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

**Reconfiguration of Existing Degree Program Proposal Form**

(Also requires Arkansas Department of Higher Education (ADHE) approval)

**[X] Undergraduate Curriculum Council**

**[ ] Graduate Council**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Andre Possani Espinosa | 9/23/2021 |   **Department Curriculum Committee Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **COPE Chair (if applicable)** |
| |  |  | | --- | --- | | Andre Possani Espinosa | 9/23/2021 |   **Department Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Head of Unit (if applicable)** |
| |  |  | | --- | --- | | Mary Elizabeth Spence | 9/29/2021 | | **Office of Assessment** |  | | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Undergraduate Curriculum Council Chair** |
| |  |  | | --- | --- | | Jason Stewart | 9/24/2021 |   **College Curriculum Committee Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Graduate Curriculum Committee Chair** |
| |  |  | | --- | --- | | Abhijit Bhattacharyya | 9/24/2021 |   **College Dean** | |  |  | | --- | --- | | Alan Utter | 10/11/2021 |   **Vice Chancellor for Academic Affairs** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **General Education Committee Chair (if applicable)** |  |

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

Andre Possani Espinosa, [apossaniespinosa@astate.edu](mailto:apossaniespinosa@astate.edu), +52 419 689 0354 ext. 2061

1. **Title(s) of degree programs to be consolidated/reconfigured:**

BSME in Mechanical Engineering

1. **Proposed title of consolidated/reconfigured program:**

BS in Mechanical Systems Engineering

1. **Proposed Effective Date:** Fall 2022
2. **Reason for proposed program consolidation/reconfiguration:**

*(Indicate student need/demand (projected enrollment) for the proposed program and document that the program meets employer needs using the ADFA Workforce Analysis Form)*

Arkansas State University campus Queretaro must follow policies from both the United States of America and Mexico. In Mexico, the Public Education Ministry (*Secretaria de Educación Pública – SEP*) allows changes to an undergrad program only every 5 years. To comply with this policy and keep our degrees updated, a more flexible engineering program is proposed.

1. **Provide current and proposed curriculum outline by semester.**

*For undergraduate programs, please use Appendix A-8-semester plan form*

*Indicate total semester credit hours required for the proposed program. If new courses are needed for the reconfiguration, approval for the courses must be requested prior to approval for the new degree. Underline any new courses. Identify required general education core courses with an asterisk. If utilizing courses from other departments, please color-code them and provide a key.*

The proposed curriculum has a total of 128 credits, the same as the current curriculum. The proposed curriculum follows the exact same General Education (38 credits) and Engineering Core (20 credits) courses as the current curriculum. Changes are only present on the Major courses. To make the proposed curriculum more flexible, 7 mandatory courses from the current curriculum become Engineering Electives. They allow the proposed curriculum to have 22 credits that can change year by year without the need of approval from the Public Education Ministry of Mexico (SEP). All 7 affected courses belong to the College of Engineering and Computer Science. Along with all engineering courses, the 7 affected courses stay as part of the list of electives. Fourteen new Mechanical Systems Engineering MSE electives are added to the list of engineering electives.

1. **Will the proposed degree be offered:**
   1. **Traditional/Face-to-face** Yes
   2. **Distance/Online** No
      1. **If yes, indicate mode of distance delivery, and the percentage of courses offered via this modality (<50%, 50-99%, or 100%).**

Enter text...

* + 1. **If online, will it be offered through Global Initiatives/Academic Partnerships (AP)?**

Enter text...

1. **Will the proposed degree be offered off-campus?** Yes
   1. **If yes, identify the off-campus location**

Arkansas State University campus Queretaro

1. **Provide documentation that proposed program has received full approval by licensure/certification entity, if required.**

*(A program offered for teacher/education administrator licensure must be reviewed/approved by the Arkansas Department of Education prior to consideration by the Coordinating Board; therefore, the Education Protocol Form also must be submitted to ADHE along with the Letter of Notification).*

The BSMSE program will be accredited by ABET. However, the ABET accreditation process requires that the program produces at least 1 graduate before the accreditation evaluation can take place.

