

METU DEPARTMENT OF ARCHITECTURE
BS 536 - Studies on Tall Buildings: Design Considerations

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Definition, emergence and historical background of tall buildings. Planning and design considerations. Lateral loads; wind and earthquake effects. Steel, reinforced concrete and composite tall buildings. Structural systems used in architectural design of tall buildings; shear trussed frame and shear walled frame systems, mega column (mega frame, space truss) and mega core systems, outriggered frame systems, tube (framed-tube, trussed-tube, bundled-tube) systems. Aerodynamic modifications against wind. The course is conducted through lectures, case studies and discussions, and aims the student to realize that the design of tall buildings starts with the architect and requires high level of interdisciplinary approach.

Despite all their negative effects, it is not possible to think of contemporary cities without tall buildings. Tall buildings are gigantic projects demanding incredible logistics, and management and influence building industry. Tall building design requires a unique collaboration particularly between the architect and the engineer. This interdisciplinary approach to resolving building planning, construction, and usage issues plays a vital role. Architects, planners, engineers, and developers must develop a broad perspective for an understanding of the planning, design, and construction of tall buildings and their impact on a global scale. Moreover, because of the scale and complexity of tall buildings, this teamwork often begins at the earliest stages of the design process and continues well into construction.

The purpose of this course is to create basic design guidance for tall buildings as a resource for architects, engineers, developers, and students. It aims to make a contribution to and strengthen particularly the architect's understanding of tall building design that requires a high level of interdisciplinary approach, by providing a broad overview of the "tall building" with its general concepts.

Outline

Introduction to the course.
Definition, emergence, and historical background.
Planning and design considerations, lateral loads, and aerodynamic modifications against wind.
Steel, reinforced concrete and composite tall buildings.
Structural systems.
Selection of the term projects.
Critics on term projects.
Preliminary presentation of term projects.
Critics on term projects.
Final presentation and submission of term projects in the form of;
A3 Size + Digital Presentation (+ Model : not compulsory)

References

1. Ali, M. ve Armstrong, P., *Architecture of Tall Buildings*, Council on Tall Buildings and Urban Habitat Committee (CTBUH), New York: McGraw-Hill Book Company, 1995.
2. Ali, M. ve Moon, K., *Structural Developments in Tall Buildings: Current Trends and Future Prospects*, Invited Review Paper, *Architectural Science Review*, Vol 50, No 3, p 205-223, 2007.
3. CTBUH, Council on Tall Buildings and Urban Habitat, Illinois Institute of Technology, S.R. Crown Hall, 3360 South State Street, Chicago, Illinois, USA, www.ctbuh.org.
4. Emporis, Emporis Corporation, A Global Building Information Company, Theodor-Heuss-Allee 2, 60486 Frankfurt, Germany, www.emporis.com.
5. Günel, M.H. and İlgin, H.E., *Yüksek Binalar: Taşıyıcı Sistem ve Aerodinamik Form*, METU Faculty of Architecture, 2010.
6. Günel, M.H. and İlgin, H.E., *Tall Buildings: Structural Systems and Aerodynamic Form*, Routledge – Taylor and Francis, 2014.
7. Holmes, J.D., *Wind Loading of Structures*, Spon Press, London, 2001.
8. Irwin, P.A. & Baker, W.F., *The Burj Dubai Tower: Wind Engineering*, *Structure Magazine*, p 28-31, June 2006.
9. Kareem, A., Kijewski, T. and Tamura, Y., *Mitigation of Motion of Tall Buildings with Specific Examples of Recent Applications*, *Wind and Structures*, Vol 2, No 3, p 201-251, 1999.
10. Schueller, W., *High-Rise Building Structures*, John and Wiley Sons Inc., New York, 1977.
11. Smith, B.S. and Coull, A., *Tall Building Structures: Analysis and Design*, New York, Wiley, 1991.
12. Taranath, B., *Steel, Concrete & Composite Design of Tall Buildings*, New York, McGraw-Hill Book Company, 1998.