



Dept. of Civil, Architectural, and Environmental Engineering  
1251 Memorial Drive  
McArthur Engineering Bldg., Rm 325  
Coral Gables, FL 33146

Last Updated: **April 29, 2019**

## PLANNED COURSE ROTATION FOR CAE COURSES

The actual course offerings can be viewed online using CaneLink. For planning purposes, the course rotations are shown on the following pages. These include:

- Civil Engineering courses: Structures / Geotechnical / Transportation
- Architectural Engineering courses: MEP & Construction
- Civil Engineering courses: Water & Environmental
- Biomedical Engineering (BME) and Mechanical & Aerospace (MAE) graduate courses relevant to CAE (Structures and Architectural engineering)

Example rotation:

Semester	Undergraduate												Graduate			
Spring 2018	210	211	212		313	310	321	450	370	371	402	404	520/620	590/690	604	711
	210		212		313					371						
	210									371						

3 Sections  
of CAE  
210 should  
be offered.

1 Combined  
section of CAE  
520 and CAE 620  
should be offered.

---

**CIVIL ENGINEERING COURSES: STRUCTURES / GEOTECHNICAL / TRANSPORTATION**

---

Semester	Undergraduate												Graduate				
Spring 2017	210 210 210	211	212 212		313 313	310	321	450	370	371 371 371	402	404	520/620		570/670		714
Fall 2017	210 210 210	211	212 212 212	213 213		310	320	350	470		402	403	521/621	525/625			712
Spring 2018	210 210 210	211	212 212		313 313	310	321	450	370	371 371 371	402	404	520/620			604	711 790
Fall 2018	210 210 210	211	212 212 212	213 213		310	320	350	470		402	403	521/621	511/611			716
Spring 2019	210 210 210	211	212 212		313 313	310	321	450	370	371 371 371	402	404	520/620	523/623	570/670	604	714
Fall 2019	210 210 210	211	212 212 212	213 213		310	320	350	470		402	403	521/621	525/625			712
Spring 2020	210 210 210	211	212 212		313 313	310	321	450	370	371 371 371	402	404	520/620	522/622	570/670	604	711 790
Fall 2020	210 210 210	211	212 212 212	213 213		310	320	350	470		402	403	521/621	511/611			716
Spring 2021	210 210 210	211	212 212		313 313	310	321	450	370	371 371 371	402	404	520/620	523/623	570/670	604	714

---

**ARCHITECTURAL ENGINEERING COURSES: MEP & CONSTRUCTION\***

Semester	Undergraduate						Graduate							
Spring 2017	380	381	404	460			560/660		581/681					781
Fall 2017			403		480	481		561/661			780			
Spring 2018	380	381	404	460			560/660		581/681			604	790 (762)	
Fall 2018			403		480	481		561/661			780		762	
Spring 2019	380	381	404	460			560/660		581/681			604	790 (762)	781
Fall 2019			403		480	481		561/661			780		762	
Spring 2020	380	381	404	460			560/660		581/681	582/682		604	762	
Fall 2020			403		480	481		561/661			780		762	781
Spring 2021	380	381	404	460			560/660		581/681	582/682		604	762	

\*Note: CAE 582/682 and CAE 781 are typically offered once every 4 semesters

### CIVIL ENGINEERING COURSES: ENVIRONMENTAL AND WATER (INCLUDING RISK)

Semester	Undergraduate							Graduate						
Fall 2017		330	340			403		530/630			541/641	542/642		730
Spring 2018	240	330		345 345	430	404	440		533/633				604	735
Fall 2018		330	340			403		530/630		540/640	541/641			743 744
Spring 2019	240	330			430	404	440					542/642	604	730
Fall 2019		330	340	345		403		530/630	533/633					735 744
Spring 2020	240	330			430	404	440			540/640	541/641		604	743
Fall 2020		330	340			403		530/630				542/642		730 744
Spring 2021	240	330		345	430	404	440		533/633				604	735

### SUMMARY OF CAE GRADUATE COURSES

<u>Courses in Rotation:</u>	<u>Existing Courses NOT in Rotation:</u>
CAE 604 Master's Design Project	
CAE 511/611 Advanced Structural Analysis CAE 520/620 Advanced Design of Concrete Structures CAE 521/621 Advanced Design of Steel Structures CAE 522/622 Design of Prestressed Concrete Structures CAE 523/623 Design of Masonry Structures CAE 525/625 Timber Structural Systems CAE 570/670 Advanced Foundation Engineering  CAE 530/630 Water-Resources Engineering II CAE 533/633 Water-Quality Control in Natural Systems CAE 540/640 Environmental Chemistry CAE 541/641 Eng. Systems for Disease Control & Bioremediation	CAE 510/610 Structural Mechanics (take MAE 507/607) CAE 524/624 Design of Bridge Structures  CAE 531/631 Surface-Water Hydrology CAE 532/632 Ground-Water Hydrology CAE 543/643 Air Pollution Control Engineering