1. **List institutions offering similar program and identify the institutions used as a model to develop the proposed program.**

Arkansas State University – BSME Mechanical Engineering

1. **Provide scheduled program review or specialized accreditation initial review date (within 10 years of program implementation).**

No earlier than Fall 2024; no later than Fall 2027

1. **Is there differential tuition requested?** *If yes, please fill out the New Program/Tuition and Fees Change Form.*

No

1. **Graduate programs only: Will this program require a comprehensive exam?**

Enter text...

**Student Learning Outcomes**

Provide outcomes that students will accomplish during or at completion of this reconfigured degree. Fill out the following table to develop a continuous improvement assessment process.

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

**University Outcomes**

Please indicate the university-level student learning outcomes for which this new program will contribute. Please complete the table by adding program level outcomes (PLO) to the first column, and indicating the alignment with the university learning outcomes (ULO). If you need more information about the ULOs, go to the [University Level Outcomes Website](http://www.astate.edu/a/assessment/student-learning-outcomes/files/ULOs%20for%20Website2.pdf).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **ULO 1: Creative & Critical Thinking** | **ULO 2: Effective Communi-cation** | **ULO 3: Civic & Social Responsibility** | **ULO 4: Globalization & Diversity** |
| **PLO 1**: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. | **X** |  |  |  |
| **PLO 2:** An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. | **X** |  | **X** |  |
| **PLO 3**: An ability to communicate effectively with a range of audiences. |  | **X** |  |  |
| **PLO 4:** An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. | **X** |  | **X** | **X** |
| **PLO 5:** An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. | **X** | **X** | **X** |  |
| **PLO 6:** An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. | **X** | **X** |  |  |
| **PLO 7:** An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. | **X** |  |  |  |

|  |  |
| --- | --- |
| **Outcome 1** | An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. |
| Assessment Procedure Criterion | Indirect Assessment  Surveys of graduating seniors (each semester)  Surveys of Alumni (every two years)  Surveys of Employers (every two years)  Direct Assessment  - 90% of students will score 3.0 or higher on portfolio evaluations (graded work, exams, papers, etc.) performed by faculty from the following course:  ME 3613 Control Systems for Mechanical Engineers |
| Which courses are responsible for this outcome? | ME 3613 |
| Assessment  Timetable | Collect data whenever ME 3613 is offered. Assess every 3 years according to the College of Engineering and Computer Science assessment schedule. |
| Who is responsible for assessing and reporting on the results? | Indirect assessment: the Director of Engineering at campus Queretaro.  Direct assessment: the Professor who teaches ME 3613. |

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| **Outcome 2** | An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. |
| Assessment Procedure Criterion | Indirect Assessment  Surveys of graduating seniors (each semester)  Surveys of Alumni (every two years)  Surveys of Employers (every two years)  Direct Assessment  90% of MSE students score 3.0 or higher on their portfolio evaluations (graded work, exams, papers, etc.) from the following course:  ME 4543 Machine Design |
| Which courses are responsible for this outcome? | ME 4543 |
| Assessment  Timetable | Collect data whenever ME 4543 is offered. Assess every 3 years according to the College of Engineering and Computer Science assessment schedule. |
| Who is responsible for assessing and reporting on the results? | Indirect assessment: the Director of Engineering at campus Queretaro.  Direct assessment: the Professor who teaches ME 4543. |

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| **Outcome 3** | An ability to communicate effectively with a range of audiences. |
| Assessment Procedure Criterion | Indirect Assessment  Surveys of graduating seniors (each semester)  Surveys of Alumni (every two years)  Surveys of Employers (every two years)  Direct Assessment  100% of MSE students in ENGR 4463 score 70/100 or higher on their exam questions related to written communication  85% of students evaluated on oral communication skills by performance appraisal in ENGR 4482 score 3.0 or higher using the assessment instrument  85% of MSE students having writing skills evaluated on a progress report in ENGR 4482, Senior Design II, or another late term writing, will have average scores of 3.0 or higher. |
| Which courses are responsible for this outcome? | ENGR 4463 and ENGR 4482 |
| Assessment  Timetable | Collect data whenever ENGR 4463 and ENGR 4482 are offered. Assess every 3 years according to the College of Engineering and Computer Science assessment schedule. |
| Who is responsible for assessing and reporting on the results? | Indirect assessment: the Director of Engineering at campus Queretaro.  Direct assessment: the Professor who teaches ENGR 4463 and ENGR 4482. |

