Academic Year	2021-2022	**Semester**	2
Course Coordinator	Steve. H.L. Yim		
Course Code	ES5004		
Course Title	The Urban Environment: Issues, assessment, and management		
Pre-requisites	None		
No of AUs	3		
Contact Hours	2 x lecture, 1 x tutorial Total = 39 hours		
Proposal Date	23/11/2021		

Course Aims

This course serves as an introduction to the key environmental problems faced by urban populations and is designed for students of all majors who have an interest in urbanization and sustainability. Topics will integrate the knowledge of the basic science, assessment methods and management of four major environment problems in urban areas. The key concepts of environment sustainability will be illustrated with case studies which will be examined to illustrate the complexity of these issues. During the lectures, the relevant sustainable development goals will be introduced.

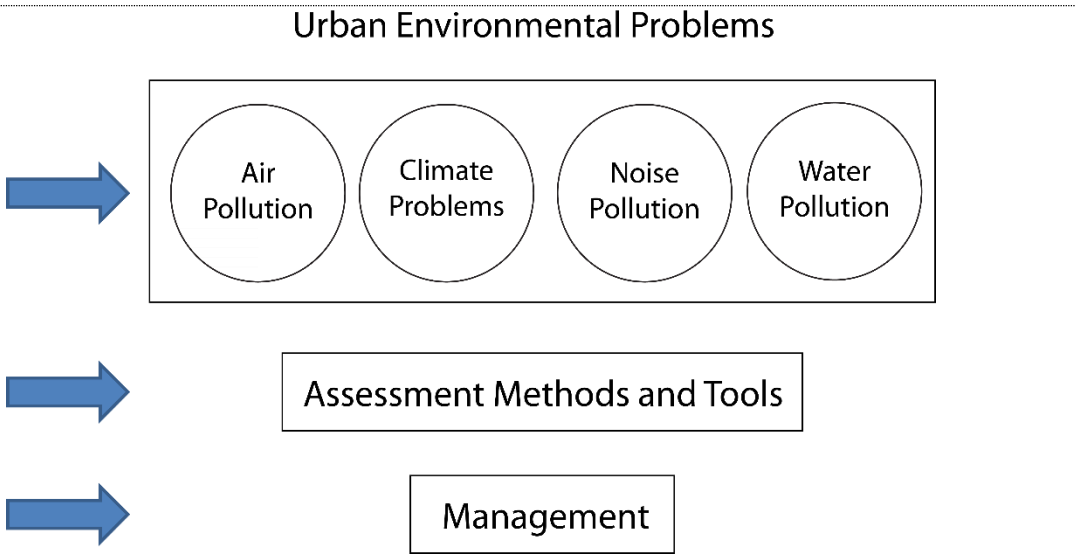
Intended Learning Outcomes (ILO)

By the end of this course, you (as a student) would be able to:

1. Describe the fundamentals of the four learnt urban environmental problems and explain the mechanisms that drive the formation and removal;
2. Identify and use appropriate techniques to assess these urban environmental problems;
3. Use critical thinking to appreciate urban environmental management; and
4. Demonstrate sensitivity and a responsible attitude to the urban environment.

Course Content

This course examines the nature of climate, noise, air and water pollution problems in cities and discusses how these pollutants and the provision of open/green space can affect urban livability. Particular emphasis is placed on the use of prediction models to assist environmental assessment and planning.



Assessment (includes both continuous and summative assessment)

Component	Course LO Tested	Related Programme LO or Graduate Attributes (Appendix 1)	Weighting	Team/Individual	Assessment Rubrics
1. In-class quiz × 4	1	1	10	Individual	Appendix 1 & 2
2. Field measurement project	2,3,4	1,2,3,4	30	Team	Appendix 1 - 3
3. Final Examination	1,2,3,4	1,2,3,4,5,6	60	Individual	Appendix 1 & 2
Total			100%		

For the field measurement project, students will have to submit peer evaluation form individually to weigh the contribution of each group member and meet up with the course coordinator to discuss their projects. The peer evaluation form is shown in Appendix 3.

Formative feedback

In-class quiz: answers will be given to the students after each quiz. Answers will be discussed with the whole class. Marks will be released after 1-2 weeks with general feedback provided.

Group project: students will be randomly assigned to form groups to conduct a measurement project. Each group will have to arrange at least one meeting with the instructor to discuss their measurement plan. Students have to present their work and results in the last two weeks. Comments will be provided to

students. Each group has to submit a project report. The presentation and report will be marked. If necessary, students can arrange meetings with the instructor to discuss their work.

Final examination: Course instructor will produce an examiner's report to analyze student performance and point out common errors.

Learning and Teaching approach

Approach	**How does this approach support students in achieving the learning outcomes?**
In-class quiz	An in-class quiz after each section will encourage students to review the learnt concepts in the section to make sure they develop the core knowledge before entering to the next section.
Group project	The group project will engage students to work together in a measurement project and apply what they learn in the lectures into an environmental problem in their real life.
Final examination	Final examination will encourage students to review all the materials at the end of the semester.

