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
  - 6 units AME 525 Engineering Analysis and AME 526 Engineering Analytical Methods
  - 12 units 500 level courses in AME department
- **18 units** Approved graduate level course work in ISE, approved by ISE academic advisor
  - 6 units of required ISE Core Courses (ISE 500 and ISE 561)
  - 12 units approved core courses from MS in Engineering Management program
- **12 units** Approved 400 or 500 level elective courses, approved by AME and/or ISE department
- No more than 16 units at 400 level may to taken as degree credit

### AME Aerospace Engineering Courses

**Required AME Courses (6 units):**
AME 525 Engineering Analysis (F)(Sp)(Su)  
AME 526 Engineering Analytical Methods (F)(Sp)(Su)

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

#### Aerospace Control Track

**Aerospace Control Core Courses:**
AME 541 Linear Control Systems II * (F)
AME 532a Flight Vehicle Stability and Control (Sp)

**Electives:**
AME 451 Linear Controls Systems I (F)(Sp) □
AME 544 Computer Control of Mechanical Systems (Sp)
AME 552 Nonlinear Control Systems ^ (Sp)
ASTE 585 Spacecraft Attitude Control (Su) +
ASTE 586 Spacecraft Attitude Dynamics +

* AME 451 is pre-req for AME 541.  
^ AME 541 is a pre-req for AME 552.
□ AME 451 is only recommended elective if equivalent not taken during undergrad.

#### Aerospace Design Track

**Aerospace Design Core Courses:**
AME 527 Elements of Vehicle and Energy Systems Design (Sp)

**Electives:**
AME 408 Computer-Aided Design of Mechanical Systems (F)(Sp)
AME 502 Modern Topics in Aerospace Design (F)
AME 528 Elements of Composite Structure Design +
ASTE 520 Spacecraft System Design (F)

#### Aerospace Structures Track

**Aerospace Structures Core Courses:**
AME 529 Aircraft Structures Analysis (Sp)
AME 546 Basic Aeroelasticity +

**Electives:**
AME 509 Applied Elasticity * (Sp)
AME 521 Engineering Vibrations II ^ (F)
AME 559 Creep +
AME 560 Fatigue and Fracture (Sp)
CE 507 Mechanics of Solids I (F)
CE 529a Finite Element Analysis (F)(Su) ∞
CE 541a Dynamics of Structures (F)

* AME 403 is pre-req for AME 509.  
^ AME 420 is pre-req for AME 521.  
∞ Cross-listed

**Notes:** Term course typically offered
(F)=Fall  (Sp)= Spring  (Su)=Summer  + Not Regularly Offered  Ex: AME 541 Linear Controls Systems II (F) is typically offered in the Fall.
## Computational Fluid Dynamics

### Courses:
- **AME 511 Compressible Gas Dynamics (Sp)**
- **AME 530a Dynamics of Incompressible Fluids (F)**
- **AME 535a Introduction to Computational Fluid Mechanics * (F)**
- **AME 530b Dynamics of Incompressible Fluids (Sp) +**
- **AME 535b Intro to Computational Fluid Mechanics (Sp) +**
- **AME 630 Transition to Chaos in Dynamical Systems (Sp) +**
- **AME 651 Statistical Theories of Turbulence +**
- **AME 652 Turbulent Shear Flows +**

### Electives:
- **AME 457 Engineering Fluid Dynamics (F)**
- **ASTE 545 Computational Techniques in Rarefied Gas Dynamics +**
- **Math 504ab Numerical Solution of Ordinary and Partial Differential Equations +**

## Aerodynamics/Fluid Dynamics

### Courses:
- **AME 511 Compressible Gas Dynamics (Sp)**
- **AME 516 Convection Processes (Sp) +**
- **AME 530a Dynamics of Incompressible Fluids (F)**
- **AME 535a Intro to Computational Fluid Mechanics * (F)**
- **AME 535b Intro to Computational Fluid Mechanics (Sp) +**
- **AME 537 Microfluids +**
- **AME 620 Aero and Hydrodynamic Wave Theory +**
- **AME 621 Stability of Fluids +**
- **AME 651 Statistical Theories of Turbulence +**
- **AME 652 Turbulent Shear Flows +**

### Electives:
- **AME 457 Engineering Fluid Dynamics (F)**
- **AME 436 Energy and Propulsion (Sp)**
- **AME 457 Fluid Dynamics (F)**
- **ASTE 501a Physical Gas Dynamics +**
- **ChE 530 Thermodynamics for Chemical Engineers (F)**

## Propulsion

### Courses:
- **AME 511 Compressible Gas Dynamics (Sp)**
- **AME 513 Principles of Combustion (F) +**
- **AME 514 Application of Combustion (Sp) +**
- **AME 436 Energy and Propulsion (Sp) +**
- **AME 457 Fluid Dynamics (F) +**
- **ASTE 501a Physical Gas Dynamics +**
- **ChE 530 Thermodynamics for Chemical Engineers (F) +**
- **ISE 565 Law and Finance for Engineering Innovation (F) +**
- **ISE 564 Performance Analysis +**
- **ISE 544 Management of Engineering Teams (F)(Sp)**
- **ISE 566 Financial Accounting for Engineering (Sp)**

## ISE Engineering Management Courses

### Required Core Courses (6 units):
- **ISE 500 Engineering Management Decisions and Statistics (F)(Sp)**
- **ISE 561 Economic Analysis of Engineering Projects (F)(Sp) Pre-Req: ISE 500**

### Accounting Elective Courses

Select **one** of the following courses (3 units):
- **CE 502 Construction Accounting (F)**
- **ISE 566 Financial Accounting for Engineering (Sp)**

## Engineering Management Elective Courses

Select **two** of the following courses (6 units):
- **ISE 515 Engineering Project Management (F)(Sp)(Su)**
- **ISE 514 Advanced Production Planning and Scheduling (F)(Sp)**
- **ISE 527 Quality Management for Engineers (F)(Sp)**
- **ISE 525 Design of Experiments (F)(Sp)**
- **ISE 544 Management of Engineering Teams (F)(Sp)**
- **ISE 561 Economic Analysis of Engineering Projects (F)(Sp)**
- **ISE 565 Law and Finance for Engineering Innovation (F) +**
- **ISE 564 Performance Analysis +**
- **ISE 556 Performance Analysis +**

### Quantitative Methods Elective Courses

Select **one** of the following courses (3 units):
- **ISE 514 Advanced Production Planning and Scheduling (F)(Sp)**
- **ISE 527 Quality Management for Engineers (F)(Sp)**
- **ISE 530 Optimization Methods for Analytics (F)**
- **ISE 525 Design of Experiments (F)(Sp)**

**Notes:** Term course typically offered

(F)=Fall   (Sp)= Spring   (Su)=Summer   + Not Regularly Offered   Ex: AME 511 Compressible Gas Dynamics (Sp) is typically offered in the Spring.

Please contact Mary Ordaz (mordaz@usc.edu) for Engineering Management advisement.
# Program of Study Worksheet

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