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| **Outcome 4** | An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. |
| Assessment Procedure Criterion | Indirect Assessment  Surveys of graduating seniors (each semester)  Surveys of Alumni (every two years)  Surveys of Employers (every two years)  Direct Assessment   * 100% of ESE students in ENGR 4463 score 70/100 or higher on their exam questions about ethics. * 90% of students will score 3.0 or higher on portfolio evaluations (graded work, exams, papers, etc.) relative to this outcome performed by faculty from the following course: ME 4553 Heat Transfer |
| Which courses are responsible for this outcome? | ENGR 4463 and ME 4553 |
| Assessment  Timetable | Collect data whenever ENGR 4463 and ME 4553 are offered. Assess every 3 years according to the College of Engineering and Computer Science assessment schedule. |
| Who is responsible for assessing and reporting on the results? | Indirect assessment: the Director of Engineering at campus Queretaro.  Direct assessment: the Professor who teaches ENGR 4463 and ME 4553. |

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| **Outcome 5** | An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objective. |
| Assessment Procedure Criterion | Indirect Assessment  Surveys of graduating seniors (each semester)  Surveys of Alumni (every two years)  Surveys of Employers (every two years)  Direct Assessment   * 100% of the MSE students in ENGR 4463 score 70/100 or higher on exam questions related to functioning on teams * 90% of MSE students evaluated by behavioral observation in ENGR 4482 score 3.0 (adequate/satisfactory) or higher using the assessment instrument. |
| Which courses are responsible for this outcome? | ENGR 4463 and ENGR 4482 |
| Assessment  Timetable | Collect data whenever ENGR 4463 and ENGR 4482 are offered. Assess every 3 years according to the College of Engineering and Computer Science assessment schedule. |
| Who is responsible for assessing and reporting on the results? | Indirect assessment: the Director of Engineering at campus Queretaro.  Direct assessment: the Professor who teaches ENGR 4463 and ENGR 4482. |

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| **Outcome 6** | An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. |
| Assessment Procedure Criterion | Indirect Assessment  Surveys of graduating seniors (each semester)  Surveys of Alumni (every two years)  Surveys of Employers (every two years)  Direct Assessment  90% of students will score 3.0 or higher on portfolio evaluations (graded work, exams, papers, etc.) relative to this outcome performed by faculty from the following course: ME 3613 Control Systems for Mechanical Engineers |
| Which courses are responsible for this outcome? | ME 3613 |
| Assessment  Timetable | Collect data whenever ME 3613 is offered. Assess every 3 years according to the College of Engineering and Computer Science assessment schedule. |
| Who is responsible for assessing and reporting on the results? | Indirect assessment: the Director of Engineering at campus Queretaro.  Direct assessment: the Professor who teaches ME 3613. |

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| **Outcome 7** | An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. |
| Assessment Procedure Criterion | Indirect Assessment  Surveys of graduating seniors (each semester)  Surveys of Alumni (every two years)  Surveys of Employers (every two years)  Direct Assessment   * 100% of students in ENGR 4463 will score 70/100 on questions related to acquisition and application of new knowledge * 90% of students evaluated by performance appraisals in ENGR 4482 for acquisition and application of new knowledge using appropriate learning strategies will score 3.0 (adequate/satisfactory) or higher using the assessment instrument |
| Which courses are responsible for this outcome? | ENGR 4463 and ENGR 4482 |
| Assessment  Timetable | Collect data whenever ENGR 4463 and ENGR 4482 are offered. Assess every 3 years according to the College of Engineering and Computer Science assessment schedule. |
| Who is responsible for assessing and reporting on the results? | Indirect assessment: the Director of Engineering at campus Queretaro.  Direct assessment: the Professor who teaches ENGR 4463 and ENGR 4482. |

