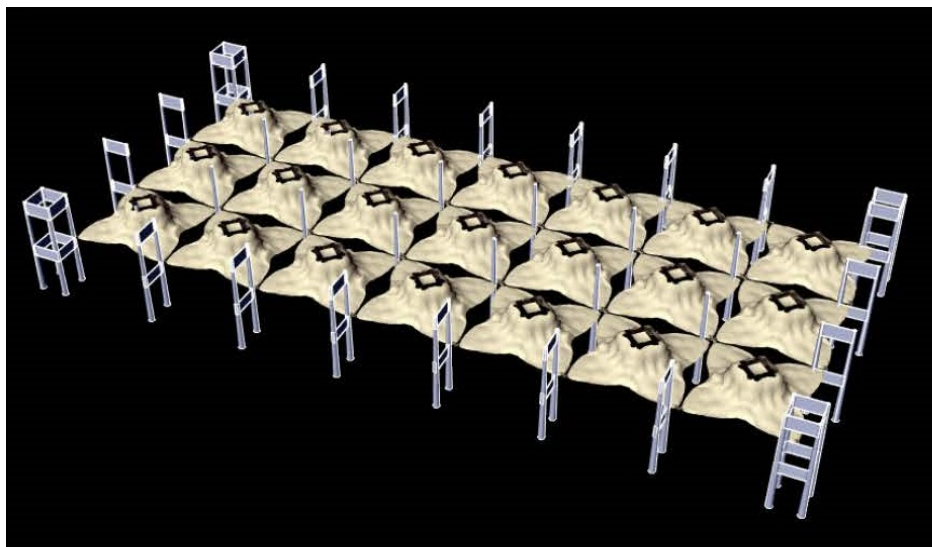


We study topics selected by the class from the list below. The course culminates in a group project involving form-finding and analysis/design of a cable net roof, based either on a prominent built example or a 3-D boundary geometry chosen by the group. Grades are based on class participation and the group project. All topics are documented in worksheets and covered in prerecorded video lectures, which we view together in-class to generate discussion. (The prerecorded lectures are then posted online.) Each topic runs one week.

- Structural member design in reinforced concrete; In 48-324, R.C. beams were sized using equivalent allowable stresses varying with concrete strength, steel strength, and reinforcement ratio. In practice, R.C. beams are sized using “ultimate strength design” termed USD. The statics and algebra of “USD” are easy to understand but were omitted in 48-324 because of time.
- Structural member design in prestressed concrete; In practice, prestressed beams are sized using allowable stress design (ASD). The statics and algebra of “ASD” for prestressed concrete were introduced in 48-324 but not fully explained because of time.
- Truss analysis and design; Truss design was mentioned in 48-324, but not studied further because of time.
- Construction planning and scheduling; Familiarity with “Gantt charts” and “resource leveling” is often expected of architects in practice and is featured in our AECM program.
- Shear wall structures; In 48-324 the building code constraint of overturning moment and resisting moment was introduced. In this elective course, we take up sizing and location of shear walls in structures.
- Geotechnical horror stories; These are architect’s, engineer’s, and builder’s nightmares.
- Two-way slabs and space frames; Exemplified by case studies including the Sendai Mediatheque.
- Exoskeleton structures; A recently hyped building type exemplified by the London Gherkin, with its 1961 precedent in Pittsburgh.
- Shell structures: Arches, domes, and shells, leading to case studies of Felix Candela.
- Topics from *Design of Building Structures*, Schueller, Prentice-Hall, 1996.
- Or, propose other topics of interest.

The following topics are preparatory to the group project:

- Statics of cable trusses and cable nets, leading to “the universal membrane equation,” (2 weeks)
- In class student-led work sessions using Kangaroo with Rhino and Grasshopper. (2 weeks, minimum)



Kangaroo models “wrinkling” under excessive load in Hajj terminal semi-conoidal units (J. Kusten, Fall 2020)