CAE 542/642 Solid and Hazardous Waste Engineering CAE 560/660 Sustainable Construction CAE 561/661 Computer Aided Architectural Engineering Design CAE 581/681 Energy-Efficient Building Design CAE 582/682 Building Energy Modeling and Simulation	CAE 550/650 Advanced Highway Design CAE 551/651 Urban Traffic Control CAE 553/653 Transportation Systems Planning and Demand Modeling
CAE 711 Theory of Elasticity CAE 712 Structural Reliability CAE 714 Structural Dynamics CAE 716 Fracture Mechanics  CAE 730 Environmental Hydrology CAE 735 Water and Wastewater Eng.: Treatment and Reuse CAE 743 Risk Analysis CAE 744 Risk Management and Resilience  CAE 762 Construction Project Management  CAE 781 Advanced Building Energy Modeling and Simulation	CAE 702 Finite Element Methods (Take MAE 705 or BME 687) CAE 713 Stability of Structures CAE 715 Plates and Shells  CAE 731 Wastewater Treatment and System Design CAE 732 Water Treatment and System Design  CAE 780 Indoor Environmental Modeling

---

**BIOMEDICAL ENGINEERING (BME) AND MECHANICAL & AEROSPACE (MAE) GRADUATE COURSES RELEVANT TO CAE (STRUCTURES, ARCHITECTURAL, AND ENVIRONMENTAL ENGINEERING)**

Semester	Graduate							
	MAE						BME	
Fall 2017	501/601	502/602	512/612					587/687
Spring 2018	507/607			516/616	714		522/622	
Fall 2018	501/601	502/602	512/612					
Spring 2019				516/616			522/622	587/687
Fall 2019	501/601	502/602	512/612					
Spring 2020	507/607			516/616	714		522/622	
Fall 2020	501/601	502/602	512/612					
Spring 2021	507/607			516/616	714		522/622	

**BME 522/622 Scanning Electron Microscopy for Engineers;** 3 credits Spring Semester

Physics of transmission and scanning electron microscopy including x-ray spectroscopic analysis. Students will learn to independently operate and use the SEM for imaging in its role in research and engineering. Each student will be responsible for several imaging assignments and an independent research project related to their field of interest.

**BME 587/687 Finite Element Analysis for Engineers;** 3 credits Fall & Spring Semester

Introduction to the finite-element method. Hands-on applications of FEMLAB software to the analysis of structural, thermal, chemical, electro-magnetic, optical, and fluid flow problems. PREREQUISITE: MTH 311

**MAE 501/601 Methods of Engineering Analysis;** 3 credits Fall Semester

Analysis of engineering systems in equilibrium and motion. Examples considered from mechanical, electrical, thermal and fluids engineering. Mathematical theory and computer methods for obtaining numerical solutions are developed for various cases involving discrete and continuous systems. Lecture, 3 hours. PREREQUISITE: MAE 412, MTH 311 OR PERMISSION OF THE INSTRUCTOR.

**MAE 502/602 Vibrations;** 3 credits Fall Semester

Basic theory of free and forced vibrations of mechanical systems with and without damping. Applications to systems with one and several degrees of freedom are included. PREREQUISITE: MAE 202, 207, 412 OR PERMISSION OF INSTRUCTOR.

**MAE 507/607 Advanced Mechanics of Solids;** 3 credits Spring Semester

Course discusses the basic elements of elasticity, plasticity, and viscoelasticity. Application to mechanical systems at rest and in motion are included. PREREQUISITE: MAE 202, 207, SENIOR STANDING OR PERMISSION OF INSTRUCTOR.

---

**MAE 512/612 Intermediate Fluid Mechanics; 3 credits Fall Semester**

Course topics include conservation of mass, momentum, and energy, potential flow, viscous laminar and turbulent flows, the Reynolds analogy, and Boundary-layer approximations. Gas dynamics are also discussed. PREREQUISITE: MAE 309.

**MAE 516/616 Introduction to Composite Materials 3 credits Offered By Announcement Only**

Course provides an introduction to composite materials and terminology. Topics include advantages offered by composite materials, current aerospace, automotive, and bio-mechanics applications, experimental results, analytical models, and effects of impact and fatigue loads. The environment's impact on composite materials' performance and design procedures are discussed. Case studies examining composite materials as efficient replacements are also included.

**MAE 705 Finite Element Methods in Mechanical and Aerospace Engineering; 3 credits Spring Semester**

Finite-element analysis methods for static and dynamic analysis of mechanical and aerospace structures, heat transfer analysis, and fluid flow applications. Primary emphasis is placed on underlying mechanics and numerical techniques. Consideration is also given to the use of existing programs, such as ANSYS, NASTRAN and FIDAP, designing proper meshes, and choosing the proper element. A term project is included. PREREQUISITE: MAE 501, 507 OR PERMISSION OF INSTRUCTOR.

**MAE 706 Experimental Methods in Fluid Mechanics; 3 credits Offered By Announcement Only**

Course topics include methods of flow visualization, laser techniques in measurement of wall motions, conduit compliance, Newtonian and non-Newtonian properties of fluids, measurement of unsteady flow and pressure, laser Doppler anemometry, ultrasound Doppler velocimetry, electro-magnetic flowmetry, measurement of steady and unsteady wall shear stresses and boundary layers. PREREQUISITE PERMISSION OF INSTRUCTOR.

**MAE 714 Computational Fluid Dynamics; 3 credits Spring Semester**

Incompressible flow equations in rectangular co-ordinates. Topics include basic computational methods for incompressible flow, three dimensional flows, compressible flow equations in rectangular coordinates, basic computational methods for compressible flows, treatment of shocks, artificial viscosities, convergence, other mesh systems, programming, testing, and information processing. PREREQUISITE: MAE 512.