UNIVERSITI TEKNOLOGI MARA

ARK751: ADVANCED ARCHITECTURAL CONSTRUCTION I

Course Name (English)	ADVANCED ARCHITECTURAL CONSTRUCTION I APPROVED
Course Code	ARK751
MQF Credit	2
Course Description	The course is a study on various forms of steel and concrete construction focusing on high-rise buildings and long span floor structures. Lectures cover topics on construction systems, buildability and integration issues, industrialised techniques and fast-tracking methods, as well as aspects of the design and detailing of cladding, including materials and maintenance consideration. At the end of the course, students are to response a constructional system and detailing of the cladding component for a building of their choice.
Transferable Skills	Tech-Savvy
Teaching Methodologies	Lectures, Field Trip, Tutorial, Presentation
CLO	CLO1 Explain various structural systems, constructional methods and materials for high rise and long span structure. CLO2 Propose various constructional methods and materials, and environmental solutions that are suitable in varying design situations.
Pre-Requisite Courses	No course recommendations

Topics
1. Structural load 1.1) Dead load, Live load, Settlement, Wind load, Typhoon and hurricane, Earthquake, Wind drift
2. Tube structure in concrete 2.1) Concrete shear core, Framed concrete shear core etc. for high-rise buildings 2.2) Concrete tube-in-tube etc. for super-tall buildings 2.3) Other techniques currently employed
3. Tube structure in steel 3.1) Semi rigid steel frame, Rigid steel frame, Steel-framed shear truss, Steel belt truss with framed shear truss etc. for high-rise buildings 3.2) Steel-framed tube, Exterior-braced framed tube, Bundled tube, Steel truss tube with mega columns etc. for super-tall buildings 3.3) Other techniques currently employed
4. Construction sequence for fast tracking for example top-bottom 4.1) n/a
5. Cladding / 'skin' 5.1) Pre-cast concrete cladding, Metal composite cladding, Curtain walling 5.2) Specialised glass for strength, fire protection, reduction of solar penetration, reduction of noise etc. 5.3) Sun-shading devices
6. Integration of building services with structure 6.1) Air-conditioning, lighting, fire fighting, water supply, sanitary, telephone, fibre optic, public address system, security system, building automated system (BAS), rainwater disposal etc.
7. A study on long span structure for reinforced concrete and steel. 7.1) R.C. grid floor, pre-cast pre-stressed hollow-core slabs, proprietary systems currently available in the market. 7.2) Pre-stressing and post-tensioning techniques 7.3) 7.4) Structural steel for long span girder/beam design: castellated beam, veirendeel truss, plate girder, box girder, lattice beam, haunched beam etc. 7.5) Proprietary systems currently available in the market eg. Trapezoidal Beam

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Report on precedent study of completed high building	50%	CLO2

Reading List

Recommended Text

- **Allen, E. & Iano, J. 2003, *Fundamentals of Building Construction: Materials and Methods*, 4 Ed., John Wiley & Sons Inc. Massachusetts**
- **Brookes, A. J. & Grech, C. 1994, *Connections: Studies in Building Assembly*, 1 Ed., Whitney Library of Design New York**
- **Macdonald, A. J. 2001, *Structure & Architecture*, 1 Ed., Architectural Press Oxford**

Reference Book Resources

- **Bennett, D. & Steinkamp, J. R. 1995, *Skyscrapers: Form and Function*, Marshall Editions Ltd. London**
- **Dupre, J. 2008, *Skyscrapers: A History of the World's Most Extraordinary Buildings*, Black Dog & Leventhal Publishers New York**
- **Howler, E. 2003, *Skyscrapers; Vertical Now.*, Universal Publishers. New York**
- **Levy, M. & Salvadori, M. G. 2002, *Why Buildings Fall Down: How Structures Fail.*, W.W. Norton & Company London**
- **Nordenson, G. & 7. Riley, T 2003, *Tall Buildings*, Museum of Modern Art. New York**
- **Zukowsky, J. & Thorne, M 2000, *Skyscrapers: The New Millenium*, Prestel. Munich**
- **Council on Tall Buildings and Urban Habitat, Melbourne Organizing Committee 2001, *Tall Buildings and Urban Habitat: Cities in the Third Millennium*, The 6th World Congress Ed., Spon Press New York**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources