UNIVERSITY OF MIAMI
COLLEGE of ENGINEERING

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

Last Updated: **August 22, 2017**

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:

3 Sections of CAE 210 should be offered.

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

Semester	Undergraduate												Graduate			
Spring 2016	210 210 210	211	212 212		313 313	310	321	450	370	371 371 371	402	404	520/620	510/610	570/670	711

CIVIL ENGINEERING COURSES: STRUCTURES / GEOTECHNICAL / TRANSPORTATION

Semester	Undergraduate												Graduate			
~~Spring 2016~~	~~210~~ ~~210~~ ~~210~~	~~211~~	~~212~~ ~~212~~		~~313~~ ~~313~~	~~310~~	~~321~~	~~450~~	~~370~~	~~371~~ ~~371~~ ~~371~~	~~402~~	~~404~~	~~520/620~~	~~510/610~~	~~570/670~~	~~711~~
~~Fall 2016~~	~~210~~ ~~210~~ ~~210~~ ~~210~~	~~211~~	~~212~~ ~~212~~ ~~212~~	~~213~~ ~~213~~		~~310~~	~~320~~	~~350~~	~~470~~		~~402~~	~~403~~	~~521/621~~	~~511/611~~		~~716~~
~~Spring 2017~~	~~210~~ ~~210~~ ~~210~~	~~211~~	~~212~~ ~~212~~		~~313~~ ~~313~~	~~310~~	~~321~~	~~450~~	~~370~~	~~371~~ ~~371~~ ~~371~~	~~402~~	~~404~~	520/620	[redacted]	~~570/670~~	~~714~~
Fall 2017	210 210 [redacted]	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	522/622 510/610	570/	711
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	714
Fall 2019	210 210 210	211	212 212 212	213 213		310	320	350	470		402	403	521/621	525/625		712

ARCHITECTURAL ENGINEERING COURSES: MEP & CONSTRUCTION*

Semester	Undergraduate						Graduate					
~~Spring 2016~~	~~380~~	~~381~~	~~404~~	~~460~~			~~560/660~~		~~581/681~~			
~~Fall 2016~~			~~403~~		~~480~~	~~481~~		~~561/661~~			~~780~~	
~~Spring 2017~~	~~380~~	~~381~~	~~404~~	~~460~~			~~560/660~~		~~581/681~~			~~781~~
Fall 2017			403		480	481		561/661			[redacted]	
Spring 2018	380	381	404	460			560/660		581/681	[redacted]		
Fall 2018			403		480	481		561/661			[redacted]	
Spring 2019	380	381	404	460			560/660		581/681			781
Fall 2019			403		480	481		561/661			[redacted]	
Spring 2020	380	381	404	460			560/660		581/681	582/682		
Fall 2020			403		480	481		561/661			[redacted]	

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

CIVIL ENGINEERING COURSES: WATER & ENVIRONMENTAL

Semester	Undergraduate							Graduate		
~~Spring 2016~~	~~240~~	~~330~~			~~430~~	~~404~~	~~440~~		~~542/642~~	~~730~~
~~Fall 2016~~		~~330~~	~~340~~	~~345~~		~~403~~		~~530/630~~	~~533/633~~	~~735~~
~~Spring 2017~~	~~240~~	~~330~~			~~430~~	~~404~~	~~440~~		~~540/640~~	~~743~~
Fall 2017		330	340			403		530/630	542/642	730
Spring 2018	240	330		345	430	404	440		533/633	745
Fall 2018		330	340			403		530/630	540/640	743 541/641
Spring 2019	240	330			430	404	440		542/642	730
Fall 2019		330	340	345		403		530/630	533/633	745

SUMMARY OF GRADUATE COURSES

Courses in Rotation:	**Existing Courses NOT in Rotation:**
CAE 511/611 Advanced Structural Analysis	CAE 510/610 Structural Mechanics (take MAE 507/607)
CAE 520/620 Advanced Design of Concrete Structures	CAE 524/624 Design of Bridge 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 531/631 Surface-Water Hydrology
CAE 533/633 Water-Quality Control in Natural Systems	CAE 532/632 Ground-Water Hydrology
CAE 540/640 Environmental Chemistry	CAE 543/643 Air Pollution Control Engineering
CAE 541/641 Eng. Systems for Disease Control & Bioremediation	
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 580/680 Hospital and Health Care Facility Design 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 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 760 Computer-Integrated Architecture, Eng. and Construction CAE 780 Indoor Environmental Modeling

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

Semester	Graduate					
	MAE					BME
~~Spring 2014~~	~~507~~			~~605~~	~~614~~	~~587~~
~~Fall 2014~~	~~501~~	~~502~~	~~512~~			~~587~~
~~Spring 2015~~	~~507~~				~~714~~	~~587~~
Fall 2015	501/601	5/602	5/612			587/687
~~Spring 2016~~	~~507/607~~			~~605~~	~~714~~	~~587/687~~
~~Fall 2016~~	~~501/601~~	~~502/602~~	~~5/612~~			~~587/687~~
~~Spring 2017~~	~~507/607~~			~~605~~	~~714~~	~~587/687~~
Fall 2017	501/601	502/602	512/612			587/687
Spring 2018	507/607			605	714	587/687
Fall 2018	501/601	502/602	512/612			587/687
Spring 2019	507/607			605	714	587/687
Fall 2019	501/601	502/602	512/612			587/687

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 3.00 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 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.