

## Applied Engineering Sciences

### University Requirements (23-24)

|   |     |
|---|-----|
| Writing, Rhetoric and American Cultures (WRA) | 4   |
| Integrative Studies in Humanities (IAH)       | 8   |
| Integrative Studies in Social Sciences (ISS)  | 8   |
| Bioscience (one of the following):            |     |
| BS 110, BS 111, ENT 205, MMG 201,             |     |
| MMG 301, PLB 105, PSL 250, ZOL 141            | 3-4 |

### College Requirements (29)

|  |   |
|--|---|
| CEM 141 General Chemistry                                  | 4 |
| CSE 131 Technical Computing and Problem Solving            | 3 |
| MTH 132 Calculus I   | 3 |
| MTH 133 Calculus II  | 4 |
| MTH 234 Multivariable Calculus                             | 4 |
| MTH 235 Differential Equations                             | 3 |
| <sup>1</sup> PHY 183 Physics for Scientists & Engineers I  | 4 |
| <sup>1</sup> PHY 184 Physics for Scientists & Engineers II | 4 |

### Major Requirements (40)

#### A. Complete all of the following courses:

|  |   |
|--|---|
| CE 221 Statics                                     | 3 |
| CEM 161 Chemistry Laboratory I                     | 1 |
| EGR 300 Technology, Society and Public Policy      | 2 |
| EGR 410 System Methodology                         | 2 |
| ME 180 Engineering Graphics Communications         | 3 |
| ME 222 Mechanics of Deformable Solids              | 4 |
| MGT 325 Management Skills and Processes            | 3 |
| MSE 250 Materials Science and Engineering          | 3 |
| PSY 101 Introductory Psychology                    | 4 |
| PSY 255 Industrial and Organizational Psychology   | 3 |
| STT 351 Probability and Statistics for Engineering | 3 |

#### B. Select one of the following courses:

|  |   |
|--|---|
| ECE 201 Circuits and Systems I                 | 3 |
| ECE 230 Digital Logic Fundamentals             | 3 |
| ECE 345 Electronic Instrumentation and Systems | 3 |

#### C. Select one of the following courses:

|  |   |
|--|---|
| BE 230 Engineering Analysis of Biological Systems          | 3 |
| CE 280 Principles of Environmental Engineering and Science | 3 |
| CHE 201 Material and Energy Balances                       | 3 |

#### D. Select one of the following courses:

|                                       |   |
|---------------------------------------|---|
| ME 201 Thermodynamics                 | 3 |
| MSE 310 Phase Equilibria in Materials | 3 |

<sup>1</sup>If PHY 231 is taken in place of PHY 183, PHY 233B must also be completed. If PHY 232 is taken in place of PHY 184, PHY 234B must also be completed.

Some courses may have prerequisites, which are not otherwise required in the program. Students should check course descriptions to ensure they are aware of prerequisites.

### E. Cognates

Cognates in Business-Supply Chain Management and Telecommunication are available to majors in Applied Engineering Sciences. Students should consult with their adviser prior to their selection of a cognate. Students must select *one* of the following cognates.

### Business-Supply Chain Management (27)

#### A. All of the following courses:

|   |   |
|---|---|
| ACC 201 Principles of Financial Accounting      | 3 |
| ACC 202 Principles of Management Accounting     | 3 |
| EC 210 Economics Principles Using Calculus      | 3 |
| FI 320 Introduction to Finance                  | 3 |
| GBL 323 Introduction to Business Law            | 3 |
| MSC 303 Introduction to Supply Chain Management | 3 |
| MSC 327 Introduction to Marketing               | 3 |
| MSC 372 Manufacturing Planning and Control      | 3 |

#### B. One of the following courses:

|   |   |
|---|---|
| BE 431 Bio-resource Optimization                | 3 |
| ME 477 Manufacturing Processes                  | 3 |
| ME 497 Biomechanical Design                     | 3 |
| STT 471 Statistics for Quality and Productivity | 3 |
| MSE 425 Biomaterials and Biocompatibility       | 3 |
| MSE 426 Introduction to Composite Materials     | 3 |

