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| For Academic Affairs and Research Use Only |
| Proposal Number | ECS17 |
| CIP Code:  |  |
| Degree Code: |  |

**Program Modification Form**

**[X] Undergraduate Curriculum Council**

**[ ] Graduate Council**

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| **Modification Type: [ ]Admissions, [ ]Curricular Sequence, or [X]Other**  |

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

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| Carlos Ramirez Jimenez | 2/23/2023 |

**Department Curriculum Committee Chair** |

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**COPE Chair (if applicable)** |
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| Carlos Ramirez Jimenez | 2/23/2023 |

**Department Chair**  |

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**Head of Unit (if applicable)**   |
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| Jason Stewart | 3/6/2023 |

**College Curriculum Committee Chair** |

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**Undergraduate Curriculum Council Chair** |
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**Director of Assessment** *(only for changes impacting assessment)* |

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**Graduate Curriculum Committee Chair** |
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| Abhijit Bhattacharyya | 3/6/2023 |

**College Dean** |

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| Len Frey | 4/20/2023 |

**Vice Chancellor for Academic Affairs** |
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**General Education Committee Chair (if applicable)**   |  |

1. **Contact Person** (Name, Email Address, Phone Number)

Carlos Ramirez Jimenez, cramirejimenez@astate.edu, +52 442 3431 871

1. **Proposed Change** (for undergraduate curricular changes please provide an 8-semester plan (appendix A), if applicable)

We are proposing for 6 courses (16 credits) to be moved from electives and become upper Major requirements. Also, want to list ISE as a potential source for upper level engineering electives.

1. **Effective Date**

Fall 2023 (2023-24 Bulletin Year)

1. **Justification –** *Please provide details as to why this change is necessary.*

We had initially considered the use of concentrations to group courses which could become areas of specialization for our students on their senior year. In order to do that, we allowed for 28 credits to become elective on our fist approach. Now, after careful revision and in order to maintain a strong mechanical/manufacturing core, facilitate logistics and optimize resources, we are proposing to move elective courses into the upper major requirements.

**Bulletin Changes**

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| **Instructions**  |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Please include a before (with changed areas highlighted) and after of all affected sections.** **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.**  |

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| Mechanical Systems Engineering, BS |
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Return to {$returnto_text} Return to: [Programs by Department](https://catalog.astate.edu/content.php?catoid=3&navoid=77) |
| UNIVERSITY REQUIREMENTS:See [University General Requirements for Baccalaureate degrees](https://catalog.astate.edu/content.php?catoid=3&navoid=67#university-general-requirements-for-all-baccalaureate-degrees)  FIRST YEAR MAKING CONNECTIONS COURSE:* [ENGR 1402 - Concepts of Engineering](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **2** (See Engineering Core Courses)

GENERAL EDUCATION REQUIREMENTS:See [General Education Curriculum for Engineering](https://catalog.astate.edu/preview_program.php?catoid=3&poid=542) **Sem. Hrs: 38**ENGINEERING CORE COURSES:* Refer to [Engineering Core Courses](https://catalog.astate.edu/preview_program.php?catoid=3&poid=543) **Sem. Hrs: 20**

MAJOR REQUIREMENTS:Electives denoted with an asterisk (\*) may be selected from any courses within the designated elective group; subject to a program advisor’s approval. They must make a rational contribution to the student’s personal and professional education goals. In addition to the University requirements for all Baccalaureate Degrees, a Bachelor of Science in Mechanical Systems Engineering requires that one of the two following conditions be met:1. “C” or better in each course in the major courses; **OR**
2. 2.5 (or greater) grade point average in the major courses listed below.
* [ENGR 2411 - Mechanics of Materials Laboratory](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **1**
* [ENGR 2413 - Mechanics of Materials](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ENGR 2421 - Electric Circuits I Laboratory](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **1**
* [ENGR 2423 - Electric Circuits I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ENGR 3423 - Dynamics](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ENGR 3443 - Engineering Thermodynamics I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ENGR 3471 - Fluid Mechanics Laboratory](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **1**
* [ENGR 3473 - Fluid Mechanics](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 2502 - Solid Modeling for Mechanical Engineers](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **2**
* [ME 3513 - Mechanical Vibrations](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 4543 - Machine Design](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 4553 - Heat Transfer](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 4603 - Control Systems for Mechanical Engineering](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* Upper level Mechanical Engineering Electives (ME prefix) **Sem. Hrs: 3**\*
* Upper level Engineering Electives (EE or ENGR or ESE or ME or MSE prefix) **Sem. Hrs: 22** \*

