**I. GenEd Requirement**  23 sh  
A. New Student Seminar  
   **GNED 199**  
   1  
C. Communication  
   C1. Writing  
   C2. Literature  
   C3. Communication  
D. Fine and Performing Arts  
F. Humanities  
   F1. Great Works and Their Influences  
   F2. Philosophical and Religious Perspectives  
G. Computer Science  
   **CSIT 104**  
   (0)  
H. Mathematics  
   **MATH 122 or AMAT 120**  
   (0)  
I. Natural Science Laboratory  
   **PHYS 191**  
   (0)  
J. Physical Education  
K. Social Science  
   Complete 6 credits from Categories K1, K2, K3 or II.B. (World Cultures)  
   K1. American and European History  
   K2. Global Cultural Perspectives  
   K3. Social Science Perspectives  
L. Interdisciplinary Studies  

**II. World Languages and Cultures Requirement**  3 sh  
A. World Languages  
   3  
B. World Cultures  
   (0)  
(Some World Cultures courses may fulfill Gen Ed requirements.)

**III. Major Requirements**  68-72 sh  
A. Physics Core  
   **(33 sh)**  
   PHYS 191 University Physics I  
   4  
   PHYS 192 University Physics II  
   4  
   PHYS 198 Introductory Physics Seminar  
   1  
   PHYS 210 Intermediate Mechanics  
   3  
   PHYS 220 Oscillations, Waves, & Optics  
   3  
   PHYS 230 Intermediate Physics Laboratory  
   4  
   PHYS 300 Junior/Senior Physics Seminar  
   1  
   PHYS 320 Statistical and Thermal Physics  
   3  
   PHYS 330 Advanced Physics Laboratory  
   4  
   PHYS 340 Electricity and Magnetism  
   3  
   PHYS 360 Modern Physics  
   3  

B. Physics Electives  
   **(6-8 sh)**  
   PHYS 180 Astronomy for Everyone  
   4  
   PHYS 245 Fundamentals of Electronics  
   4  
   PHYS 280 Astronomy for Physicists  
   4  
   PHYS 341 Electronics and Digital Circuits  
   4  
   PHYS 350 Modern Optics  
   4  
   PHYS 380 Observational Astronomy  
   4  
   PHYS 399 Special Topics in Physics  
   1-4  
   PHYS 451 Radiation and Medical Physics  
   3  
   PHYS 461 Special & General Relativity  
   3  
   PHYS 462 Nuclear Physics  
   4  
   PHYS 464 Quantum Mechanics  
   3

**IV. Transfer credits from Stevens applied to MSU**  15 sh  
(Undergraduate engineering courses to prepare for graduate coursework.)

**V. Free Electives**  7 - 11 sh

**Minimum total required for graduation**  120 sh  
Students apply to dual-degree program in 6th semester (Jan. 15th deadline). For admission to Stevens MS program, General Education and major courses must be completed by the end of the 6th semester, with an overall GPA of at least 3.2 and math/science GPA at least 3.0. Admission committee interview required. Enrollment at Stevens commences in year 4.

Revised May 1, 2020
Stevens M.E. in Mechanical Engineering
Requirements

1. Complete these two required courses:
ME 635 Modeling and Simulation
ME 641 Engineering Analysis I

2. Complete 4 courses from any of these 7 concentrations:

Product Design
ME 520 Analysis and Design of Composites
ME 615 Thermal Systems Design
ME 658 Advanced Mechanics of Solids
ME 659 Advanced Structural Design
ME 663 Finite Element Method
ME 665 Advanced Product Development

Manufacturing
ME 565 Introduction to Additive Manufacturing
ME 566 Design for Manufacturability
ME 644 Computer Integrated Design & Manufacturing
ME 645 Design of Production Systems
ME 652 Advanced Additive Manufacturing
ME 653 Design for Additive Manufacturing

Thermal, Fluids, Energy
ME 510 Power Plant Engineering
ME 601 Engineering Thermodynamics
ME 604 Advanced Heat Transfer
ME 615 Thermal Systems Design
ME 674 Fluid Dynamics
ME 675 Computational Fluid Dynamics & Heat Transfer

Pharmaceutical Manufacturing
ME 530 Introduction to Pharmaceutical Manufacturing
ME 535 Good Manufacturing Practice in Pharmaceutical Facilities Design
ME 540 Validation and Regulatory Affairs in Pharmaceutical Manufacturing
ME 628 Manufacturing and Packaging of Pharmaceutical Oral Solid Dosage Products
ME 629 Manufacturing of Sterile Pharmaceuticals
ME 647 Environmental Systems (HVAC) in Healthcare Manufacturing

Medical Devices
ME 525 Biomechanics
ME 526 Biofluid Mechanics
ME 580 Medical Device Design and Technology
ME 658 Advanced Mechanics of Solids
ME 660 Medical Devices Manufacturing
ME 674 Fluid Dynamics