**Appendix A, 8-Semester Plan**

(**Referenced in #9** - **Undergraduate Proposals Only)**

*Instructions: Please identify new courses in italics*.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Arkansas State University campus Queretaro**  **Degree: Bachelor of Science**  **Major: Mechanical Systems Engineering**  **Year: 2022** | | | | | | | | |
| 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 |  |  |  | ++ ME Elective | 3 |  |
|  | +++ Professional Development Elective | 3 |  |  |  | +++ Professional Development Elective | 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 3613 | Control Systems for ME | 3 |  |
|  | ++++ Engineering Elective | 3 |  |  |  | ++++ Engineering Elective | 3 |  |
|  | ++++ Engineering Elective | 3 |  |  |  | ++++ Engineering Elective | 3 |  |
|  | ++++ Engineering Elective | 3 |  |  |  | ++++ Engineering Elective | 3 |  |
|  | ++++ Engineering Elective | 3 |  |  |  | ++++ Engineering Elective | 1 |  |
| **Total Hours** |  | 16 |  |  | **Total Hours** |  | 15 |  |
| **Total Jr/Sr Hours 66 Total Degree Hours 128** | | | | | | | | |
| + See General Education Requirements for College of Engineering.  ++ Upper-level Mechanical Engineering courses.  +++ Approved Professional Development Elective. Advisor approval required.  ++++ Engineering Elective: Upper-level EE, ENGR, ESE, ME or MSE course. | | | | | | | | |

**Bulletin Changes**

|  |
| --- |
| **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.** |

**From the 2021-2022 undergraduate catalog**

**From Page 71**

**Before:**

Special Education

World Languages and Cultures (emphasis in):

—French

—Spanish

**Bachelor of Science in Electrical Engineering (B.S.E.E.)**

Electrical Engineering

**Bachelor of Science in Mechanical Engineering (B.S.M.E.)**

Mechanical Engineering

**Bachelor of Science in Nursing (B.S.N.)**

Nursing

—Second Degree Accelerated Program

—RN to BSN

—LPN to BSN

**After:**

Special Education

World Languages and Cultures (emphasis in):

—French

—Spanish

**Bachelor of Science in Electrical Engineering (B.S.E.E.)**

Electrical Engineering

**Bachelor of Science in Mechanical Engineering (B.S.M.E.)**

Mechanical Engineering

**Bachelor of Science**

Mechanical Systems Engineering

**Bachelor of Science in Nursing (B.S.N.)**

Nursing

—Second Degree Accelerated Program

—RN to BSN

—LPN to BSN

**From Page 87**

**Before:**

**COLLEGE OF ENGINEERING AND COMPUTER SCIENCE**

Department of Computer Science

Program for Civil Engineering

Program for Data Science and Data Analytics

Program for Electrical Engineering

Program for Engineering Management Systems

Program for Mechanical Engineering

Program for Engineering Technology

**After:**

**COLLEGE OF ENGINEERING AND COMPUTER SCIENCE**

Department of Computer Science

Program for Civil Engineering

Program for Data Science and Data Analytics

Program for Electrical Engineering

Program for Engineering Management Systems

Program for Mechanical Engineering

Program for Mechanical Systems Engineering

Program for Engineering Technology

**From Page 185**

**Before:**

**College of Engineering and Computer Science**

Professor Abhijit Bhattacharyya, Dean

Associate Professor Yeonsang Hwang, Associate Dean

**PROGRAMS OF STUDY**

The College of Engineering and Computer Science offers undergraduate degree programs in a

broad spectrum of areas, including a Bachelor of Arts and a Bachelor of Science in Computer Science;

a Bachelor of Science in Civil Engineering degree; a Bachelor of Science in Data Science and Data

Analytics; a Bachelor of Science in Electrical Engineering degree; a Bachelor of Science in Engineering

Management Systems; a Bachelor of Science and an Associate of Science in Engineering Technology a

Bachelor of Science and Associate of Applied Science in Land Surveying and Geomatics; and a Bachelor

of Science in Mechanical Engineering degree. Minors are available in Computer Science, Electrical

Engineering, Land Surveying and Geomatics, and Renewable Energy Technology. Two undergraduate

certificates in Data Analytics and Controls and Automation are also available.

