

<b>Academic Year</b>	2018-19	<b>Semester</b>	1
<b>Course Coordinator</b>	Associate Professor Li Bing		
<b>Course Code</b>	CV3011		
<b>Course Title</b>	Reinforced Concrete Design		
<b>Pre-requisites</b>	CV2011 Structural Analysis I		
<b>No of AUs</b>	3		
<b>Contact Hours</b>	Total : 39 Hours (Lectures: 26 hrs; Tutorials: 13 hrs)		
<b>Proposal Date</b>	January 2018		

### Course Aims

The objective is to equip the students with basic understanding of the behaviour of reinforced concrete structures and to develop the skill to analyze and design basic concrete members.

### Intended Learning Outcomes (ILO)

By the end of this course, the students would be able to:

1. Analyze and design singly and doubly reinforced concrete beams under flexure and shear, including regular (rectangular shaped) and T-beams.
2. Analyze and design structural concrete beams subjected to shear loading;
3. Conduct a service load analysis to control deflection and cracking of beams;
4. Determine bond length, lap splice and detailing requirements for reinforced concrete members;
5. Analyze and design one way and two way slabs under flexure and shear;
6. Conduct a service load analysis to control deflection and cracking of slabs;
7. Analyze and design reinforced concrete columns and develop moment-axial load interaction curves;
8. Analyze and design isolated and combined footings; and
9. Consider the limitations of the design methods used when applying them.

### Course Content

S/N	Topic	Lecture Hours	Tutorial Hours
1	<b>Basic design concepts:</b> Basic layout of concrete structures, loading, basic material properties of concrete and reinforcing steel, limit state design philosophy.	2	1
2	<b>Analysis of structure:</b> Load combinations and loading arrangements, simplification of framed structures, moment redistribution.	4	2
3	<b>Design and analysis of flexural members:</b> Singly and doubly reinforced rectangular sections, flanged sections, shear, bond and anchorage, serviceability.	8	4

4	<b>Solid slabs:</b> Slab actions, design of one-way spanning slabs, two-way spanning slabs.	5	2
5	<b>Columns:</b> Classification, column behaviour, axially loaded rectangular column, uni-axially bent and bi-axially bent columns, column interaction diagram.	4	2
6	<b>Footing design:</b> Design consideration, design of axially loaded pad footing, eccentrically loaded pad footing, eccentric footing.	3	2
<b>Total hours</b>		<b>26</b>	<b>13</b>

#### Assessment (includes both continuous and summative assessment)

Component	Course LO Tested	Related Programme LO or Graduate Attributes	Weightage	Team / Individual	Assessment Rubrics
1. Final Examination	1,2,3,4,5,6,7,8, 9	CIV SLOs a, b, e,	60%	Individual	
2. Continuous Assessment 1 (CA1): Quiz 1	1, 2	CIV SLOs a, b, e,	20%	Individual	
3. CA2: Quiz 2	5,6,7	CIV SLOs a, b, e,	20%	Individual	
Total			100%		

#### Formative feedback

1. Feedback will be through the dissemination of the student's performance in quizzes as well as review of the quiz questions in class.
2. Additional channel will be through individual consultation initiated by students on their particular learning needs.

#### Learning and Teaching approach

Approach	How does this approach support students in achieving the learning outcomes?
Lecture	Weekly lectures to enable students to have the necessary knowledge to achieve the learning outcomes
Tutorial	Weekly tutorials to get students to practice and hone their ability to achieve the learning outcomes

#### Reading and References

Mosley, W.H., Hulse, R. and Bungey, J.H., "Reinforced Concrete Design to EuroCode 2", 7<sup>th</sup> edition, Palgrave Macmillan, London, 2012.

Wight, J.K., "Reinforced Concrete: Mechanics and Design", 7<sup>th</sup> edition, Pearson/Prentice-Hall, 2015.

### Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

### Course Policies and Student Responsibilities

As a student of the course, you are required to abide by both the University Code of Conduct and the Student Code of Conduct. The Codes provide information on the responsibilities of all NTU students, as well as examples of misconduct and details about how students can report suspected misconduct. The university also has the Student Mental Health Policy. The Policy states the University's commitment to providing a supportive environment for the holistic development of students, including the improvement of your mental health and wellbeing. These policies and codes concerning students can be found in the following link.

<http://www.ntu.edu.sg/SAO/Pages/Policies-concerning-students.aspx>

### Course Instructors

Instructor	Office Location	Phone	Email
Li Bing	N1-01c-102	67905292	cbli@ntu.edu.sg
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### Planned Weekly Schedule

Week	Topic	Course LO	Readings/ Activities
1	Basic design concepts	1	Tutorial and lectures
2	Analysis of structure	2	Tutorial and lectures
3	Analysis of structure	2	Tutorial and lectures
4	Design and analysis of flexural members	3	Quiz 1 Tutorial and lectures

5	Design and analysis of flexural members	3	Tutorial and lectures
6	Design and analysis of flexural members	3,4	Tutorial and lectures
7	Design and analysis of flexural members	4	Tutorial and lectures
8	Solid slabs	5	Tutorial and lectures
9	Solid slabs	6	Tutorial and lectures
10	Columns	7	Quiz 2 Tutorial and lectures
11	Columns	7	Tutorial and lectures
12	Footing design	8,9	Tutorial and lectures
13	Footing design	8,9	Tutorial and lectures