### Telecommunication (30)

|   |   |
|---|---|
| ACC 230 Survey of Accounting Concepts               | 3 |
| EC 201 Introduction to Microeconomics               | 3 |
| TC 100 The Information Society                      | 3 |
| TC 200 History and Economics of Telecommunication   | 4 |
| TC 201 Introduction to Telecommunication Technology | 4 |
| TC 310 Basic Telecommunication Policy               | 4 |
| TC 361 Data Communication                           | 3 |
| TC 463 Network Design and Implementation I          | 3 |
| TC 465 Network Design and Implementation II (W)     | 3 |

### Other Electives (Variable)

#### Total credits Required for Degree

**128**

The requirements listed above apply to students admitted to the major of Applied Engineering Sciences in the Engineering Undergraduate Studies Office (UGS) beginning Fall, 2006. The Engineering Undergraduate Studies Office constantly reviews requirements and reserves the right to make changes as necessary. Consequently, each student is strongly encouraged to consult with his/her adviser to obtain assistance in planning and appropriate schedule of courses. Students who have questions about Applied Engineering Sciences should contact the Engineering Undergraduate Studies Advising Office, 1415 Engineering Building, phone (517) 355-6616 extension 1.

## Applied Engineering Sciences Sample Program

| Freshman Year |           |               |              | Sophomore Year |              |              |           |
|---------------|-----------|---------------|--------------|----------------|--------------|--------------|-----------|
| Fall          | Credits   | Spring        | Credits      | Fall           | Credits      | Spring       | Credits   |
| CEM 141       | 4         | Bioscience    | 3/4          | Cognate #1     | 3            | CE 221       | 3         |
| CEM 161       | 1         | CSE 131       | 3            | IAH 20X        | 4            | Cognate #2   | 3         |
| ME 180        | 3         | MTH 133       | 4            | MTH 234        | 4            | ISS 2XX      | 4         |
| MTH 132       | 3         | PSY 101       | 4            | PHY 183        | 4            | MTH 235      | 3         |
| WRA 1XX       | 4         |               |              | PSY 255        | 3            | MSE 250      | 3         |
| <b>Total</b>  | <b>15</b> | <b>Total</b>  | <b>15/16</b> | <b>Total</b>   | <b>18</b>    | <b>Total</b> | <b>16</b> |
| Junior Year   |           |               |              | Senior Year    |              |              |           |
| Fall          | Credits   | Spring        | Credits      | Fall           | Credits      | Spring       | Credits   |
| Cognate #3    | 3         | Cognate #5    | 3            | Cognate #6     | 3            | Cognate #8   | 3         |
| Cognate #4    | 3         | IAH XXX       | 4            | Cognate #7     | 3            | Cognate #9   | 3         |
| EGR 300       | 2         | Item B Choice | 3            | ISS 3XX        | 4            | EGR 410      | 2         |
| ME 222        | 4         | Item C Choice | 3            | Elective       | 1/2          | Elective     | 3         |
| PHY 184       | 4         | Item D Choice | 3            | MGT 325        | 3            | Elective     | 3         |
|               |           |               |              | STT 351        | 3            |              |           |
| <b>Total</b>  | <b>16</b> | <b>Total</b>  | <b>16</b>    | <b>Total</b>   | <b>17/18</b> | <b>Total</b> | <b>14</b> |

### Program Objectives

The Applied Engineering Sciences major is an undergraduate, interdisciplinary program that combines scientific and technical course work with a complementary cognate resulting in a Bachelor of Science degree awarded by the College of Engineering. It is the intent of the Applied Engineering Sciences major to provide educational opportunities for the undergraduate student who wishes to gain a broad foundation in the engineering sciences, core engineering disciplines and their application to one of the cognate areas. Cognates are available in Business - Supply Chain Management and Telecommunication. On a space available basis, an Information Technology Specialization can be combined with either of the two cognates.

The program is designed to develop an individual who:

1. Brings to the workplace a knowledge of business, management, and logistics, grounded in calculus, basic sciences, and engineering sciences;
2. Can apply the rigor of their education and training to a diverse set of problems;
3. Is prepared to work at the interfaces of planning, design, production, procurement, marketing, distribution, sales, and management;
4. Can effectively communicate across diverse professional disciplines; and
5. Is knowledgeable of contemporary technological and societal issues and can facilitate the effective deployment of new technologies.