The College of Engineering and Computer Science grants a wide-range of master’s degree programs

(M.E.M., M.S., M.S.E., M.S.Engr.) and multiple graduate certificates. For further information, see

A-State’s Graduate Bulletin.

From an administrative standpoint, the college is comprised of one department and five programs:

Department of Computer Science

Program for Civil Engineering

Program for Electrical Engineering

Program for Engineering Management Systems

Program for Engineering Technology

Program for Mechanical Engineering

**After:**

**College of Engineering and Computer Science**

Professor Abhijit Bhattacharyya, Dean

Associate Professor Yeonsang Hwang, Associate Dean

**PROGRAMS OF STUDY**

The College of Engineering and Computer Science offers undergraduate degree programs in a

broad spectrum of areas, including a Bachelor of Arts and a Bachelor of Science in Computer Science;

a Bachelor of Science in Civil Engineering degree; a Bachelor of Science in Data Science and Data

Analytics; a Bachelor of Science in Electrical Engineering degree; a Bachelor of Science in Engineering

Management Systems; a Bachelor of Science and an Associate of Science in Engineering Technology a

Bachelor of Science and Associate of Applied Science in Land Surveying and Geomatics; and a Bachelor

of Science in Mechanical Engineering degree. Minors are available in Computer Science, Electrical

Engineering, Land Surveying and Geomatics, and Renewable Energy Technology. Two undergraduate

certificates in Data Analytics and Controls and Automation are also available. Furthermore, the College

offers a Bachelor of Science in Electrical Systems Engineering and a Bachelor of Science in Mechanical

Systems Engineering at the campus Queretaro in Mexico.

The College of Engineering and Computer Science grants a wide-range of master’s degree programs

(M.E.M., M.S., M.S.E., M.S.Engr.) and multiple graduate certificates. For further information, see

A-State’s Graduate Bulletin.

From an administrative standpoint, the college is comprised of one department and seven programs:

Department of Computer Science

Program for Civil Engineering

Program for Electrical Engineering

Program for Electrical Systems Engineering

Program for Engineering Management Systems

Program for Engineering Technology

Program for Mechanical Engineering

Program for Mechanical Systems Engineering

**After Page 210 and before the heading on “Engineering Program Minors” (pg. 211).   
(Before: N/A (this section is new)).**

**After:**

Mechanical Systems Engineering Program

**Assistant Professors:** *Ramirez, Hernandez*

**Instructors:** *Martinez, Iracheta, Cavezza*

In the Bachelor of Science in Mechanical Systems Engineering (BSMSE) program at A-State campus Queretaro, students combine design, mechanics, machines, materials science, thermo-fluids, and control with state-of-the-art computational methods to analyze, innovate, design, implement and operate complex engineering systems which are economical, reliable, efficient, and sustainable. Emphasis is given to conventional, alternative, and renewable energy generation principles. This flexible program allows students to choose from a wide range of electives to create a unique experience. Students can choose from specialized focuses such as Energy, Structures & Materials, Computational Mechanics, or select a different set of electives.

**PROGRAM EDUCATIONAL OBJECTIVES**

The educational objectives for the Mechanical Systems Engineering Program are:

1. Graduates have successfully advanced in mechanical engineering practice as evidenced by their achievements and contributions to their employers and the greater engineering community.
2. Graduates have pursued graduate degrees or completed professional development activities in continuing to advance their knowledge base in the mechanical engineering or related professional fields.
3. Graduates have made a broader contribution to local and national economic development by providing a mechanical engineering perspective to the challenges and opportunities of society.