Professional Development Electives (Advisor approval required) - Req. Hrs: 6These electives may be selected outside the Engineering Programs, subject only to the following list or advisor’s approval.  It must make a rational contribution to the student’s personal and professional education goals.  Pre-approved Professional Development Electives: * [CHEM 1023 - General Chemistry II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 3243 - Linear Algebra](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 3303 - Modern Algebra I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 3323 - Mathematical Modeling](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 3343 - College Geometry](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4423 - Modern Algebra II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4513 - Applied Mathematics](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4533 - Introduction to Numerical Analysis](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4553 - Advanced Calculus I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4563 - Advanced Calculus II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 3523 - Introduction to Robotics Laboratory](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 4523 - Introduction to Finite Element Analysis](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 4593 - Design of Heating, Ventilating, and Air-Conditioning Systems](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [STAT 4453 - Probability and Statistics I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [STAT 4463 - Probability and Statistics II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [TECH 3433 - AutoCAD 3D Modeling](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [TECH 3453 - Advanced Technology Design Solid Works](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**

Sub-total: 63ADDITIONAL SUPPORT COURSES:* [MATH 4403 - Differential Equations](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [PHYS 2044 - University Physics II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **4**

Sub-total: 7TOTAL REQUIRED HOURS: 128 |

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| Mechanical Systems Engineering, BS |
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| UNIVERSITY REQUIREMENTS:See [University General Requirements for Baccalaureate degrees](https://catalog.astate.edu/content.php?catoid=3&navoid=67#university-general-requirements-for-all-baccalaureate-degrees)  FIRST YEAR MAKING CONNECTIONS COURSE:* [ENGR 1402 - Concepts of Engineering](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **2** (See Engineering Core Courses)

GENERAL EDUCATION REQUIREMENTS:See [General Education Curriculum for Engineering](https://catalog.astate.edu/preview_program.php?catoid=3&poid=542) **Sem. Hrs: 38**ENGINEERING CORE COURSES:* Refer to [Engineering Core Courses](https://catalog.astate.edu/preview_program.php?catoid=3&poid=543) **Sem. Hrs: 20**

MAJOR REQUIREMENTS:Electives denoted with an asterisk (\*) may be selected from any courses within the designated elective group; subject to a program advisor’s approval. They must make a rational contribution to the student’s personal and professional education goals. In addition to the University requirements for all Baccalaureate Degrees, a Bachelor of Science in Mechanical Systems Engineering requires that one of the two following conditions be met:* “C” or better in each course in the major courses; **OR**
* 2.5 (or greater) grade point average in the major courses listed below.
* [ENGR 2411 - Mechanics of Materials Laboratory](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **1**
* [ENGR 2413 - Mechanics of Materials](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ENGR 2421 - Electric Circuits I Laboratory](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **1**
* [ENGR 2423 - Electric Circuits I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ENGR 3423 - Dynamics](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ENGR 3443 - Engineering Thermodynamics I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ENGR 3471 - Fluid Mechanics Laboratory](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **1**
* [ENGR 3473 - Fluid Mechanics](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* ESE 3003 - Introduction to Energy Systems **Sem. Hrs:3**
* [ME 2502 - Solid Modeling for Mechanical Engineers](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **2**
* [ME 3513 - Mechanical Vibrations](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* ME 4523 - Introduction to Finite Element Analysis **Sem. Hrs:** **3**
* [ME 4543 - Machine Design](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 4553 - Heat Transfer](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* ME 4573 - Mechanical System Design **Sem. Hrs:** **3**
* [ME 4603 - Control Systems for Mechanical Engineering](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* MSE 3423 - Applied Mechanics of Materials **Sem. Hrs:** **3**
* MSE 4423 - Experimental Stress Analysis **Sem. Hrs:** **3**
* MSE 4561 - Manufacturing Processes Laboratory **Sem. Hrs:** **1**
* Upper level Engineering Electives (EE or ENGR or ESE or ISE or ME or MSE prefix) **Sem. Hrs: 12**\*

**Professional Development Electives (Advisor approval required)** - **Req. Hrs: 3\***These electives may be selected outside the Engineering Programs, subject only to the following list or advisor’s approval.  It must make a rational contribution to the student’s personal and professional education goals.  Pre-approved Professional Development Electives: * [CHEM 1023 - General Chemistry II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 3243 - Linear Algebra](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 3303 - Modern Algebra I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 3323 - Mathematical Modeling](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 3343 - College Geometry](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4423 - Modern Algebra II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4513 - Applied Mathematics](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4533 - Introduction to Numerical Analysis](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4553 - Advanced Calculus I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [MATH 4563 - Advanced Calculus II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 3523 - Introduction to Robotics Laboratory](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [ME 4593 - Design of Heating, Ventilating, and Air-Conditioning Systems](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [STAT 4453 - Probability and Statistics I](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [STAT 4463 - Probability and Statistics II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [TECH 3433 - AutoCAD 3D Modeling](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [TECH 3453 - Advanced Technology Design Solid Works](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**

Sub-total: 63ADDITIONAL SUPPORT COURSES:* [MATH 4403 - Differential Equations](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **3**
* [PHYS 2044 - University Physics II](https://catalog.astate.edu/preview_program.php?catoid=3&poid=1981&returnto=77) **Sem. Hrs:** **4**

Sub-total: 7TOTAL REQUIRED HOURS: 128 |

 Return to: [Programs by Department](https://catalog.astate.edu/content.php?catoid=3&navoid=77)

**Appendix A, 8-Semester Plan**

(**Referenced in #2** - **Undergraduate Proposals Only)**

*Instructions: Please identify new courses in italics*.

