

Syllabus of CIVL 2910 - Fundamental of green building

Syllabus

Instructor

First half

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Second half

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Course description

Urbanization process has significantly modified the environment we live in during the past decades. People spend more than 90% of lifetime in buildings and cities. The quality of built environment is critical to comfort, productivity, and health of city residents. Meanwhile, buildings consume 30%-40% of total energy consumption in cities. Reducing building energy consumption

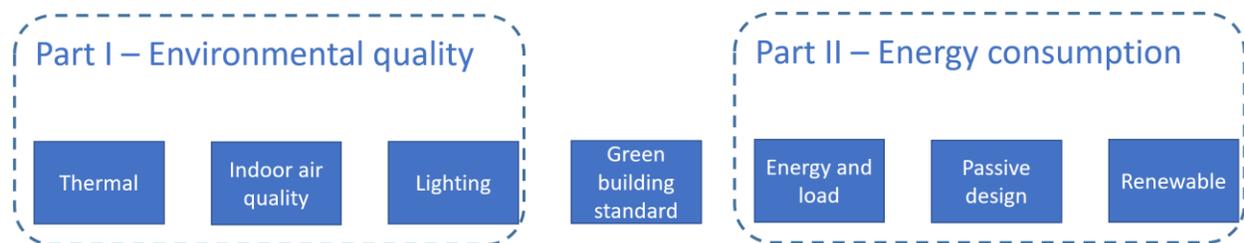
is crucial for the sustainable development of human beings. The goal of green building is to create comfort built environment with less energy consumption.

On the building scale, this course will cover the two pillars of green building: the environment quality and energy consumption. First, it will discuss the four aspects of indoor environment quality: thermal environment, indoor air quality, lighting environment and acoustic environment. Then, it will introduce building energy consumption, energy efficient design (sometimes referred to as passive design), and the opportunities as well as the challenges to integrate renewables into green building. Last, it will introduce the mainstream green building standards in the world.

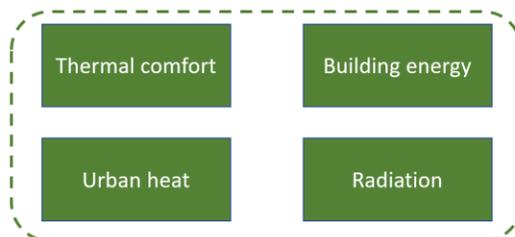
On the city scale, the course will cover the basic principles of surface energy balance under the influence of anthropogenic activities. Students are expected to learn fundamental knowledge on how thermal properties affect the temperature behaviour of engineering materials, and how building design interacts with the outdoor environment. Lectures will cover the underlying mechanisms that can lead to green buildings in an interactive built environment.

The fundamental knowledge about green building can help students better understand built environment, energy efficient building design, micro-climate of cities, and the interaction between buildings and micro-climate. Students plan to work in the building industry as civil engineer, urban planner, building services engineering will benefit from learning the fundamental knowledge of green building.

First half: building scale



Second half: neighborhood/city scale



Calendar

Week	Date	No.	Lecture	Assignment
1	5 th Sep.	1	Introduction	
	7 th Sep.	2	The property of air	
2	12 th Sep.			
	14 th Sep.	3	Thermal environment	HW 1 released
3	19 th Sep.	4	Indoor air quality and air flow management	
	21 st Sep.	5	Lighting environment	HW 1 due
4	26 th Sep.	6	Building energy consumption	HW 2 released
	28 th Sep.	7	Building thermal load	
5	3 rd Oct.	8	Reduced load	HW 2 due
	5 th Oct.	9	Passive design and energy recovery	HW 3 released
6	10 th Oct.	10	Renewable energy and smart micro-grid	
	12 th Oct.	11	Green building standard	HW 3 due
7	17 th Oct.	12	First half course review	
	19 th Oct.	13	In-class exam	
8	24 th Oct.	14	Urban surface property	
	26 th Oct.	15	Radiation exchange in cities	
9	31 st Oct.	16	Radiation exchange in cities	HW 4 released
	2 nd Nov.	17	Surface energy balance	
10	7 rd Nov.	18	Surface energy balance	
	9 rd Nov.	19	Surface energy balance	HW 5 released
11	14 rd Nov.	20	Outdoor thermal comfort	
	16 rd Nov.	21	Building energy consumption	
12	21 st Nov.	22	Urban observation and modelling	HW 6 released
	23 rd Nov.	23	Urban heat island	
13	28 rd Nov.	24	Urban heat island	
	30 rd Nov.	25	Second half course review	

Grading

- Assignments: $5\% \times 6 = 30\%$
- Mid-term exam: 35%
- Final exam: 35%

Assignments

A total of six homework assignments let you practice and apply the concepts learned in lecture and section. The homework will be due one week since it is released.

Assignment late policy

All assignments must be turned in on time (deadline is 23:59 pm on the due date). We will allow a total of five late days (Weekends and holidays counted) cumulatively. We will not make any additional allowances for late assignments: the late days are intended to provide for exceptional circumstances, and students should avoid using them unless absolutely necessary. Any assignments that are submitted late (with insufficient late days remaining) will not be graded.

Integrity

Cheating is strictly not allowed for either assignments or exams.

All assignments should be done individually. You are allowed to discuss homework questions with other students, but not allowed to copy solutions or share your solution to a question with other students who haven't completed the question already. Cheating on assignments or final exam results in 0 points, so you really do not want to cheat.

Please, do your own work. Thank you!

Citizenship

A diversified, inclusive and equitable environment would benefit everyone of our community. For exceptionally rude or disrespectful behavior toward the course staff or other students, your final grade will be lowered by up to a full letter grade (e.g., from an A- to a B-) at the discretion of the course instructors. You don't need to be concerned about this policy if you treat other human beings with even a bare minimum of respect and consideration and do not engage in behavior that is actively harmful to others.

Office hour

- Time: 4-5 pm every Wed.
- Venue: Room 3564 for the first half and Room 3590 for the second half