Robotics & Control
ME 598 Introduction to Robotics
ME 621 Introduction to Modern Control Engineering
ME 622 Optimal Control and Estimation of Dynamical Systems
ME 631 Mechanical Vibrations I
ME 651 Analytic Dynamics
ME 654 Advanced Robotics

Micro/Nano Systems
ME 573 Introduction to MEMS
ME 581 Introduction to BioMEMS
ME 680 Fundamentals of Micro/Nano Fluidics
ME 681 Applications of Advanced Micro/Nano Materials, Structures, and Devices
NANO 525 Techniques of Surface and Nanostructure Characterization
NANO 600 Nanoscale Science and Technology

3. Choose 4 elective courses.
A maximum of 2 may be non-ME courses. Of the 2 non-ME courses, a maximum of one may be a non-SES course (i.e. any Stevens graduate course). A student may substitute a Project (ME 800 Special Problems in Mechanical Engineering, 3 credits) or a Master’s Thesis (ME 900 Thesis in Mechanical Engineering, 6 credits) for the appropriate number of courses.
# Suggested Sequence for Five-Year Plan

## First Year (MSU)

<table>
<thead>
<tr>
<th>Fall</th>
<th>Total: 18cr</th>
<th>Spring</th>
<th>Total: 18cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. PHYS 191 University Physics I (4)</td>
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<td>PHYS 192 University Physics II (4)</td>
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</tr>
<tr>
<td>H. MATH122 Calc I or AMAT120 App Calc A(4)*</td>
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<td>PHYS 198 Introductory Physics Seminar (1)</td>
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<tr>
<td>G. CSIT 104 Computational Concepts (3)</td>
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<td>MATH 221 Calc II or AMAT 220 App Calc B (4)</td>
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<tr>
<td>C1. Writing (3)</td>
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<td>C2. Literature (3)</td>
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<td>C3. Communication (3)</td>
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<td>D, F1, or F2 Gen. Ed. Course (3)</td>
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<td>K1, K2, K3, or World Cultures Course (3)</td>
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## Second Year (MSU)

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<td>PHYS 220 Oscillations, Waves, &amp; Optics (3)**</td>
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<td>PHYS 360 Modern Physics (3)**</td>
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<td>PHYS 230 Intermediate Physics Lab (4)</td>
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<td>AMAT 350 or PHYS 377 (3) [or MATH 325 (4)]</td>
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<td>MATH 222 Calculus III (4)</td>
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<td>CHEM 121 General Chemistry II (4)</td>
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<td>CHEM 120 General Chemistry I (4)</td>
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<td>K1, K2, K3, or World Cultures Course (3)</td>
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<td>L. Interdisciplinary Studies (3)</td>
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<td>Free Elective (3)</td>
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## Third Year (MSU)

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<tbody>
<tr>
<td>PHYS 210 Intermediate Mechanics (3)**</td>
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<td>PHYS 340 Electricity and Magnetism (3)**</td>
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<td>PHYS 330 Advanced Physics Lab (4)</td>
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<td>PHYS 320 Statistical and Thermal Physics (3)**</td>
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<td>Free Elective (3)</td>
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<td>Free Elective (3)</td>
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<tr>
<td>World Language I (3)</td>
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<td>J. Physical Education (1)</td>
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## Fourth Year (Stevens)

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<td>ME 126 Mechanics of Solids (4)</td>
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<td>ME 483 Control Systems (3)</td>
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<td>ME 322 Engineering Design VI (2)</td>
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<td>ME 491 Manufacturing Processes &amp; Systems (3)</td>
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<td>ME 345 Modeling and Simulation (3)</td>
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<td>ME 635 Modeling &amp; Simulation (3); required</td>
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<tr>
<td>ME 361 Design of Machine Components (3)</td>
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<td>ME 641 Engineering Analysis I (3); required</td>
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<td>ME 354 Heat Transfer (3)</td>
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## Fifth Year (Stevens)

<table>
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<tr>
<th>Fall</th>
<th>Total: 12cr</th>
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<td>ME Concentration Course III (3)</td>
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<td>ME Concentration Course II (3)</td>
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<td>ME Concentration Course IV (3)</td>
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<td>ME Elective Course I (3)</td>
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<tr>
<td>ME Elective Course II (3)</td>
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<td>ME Elective Course IV (3)</td>
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</tbody>
</table>

Note: General Education, World Languages/Cultures, and free electives can be taken in any sequence, but C1 and C2 should be completed in Year 1.

*Students who do not have a strong (4 year) background in high school mathematics, including exponential, logarithmic, and trigonometric functions are advised to take MATH 111 Applied Precalculus before Calculus I.

** The PHYS 210, 320, 340 and PHYS 220, 360 sequences are offered in alternate years and can be taken in Year 2 or Year 3. Most 200-level and higher physics courses are offered on an alternate-year schedule.