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| **Arkansas State University campus Queretaro****Degree: Bachelor of Science****Major: Mechanical Systems Engineering****Year: 2023** |
| Students requiring developmental course work based on low entrance exam scores (ACT, SAT, ASSET, COMPASS) may not be able to complete this program of study in eight (8) semesters. Developmental courses do not count toward total degree hours. **Students having completed college level courses prior to enrollment will be assisted by their advisor in making appropriate substitutions. In most cases, general education courses may be interchanged between semesters.** A minimum of 45 hours of upper division credit (3000-4000 level) is required for this degree. |
| **Year 1** |  | **Year 1** |
| **Fall Semester** |  | **Spring Semester** |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
| CHEM 1011 | General Chemistry I Lab | 1 | X |  | ENG 1013 | Composition II | 3 | X |
| CHEM 1013 | General Chemistry I | 3 | X |  | ENGR 1412 | Software Applications for Engineers | 2 |  |
| COMS 1203 | Oral Communication | 3 | X |  | MATH 2214 | Calculus II | 4 | X |
| ENG 1003 | Composition I | 3 | X |  | ME 2502 | Solid Modeling for Mechanical Engineers | 2 |  |
| ENGR 1402 | Concepts of Engineering | 2 |  |  | PHYS 2034 | University Physics I | 4 | X |
| MATH 2204 | Calculus I | 4 | X |  |  |  |  |  |
| **Total Hours** |  | 16 |  |  | **Total Hours** |  | 15 |  |
| **Year 2** |  | **Year 2** |
| **Fall Semester** |  | **Spring Semester** |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
| ENGR 2401 | Applied Engineering Statistics | 1 |  |  | ENGR 2411 | Lab. For Mechanics of Materials | 1 |  |
| ENGR 2403 | Statics | 3 |  |  | ENGR 2413 | Mechanics of Materials | 3 |  |
| ENGR 2421 | Electric Circuits I Lab | 1 |  |  | ENGR 3423 | Dynamics | 3 |  |
| ENGR 2423 | Electric Circuits I | 3 |  |  | MATH 4403 | Differential Equations | 3 |  |
| MATH 3254 | Calculus III | 4 | X |  | PHYS 2044 | University Physics II | 4 |  |
|  | + Fine Arts Elective | 3 | X |  |  | + Social Science Elective | 3 | X |
| **Total Hours** |  | 15 |  |  | **Total Hours** |  | 17 |  |
| **Year 3** |  | **Year 3** |
| **Fall Semester** |  | **Spring Semester** |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
| ENGR 3433 | Engineering Economics | 3 |  |  | ENGR 4453 | Numerical Methods for Engineers | 3 |  |
| ENGR 3443 | Engineering Thermodynamics I | 3 |  |  | ME 3513 | Mechanical Vibrations | 3 |  |
| ENGR 3471 | Lab for Fluid Mechanics | 1 |  |  | ME 4553 | Heat Transfer | 3 |  |
| ENGR 3473 | Fluid Mechanics | 3 |  |  |  | + Humanities Elective | 3 | X |
| ME 4543 | Machine Design | 3 |  |  | ESE 3003 | Introduction to Energy Systems | *3* |  |
|  | ++ Professional Development Elective | 3 |  |  | MSE 4423 | Experimental Stress Analysis | 3 |  |
| **Total Hours** |  | 16 |  |  | **Total Hours** |  | 18 |  |
| **Year 4** |  | **Year 4** |
| **Fall Semester** |  | **Spring Semester** |
| **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
| ENGR 4401 | Senior Seminar | 1 |  |  | ENGR 4482 | Senior Design II | 2 |  |
| ENGR 4463 | Senior Design I | 3 |  |  | ME 4603 | Control Systems for ME | 3 |  |
| ME 4523 | Introduction to Finite Element Analysis | *3* |  |  | MSE 3423 | Applied Mechanics of Materials | *3* |  |
| ME 4573 | Mechanical System Design | 3 |  |  | MSE 4561 | Manufacturing processes Laboratory | *1* |  |
|  | +++ Engineering Elective Upper Level | 3 |  |  |  | +++ Engineering Elective Upper Level | *3* |  |
|  | +++ Engineering Elective Upper Level | 3 |  |  |  | +++ Engineering Elective Upper Level | 3 |  |
| **Total Hours** |  | 16 |  |  | **Total Hours** |  | 15 |  |
| **Total Jr/Sr Hours 69 Total Degree Hours 128** |
| + See General Education Requirements for College of Engineering.++ Approved Professional Development Elective. Advisor approval required.+++ Engineering Elective: Upper-level EE, ENGR, ESE, ME or MSE course. |