The Mechanical Systems Engineering Program’s outcomes define the knowledge, skills, attitudes, and behaviors that program graduates are expected to have by the time of graduation from the Program. Graduates of the Mechanical Systems Engineering Program will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environ­mental, and economic factors;
3. An ability to communicate effectively with a range of audiences;
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; and
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**Major in Mechanical Systems Engineering**

**Bachelor of Science**

A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

|  |  |
| --- | --- |
| **University Requirements:** | |
| See University General Requirements for Baccalaureate degrees (p. 47) | |
| **First Year Making Connections Course:** | **Sem. Hrs.** |
| ENGR 1402, Concepts of Engineering (See Engineering Core Courses) | **-** |
| **General Education Requirements:** | **Sem. Hrs.** |
| See General Education Curriculum for Engineering | **38** |
| **Engineering Core Courses:** | **Sem. Hrs.** |
| Refer to Engineering Core Courses | **20** |
| **Major Requirements:**  Electives denoted by an asterisk (\*) must be chosen from a list of approved electives which is available from Mechanical Systems Engineering advisors and through the faculty office.  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. | **Sem. Hrs.** |
| ENGR 2411, Mechanics of Materials Laboratory | 1 |
| ENGR 2413, Mechanics of Materials | 3 |
| ENGR 2423 **AND** ENGR 2421, Electric Circuits I and Laboratory | 4 |
| ENGR 3423, Dynamics | 3 |
| ENGR 3443, Engineering Thermodynamics I | 3 |
| ENGR 3471, Fluid Mechanics Laboratory | 1 |
| ENGR 3473, Fluid Mechanics | 3 |
| ME 2502, Solid Modeling for Mechanical Engineers | 2 |
| ME 3513, Mechanical Vibrations | 3 |
| ME 3613, Control Systems for Mechanical Engineers | 3 |
| ME 4543, Machine Design | 3 |
| ME 4553, Heat Transfer | 3 |
| \* Mechanical Engineering Elective (upper level, ME prefix) | 3 |
| \* Engineering Electives (upper level, EE or ENGR or ESE or ME or MSE prefix) | 22 |
| \* Professional Development Electives (advisor approval required)  *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  MATH 3243, Linear Algebra  MATH 3303, Modern Algebra I  MATH 3323, Mathematical Modeling  MATH 3343, College Geometry  MATH 4423, Modern Algebra II  MATH 4513, Applied Mathematics  MATH 4533, Numerical Methods  MATH 4553, Advanced Calculus I  MATH 4563, Advanced Calculus II  ME 3523, Introduction to Robotics Laboratory  ME 4523, Introduction to Finite Element Analysis  ME 4593, Design of Heating, Ventilating, and Air-Conditioning Systems  STAT 4453, Probability and Statistics I  STAT 4463, Probability and Statistics II  TECH 3433, AutoCAD 3D Modeling  TECH 3453, Advanced Technology Design Solid Works | 6 |
| **Sub-total** | 63 |
| **Additional Support Courses:** | **Sem. Hrs.** |
| MATH 4403, Differential Equations | **3** |
| PHYS 2044, University Physics II | 4 |
| **Total Required Hours:** | **128** |

**Page 552, before the heading “Military Science and Leadership (MSL)”**

**Before:**

**MLED 4116. Teaching Internship II** Directed teaching under the supervision of a qualified

teacher in an appropriate area of specialty. Prerequisites, Admission into Teacher Education

Program, MLED 4042, MLED 4006, Two of the following specialty courses, MLED 4002, MLED

4012, MLED 4022, MLED 4032. Spring.

**Military Science and Leadership (MSL)**

**MSL 1011. Introduction to the Army and Critical Thinking** Examines the unique duties

and responsibilities of officers. Discuss organization and role of the Army. Review basic

life skills pertaining to fitness and communication. Analyze Army values and expected ethical

behavior.

**After:**

**MLED 4116. Teaching Internship II** Directed teaching under the supervision of a qualified

teacher in an appropriate area of specialty. Prerequisites, Admission into Teacher Education

Program, MLED 4042, MLED 4006, Two of the following specialty courses, MLED 4002, MLED

4012, MLED 4022, MLED 4032. Spring.

