SUMMER ABROAD 2014

ENG-104: Mechanics of Materials
Instructor: Sashi Kunnath, Professor of Civil Engineering, UC Davis
Co-Instructor: Giorgio Monti, Professor, University of Rome “La Sapienza”
E-mail: skkunnath@ucdavis.edu

By Hibbeler, Pearson

TOPICS
1: Normal stress, strain; Shear stress, strain; Design for axial load & shear
2: Deformation of axially loaded determinate & indeterminate bars;
3: Thermal effects; Stresses on inclined sections
4: Torsion of circular bars & tubes; Stresses & strains in pure shear
5: Concepts of strain energy & stress concentration (axial loading & torsion)
6: Shear force and bending moment diagrams
7: Centroids & Moment of Inertia
8: Pure bending of beams – normal stresses & design for bending stress
9: Shear stresses in beams of constant cross-section; non-uniform beams
10: Stresses in Composite beams
11: Analysis of Stress & Strain – Mohr’s circle (2D only)
12: Combined stresses (shear & bending)
13: Deflection of beams – integration method and energy method (intro to virtual work)
14: Indeterminate beams and Column buckling
15: Thin walled tubes and shear flow

ECI 198: Engineering of Historic Constructions
No textbook; lectures, field trips and handouts

Historical Sources of Information
The Secrets of the Golden Number
The Art of Construction in the Roman Times

Classic Masonry Typologies
The Popular Tradition & the Cultural Tradition
The Opus Quadratum and its Mechanics
Vertical and Horizontal Actions; Behavior under in-plane loads
The use of the diàtoni; Chain-like behavior

The Monolithic Wall under Horizontal and Vertical Action
‘Collapse modes’ of sliding and overturning
Horizontal (e.g., arch thrust); Vertical (e.g., arch weight)

The Wall of Bricks
The Wall of Ortòstati and Diàtoni
‘Modern’ interpretation & Effectiveness of the roof

Multistory Buildings with Vaults
An example: the Cathedral of S. Angelo dei Lombardi
Verification sequence, roof trusses
Arches, Vaults and Domes