ENGR 442—Mechanics of European Structures

Catalog Data: ENGR 442. Mechanics of European Structures. (3-0). Credit 3. II. Design and construction of major structures in Europe from 1st century BC to 16th century; masonry design construction techniques; mechanics of columns, arches, vaults, walls, buttresses, and other components; modern analysis techniques applied to historic masonry structures. Prerequisites: CVEN 305 or equiv; consent of instructor.

Instructor: Ray W. James, P.E., Ph.D., Dept. of Civil Engineering, 979-845-2475


Goals: The student will develop an appreciation for the evolution of masonry structural engineering and construction, and be introduced to modern methods of analysis applied to historic structures.

Topics: Introduction & history of European design and construction (2 hr)
Roman
Gothic
Mechanics of masonry construction and early design methods (30 hr)
Material properties, loads, simplifying assumptions
Foundation systems
Columns and towers (4 hr)
Arches (6 hr)
Vaults and domes (6 hr)
Walls and window openings (4 hr)
Buttresses (4 hr)
Timber roofing systems (2 hr)
Spires (2 hr)
Analysis of European structures by the finite element method (12 hr)
Introduction to Pro-Engineer/Mechanica (6 hr)
Course project selection (2 hr)
Course project presentations (4 hr)

Computer usage: Use of commercial FEM analysis programs and preparation of engineering report using word processors.

Grading: Attendance & Participation 20%
Mid-term exam 40% (1 hr)
Student project 40%

ADA Statement: The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room 126 of the Koldus Building, or call 845-1637.