**Mechanical Systems Engineering (MSE)**

**MSE 3413. Materials Properties** The basic principles behind processing and manufacturing of materials are reviewed. These principles are utilized in a systematic manner for the manufacturing of mechanical components. Prerequisites C or better in CHEM 1013 C or ENGR 2403 or PHYS 2034.

**MSE 3423. Applied Mechanics of Materials** The application and utilization in design of stress and deformation of members in tension, compression, torsion, and bending are reviewed. Allowable stress, combination loading, stress and strain transformation, and beam deflection techniques are utilized to solve engineering problems. Prerequisite C or better in ENGR 2413.

**MSE 4423. Experimental Stress Analysis** Theory and basic applications of photo-elastic, electric strain gage and accelerometer methods for the experimental solution of 2D and 3D structural problems considering static and dynamic loads. Prerequisite: C or better in MSE 3423.

**MSE 4433. Composite Materials** Product life cycle for a typical composite component including design, testing, prototyping, manufacturing, certification, maintenance, and repair. Different types of composites available in the market along with their designing principles are reviewed with a focus on polymer-based composites. Prerequisite: C or better in MSE 3413.

**MSE 4443. Metallic Materials** Physical and chemical properties, phase diagrams, imperfections and heat treatment for steels and steel alloys. Constitution, microstructure and dedicated mechanical properties for metals. Prerequisites C or better in MSE 3413.

**MSE 4453. Tooling and Fixture Design** Fundamentals of jigs and fixtures including methods and manufacturing process. The work-holding concepts and principles. Types of locators and pins and basic application of machine tool fixtures. Prerequisite C or better in ENGR 2413 and ME 2502.

**MSE 4473. Compressible Fluid Mechanics** Basics of compressible fluid dynamics, including governing equations, thermodynamic context and characteristic parameters. Basic applications of compressible flows to the analysis of nozzles and compressible turbomachinery. Introduction to Turbulent flows. Prerequisite: C or better in ENGR 3473.

**MSE 4502. Advanced Solid Modeling** Advanced computer modeling using CAD software. Topics covered include but are not limited to: advanced parametric modeling, surface modeling, sheet metal and injection mold design. Prerequisite: C or better in ME 2502.

**MSE 4521. Finite Element Analysis Laboratory** The solution of practical engineering applications, using modern FEA software. Detailed explanation of preprocess, process and postprocess of FEA models. Adequate interpretation of FEA results. Simulations of: linear elasticity, modal analysis, transient dynamic analysis, non-linear analysis and explicit dynamics. Prerequisite: C or better in ENGR 2413. Corequisite: ME 4523.

**MSE 4531. Computational Fluid Mechanics Laboratory** The solution of practical engineering applications, using modern CFD software. Detailed explanation of preprocess, process and postprocess of CFD models. Adequate interpretation of CFD results. Simulations of: flat plate boundary layer, flow past a cylinder / airfoil, Taylor-Couette flow. Prerequisite: C or better in ENGR 3473. Corequisite: MSE 4533.

**MSE 4533. Computational Fluid Mechanics** Formulation and application of finite difference methods for solving fluid flow problems. Classification of partial differential equations and formulation of well-posed problems. Discrete approximation of partial differential equations: stability, consistency, and convergence. Finite-volume formulations. Application of methods to flow problems. Prerequisite: C or better in ENGR 3473.

**MSE 4553. Continuum Mechanics**  The classical field theory of deformable bodies. The theory will be systematically developed, from the kinematics to the balance equations, the material theory, and the entropy principles. Prerequisite: C or better in ME 4543.

**MSE 4561. Manufacturing Processes Laboratory** Basic manufacturing processes such as machining, welding, and joining. Corequisite: ME 4563.

**MSE 4573. Advanced Manufacturing** Advanced manufacturing techniques such as additive manufacturing, automated composite deposition, laser machining/welding, robotics and IoT integration. Prerequisite: C or better in ME 4563.

**Military Science and Leadership (MSL)**

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and responsibilities of officers. Discuss organization and role of the Army. Review basic

life skills pertaining to fitness and communication. Analyze Army values and expected ethical

behavior.