New York University Tandon School of Engineering  
Course Outline CE-GY 6033  
Selected Topics in Structural Engineering - Tall Buildings  
Spring 2017  
Professor Georgi Petrov PE AIA  
Mondays 6:00 – 8:30; Rogers Hall, room 204

Contact: gip1@nyu.edu  
Office Phone: 212-298-9603  
Office hours: By appointment

Course Description:
The course includes a broad treatment of tall buildings. Introductory topics include: historical tall building development, urban planning, energy efficiency and long-term sustainability. Structural topics include: foundation systems, analysis methods, and design of structural systems for gravity, wind, and seismic loads. Unique aspects of mechanical, electrical, plumbing, and fire-safety issues will be highlighted. Construction topics include: steel erection and concrete placement methods, on-site inspection and observation, and economic project delivery. Several case studies will be presented by guest speakers active in design and construction of some of the tallest buildings worldwide.

Course Pre-requisites:
Structural Analysis:
- Shear, moment, axial force diagrams
- Analysis of trusses/frames
- Use of analysis software
- Use of CAD software

Structural Design (Steel and Concrete):
- Floor systems (flat plate, slab/girder, metal deck, etc.)
- Columns under combined axial and flexural loads
- Foundation systems
- Moment frames, braced frames, and shear walls

Course Structure
Lectures, presentations, guest lectures, course readings, term project.
Readings
An optional and recommended text is:

**Structural Analysis and Design of Tall Buildings: Steel and Composite Construction**
by Bungale S. Taranath
ISBN-10: 1439850895
Published by CRC Press 2011

Other printed Resources:
The Tall Buildings Reference Book
By Dave Parker and Antony Wood
ISBN-10: 0415780411
Published by the Council on Tall Buildings and Urban Habitat (CTBUH)

Grading

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Midterm</td>
<td>10%</td>
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<tr>
<td>Term project</td>
<td>40%</td>
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<tr>
<td>Final exam</td>
<td>30%</td>
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*Homework:* Assigned during the week, due in class on the date specified. No late homework will be accepted. To receive credit, homework solutions must be organized and legible.

*Midterm Examination:* One exam, administered during class.

*Final Examination:* A comprehensive final exam will be administered on a date, time, and location determined by the university.
Class Schedule

23 Jan.  Class 1 – Introduction and Course Expectations
30 Jan.  Class 2 – History of Tall Buildings
6 Feb.  Class 3 – Urban Planning and Sustainability
   • Urban Planning with Tall Buildings
   • Energy and Sustainability Considerations
   • Guest Lecture: Bank of America Tower
13 Feb  Class 4 – Loads I
   • Wind Loads
   • Design for Wind Loads
20 Feb  NO Class - Presidents day
27 Feb  Class 5 – Loads II
   • Seismic Load
   • Design for Seismic Loads
   • Gravity
6 Mar  Class 6 - Foundations
   • Guest Lecture by Prof. Magued Iskander
13 Mar  NO Class – Spring Break
20 Mar  Class 7 – Structural Systems
27 Mar  Class 8 – Mid Term Exam
3 Apr  Class 9 – Design of Gravity Systems
   • Materials
   • Concrete Systems
   • Steel Systems
10 Apr  Class 10 – Design of Cores
   • Layout and Coordination
   • Shear Walls
   • Link Beams
   • Braced Frames
17 Apr  Class 11- Construction
   • Staged Construction Analysis
   • Project Management
   • On-site observations and Inspection
   • Fire safety
   • Mechanical/electrical systems
   • Cladding
24 Apr  Class 12 – Site Visit
   • Manhattan West Project
1 May  Class 13 – Case Studies / Project Help
   • Jin Mao, Shanghai, China / Zifeng Tower, Nanjing, China / Lotte Supertower, Seoul, South Korea / Burj Khalifa, Dubai, UAE
8 May  Class 14 – Project Presentations
15 May  Final
Further Suggested Texts:

**Engineering Architecture: The Vision of Fazlur R. Khan** by Yasmin Sabina Khan

**Skyscrapers: Form & Function** by David Bennett
ISBN-10: 0684803186

**Hongkong Bank: The Building of Norman Foster's Masterpiece** by Stephanie Williams

**Unbuilding** by David Macaulay
ASIN: B004H1UF3K

**Why Buildings Fall Down: How Structures Fail** by Mario Salvadori

**Planning For Tall Buildings** by Michael J. Short
ASIN: B00ABLEKJK
Moses Center Statement of Disability

If you are a student with a disability who is requesting accommodations, please contact New York University’s Moses Center for Students with Disabilities (CSD) at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.

NYU School of Engineering Policies and Procedures on Academic Misconduct
A. Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School’s rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School’s Policy on Academic Misconduct.

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

1. Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person’s work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.
2. Fabrication: including but not limited to, falsifying experimental data and/or citations.
3. Plagiarism: intentionally or knowingly representing the words or ideas of another as one’s own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.
4. Unauthorized collaboration: working together on work that was meant to be done individually.
5. Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.
6. Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.