: 3

CSCE 210-470 (<http://catalog.tamu.edu/undergraduate/course-descriptions/csce/>)<sup>6</sup>

ISEN 320 Operations Research I

ISEN 340 Operations Research II

MATH 325 The Mathematics of Interest

MATH 407-499 (<http://catalog.tamu.edu/undergraduate/course-descriptions/math/>)

STAT 335-482 (<http://catalog.tamu.edu/undergraduate/course-descriptions/stat/>)

University Core Curriculum (<http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/>)<sup>1</sup> 3

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**Semester Credit Hours 16**

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**Total Semester Credit Hours 120**

<sup>1</sup> Of the 18 hours shown as University Core Curriculum (<http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/>), 3 must be from Language, Philosophy and Culture; 3 from Creative Arts; 6 from American History; and 6 from Government/Political Science.

<sup>2</sup> Select 4 hours from ASTR 111, BIOL 111, BIOL 112, CHEM 119, CHEM 120, CHEM 107/CHEM 117. The remaining 4 hours may be selected from ASTR 111, ATMO 201/ATMO 202, BIOL 111, BIOL 112, CHEM 119, CHEM 120, CHEM 107/CHEM 117, GEOL 101/GEOL 102, OCNG 251/OCNG 252.

<sup>3</sup> MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171 or MATH 172. MATH 200 is also highly recommended for math majors co-enrolled in MATH 151, MATH 152, MATH 171 or MATH 172.

<sup>4</sup> Select from any 100-499 course not used elsewhere (except ALED 125; ASCC 102; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 153; KINE 199; LAND 101; MATH 102-148, MATH 151-168 (<http://catalog.tamu.edu/undergraduate/course-descriptions/math/>), MATH 304, MATH 309, MATH 311, MATH 365, MATH 366, MATH 367, MATH 375, MATH 376; PBSI 301; PHYS 201, PHYS 202, PHYS 205; STAT 201, STAT 301-303 (<http://catalog.tamu.edu/undergraduate/course-descriptions/stat/>)).

<sup>5</sup> MATH 433 is only offered in spring semesters.

<sup>6</sup> Except CSCE 222/ECEN 222, CSCE 285, CSCE 289, CSCE 291, CSCE 402.

Maximum of 3 hours of MATH 300 or CSCE 222/ECEN 222 may be used in this degree program.

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 4 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 300, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two grades of D in upper-level

(325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

Students desiring teacher certification should consult the requirements for certification before registering for electives.

Graduation requirements include a requirement for 3 hours of International and Cultural Diversity course (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/>)s and 3 hours of Cultural Discourse (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/>) courses. A course satisfying a Core category, a college/department requirement, or a general elective can be used to satisfy this requirement. See academic advisor.