General Requirements for Graduation Without Thesis – 48 units total with 3.0 GPA overall: (All classes must be passed with a grade of C or higher)

- **18 units** Approved graduate level course work in AME, approved by AME academic advisor
  - 4 units AME 525 Engineering Analysis
  - 14 units 500 level courses in AME department
- **18 units** Approved graduate level course work in ISE, approved by ISE academic advisor
  - 12 units of required ISE Core Courses (ISE 500, ISE 515, ISE 544, and ISE 561)
  - 3 units required Engineering Elective (Select one: ISE 530, ISE 536, or ISE 562)
  - 3 units Business/Management Area. 500 level business and/or management course. Advisor approval.
- **12 units** Approved 400 or 500 level elective courses by AME and/or ISE departments
- No more than 5 classes (15 units) at 400 level

**Notes:** Term course typically offered is (F)=Fall  (Sp)= Spring  (Su)=Summer  + Not Regularly Offered
Ex: AME 436 Energy and Propulsion (Sp) is typically offered in the Spring.

## AME Mechanical Engineering Courses

### Required AME Courses (4 units):
AME 525 Engineering Analysis (F)(Sp)(Su)

### Recommended Courses by Specialization: Note Specializations do not appear on transcripts or diplomas

#### Thermal and Fluid Sciences Track

<table>
<thead>
<tr>
<th>Combustion Core Courses:</th>
<th>Fluid Dynamics Core Courses:</th>
<th>Heat Transfer Core Courses:</th>
</tr>
</thead>
<tbody>
<tr>
<td>AME 436 Energy and Propulsion (Sp)</td>
<td>AME 457 Engineering Fluid Dynamics (F)</td>
<td>AME 457 Engineering Fluid Dynamics (F)</td>
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<tr>
<td>AME 513 Principles of Combustion (F)</td>
<td>AME 511 Compressible Gas Dynamics (Sp)</td>
<td>AME 515 Advanced Problems in Heat Conduction (Sp) +</td>
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<tr>
<td>AME 514 Applications of Combustion and Reacting Flows (Sp)</td>
<td>AME 530a Dynamics of Incompressible Fluids (F)</td>
<td>AME 516 Convective Processes (Sp) +</td>
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<tr>
<td>AME 530a Dynamics of Incompressible Fluids (F)</td>
<td>AME 535a Intro to Computational Fluid Mechanics *(F)</td>
<td>AME 517 Radiation Heat Transfer (F) +</td>
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**Electives with any emphasis:**
AME 530b Dynamics of Incompressible Fluids (Sp) +
AME 535b Intro to Computational Fluid Dynamics (Sp) +

* AME 526 is recommended prep for AME 535a.

#### Design Track

<table>
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<tr>
<th>Design Core Courses:</th>
<th>AME 505 Engineering Information Modeling (Sp)</th>
<th>AME 509 Applied Elasticity (Sp)</th>
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<tbody>
<tr>
<td>AME 503 Advanced Mechanical Design (F)(Su)</td>
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### Recommended Electives:

AME 404 Mechanical Engineering Problems (F)  
AME 541 Linear Control Systems II *(F)  
CE 529a Finite Element Analysis (F)(Su)

AME 451 Linear Controls Systems I (F)(Sp)  
ASTE 520 Spacecraft System Design (F)(Sp)  
SAE 549 System Architetecting (F)(Sp)(Su)

AME 527 Elements of Vehicle and Energy Systems Design (Sp)  
ASTE 523 Design of Low Cost Space Missions (Sp)

^ AME 451 is pre-req for AME 541.

□ AME 451 is only recommended elective if equivalent not taken during undergrad.
### Mechanics and Materials Core Courses:
- AME 509 Applied Elasticity (Sp)
- AME 560 Fatigue and Fracture (Sp)
- MASC 551 Mechanical Behavior of Engineering Materials (F)
- AME 560 Fatigue and Fracture (Sp)
- MASC 551 Mechanical Behavior of Engineering Materials (F)
- MASC 534 Materials Characterization (F)
- MASC 561 Dislocation Theory and Applications (Sp)

### Dynamics and Control Core Courses:
- AME 521 Engineering Vibrations II (F)
- AME 524 Advanced Engineering Dynamics (F)
- AME 552 Nonlinear Control Systems ^ (Sp)
- AME 522 Nonlinear Vibrations (F)
- AME 541 Linear Control Systems II * (F)

### Recommended Electives:
- AME 588 Materials Selection (F)
- AME 559 Creep (F) +
- CE 529a Finite Element Analysis (F)(Su)
- AME 559 Creep (F) +
- MASC 561 Dislocation Theory and Applications (Sp)

### Energy Core Courses:
- AME 430 Thermal System Design (F)
- AME 577 Survey of Energy & Power for a Sustainable Future (Sp)
- CE 515 Sustainable Infrastructure Systems (F)
- AME 578 Modern Alternative Energy Conversion Devices (F)

### Recommended Electives:
- AME 513 Principles of Combustion (F)
- AME 579 Combustion Chemistry and Physics (Sp)
- AME 581 Intro to Nuclear Engineering (F)
- AME 514 Applications of Combustion and Reacting Flows (Sp)
- AME 582 Nuclear Reactor Physics (Sp)
- ENE 505 Energy and Environment (F)(Sp)

### ISE Engineering Management Courses

#### ISE Required Core Courses (12 units):
- ISE 500 Engineering Management Decisions and Statistics
- ISE 544 Management of Engineering Teams
- ISE 515 Engineering Project Management
- ISE 561 Economic Analysis of Engineering Projects*
- ISE 562 Value and Decision Theory

#### Required Engineering Elective

Select one of the following courses (3 units):
- ISE 530 Optimization Methods for Analytics
- ISE 536 Linear Programming and Extensions
- ISE 562 Value and Decision Theory

#### Business and Management Area

Select one 500 level course (3 units):
Business and/or management content with advisor approval.

### ISE Elective Courses

**Please contact Mary Ordaz (mordaz@usc.edu) in ISE for elective recommendations.**

* ISE 460 is pre-req for ISE 561.
Program of Study Worksheet

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<thead>
<tr>
<th>Course</th>
<th>Semester</th>
<th>Notes</th>
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<tbody>
<tr>
<td>AME 525</td>
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*To be approved to pursue the MSME/MSEM with Thesis, you must first discuss with an AME Academic Advisor during your first semester in program. An AME or ISE faculty thesis advisor must be secured by student and special planning of coursework and units must be discussed with AME Academic Advisor.*