Reading and References

Recommended Book list

Air Quality

R1. Stephen T. Holgate, Hillel S. Koren, Jonathan M. Samet, Robert L. Maynard. Air Pollution and Health. Academic Press, 1999, ISBN-13: 978-0123523358

R2. R.M. Harrison, R.E. Hester; Contributions by O. Hertel et al. Air quality in urban environments. Issues in environmental science and technology; v. 28. Cambridge, Royal Society of Chemistry 2009, Ch. 1, ISBN-13: 978-1847559074

Climate

R3. Helmut E. Landsberg. The urban climate. New York : Academic Press, 1981, Ch. 5, ISBN-13 : 978-0123994639

R4. Shinsuke Kato, Kyosuke Hiyama. Ventilating Cities: Air-flow Criteria for Healthy and Comfortable Urban Living. 2012.. Dordrecht : Springer Netherlands 2012, Ch. 1-3, ISBN-13: 978-9400727700

R5. The United States Environmental Protection Agency. Reducing Urban Heat Islands: Compendium of Strategies – Urban Heat Island Basics, P.1-16.
Available: http://www.epa.gov/hiri/resources/pdf/BasicsCompendium.pdf

Noise

R6. Amando García. Environmental urban noise. Southampton ; Boston : WIT Press, c2001, ISBN-13: 978-1853127526

R7. A. Lara Saenz and R.W.B. Stephens. Noise pollution : effects and control. Chichester : Published on behalf of the Scientific Committee on Problems of the Environment (SCOPE) of the International Council of Scientific Unions (ICSU) by Wiley, c1986, ISBN-10: 0471903256

Water Quality

R8. Timothy R. Lazaro. Urban Hydrology (revised edition). CRC Press; Rev Sub edition, 1990, ISBN-13: 978-0877625476

R9. Jiri Marsalek et al. Urban water cycle processes and interactions. Paris, France : UNESCO Pub. ; Leiden, The Netherlands : Taylor & Francis, c2008, ISBN-13: 978-0415453479

Course Policies and Student Responsibilities

(1) General

Students are expected to complete all assigned pre-class readings and activities, attend all seminar classes punctually and take all scheduled assignments and tests by due dates. Students are expected to take responsibility to follow up with course notes, assignments and course related announcements for seminar sessions they have missed. Students are expected to participate in all seminar discussions and activities.

(2) Absenteeism

TBL requires you to be in class to contribute to team work. In-class activities make up a significant portion of your course grade. Absence from class without a valid reason will affect your overall course grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities.

If you miss a seminar session, you must inform your team members and me via email (include email address) prior to the start of the class. Students who miss T-RATs and team in-class activity with valid reasons will earn the team score. Students who miss I-RAT or T-RAT without a valid reason will earn nothing for that session of absence.

For I-RAT scores, we will consider the best of ten I-RATs out of twelve I-RATs. This method will take care of students who miss classes with valid reasons. Students, who miss I-RATs more than twice with valid reasons, may be asked to take a separate test.

(3) Online Compulsory Assignments

You are required to submit online compulsory assignments on due dates. You have three attempts. The latest score will be considered in the course assessment.

For another example, please refer to http://www.ntu.edu.sg/tlpd/ta/Pages/Policy.aspx

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.

Diversity and inclusion policy

Integrating a diverse set of experiences is important for a more comprehensive understanding of science.

It is our goal to create an inclusive and collaborative learning environment that supports a diversity of thoughts, perspectives and experiences, and that honours your identities; including ethnicity, gender, socioeconomic status, sexual orientation, religion or ability.

To help accomplish this:

- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with one of the instructors or an ASE faculty member. We want to be a resource for you.
- Your classmates and instructors (like many people) are still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to the instructors or an ASE faculty member about it.
- As a participant in course discussions, you should also strive to honour the diversity of your classmates. You can do this by: using preferred pronouns and names; being respectful of others opinions and actively making sure all voices are being heard; and refraining from the use of derogatory or demeaning speech or actions.

All members of the class are expected to adhere to the NTU anti-harassment policy. if you witness something that goes against this or have any other concerns, please speak to your instructors or an ASE faculty member.

Course Instructors

Instructor	Office Location	Phone	Email
Steve. H.L. Yim	N2-01c-44	-	steve.yim@ntu.edu.sg

Planned Weekly Schedule

Week	Topic	Contents/ fundamental concepts
1	Course overview	Introduction to environmental problems in urban areas; Course arrangement
Air Quality Section: Recommended reading books: R1 and R2		
2	Air Quality - Basics, Emissions, Trends and Problems	Characteristics of different emissions sources and pollutants (gaseous and particulate matters); Regional and local air pollutions; Influence of weather conditions; Health effects;
3	Urban Air Quality Assessment - Modelling and Measurement	Numerical and physical models; Measurement equipment
4	Managing Urban Air Quality	Air quality assessment; Air quality objectives; Air quality policy
Climate Section: Recommended reading books: R3, R4 and R5		
5*	Urban Climate - Basics and Problems	Health island effects; degradation of air ventilation; causes and effects (health and energy consumption) (*) A 5-min in-class quiz in the lecture in week 5 (about the materials of air quality section)
6	Urban Climate Assessment and Management	Assessment tools, mitigations, and policy and planning
Noise Section: Recommended reading books: R6 and R7		
7*	Noise - Basics, Characterization, Assessment Metrics	Sound, noise, propagation, measure metrics; health effects of noise pollution (*) A 5-min in-class quiz in the lecture in week 7 (about the materials of climate section)
8	Urban Noise Pollution and its Assessment	Sources of noise in cities; Noise assessment
9	Managing Urban Acoustic Environment	Source reduction, planning & urban design, housing layout, soundscape
Water Quality Section: Recommended reading books: R8 and R9		
10*	Importance of Water Bodies in Urban Areas	Human water interaction, beneficial use, water quality parameters and objectives (*) A 5-min in-class quiz in the lecture in week 10 (about the materials of noise section)
11**	Water quality and its Assessment and Management	Sources of water contaminants, urbanization effects on surface waters and groundwater; Strategies for water quality assessment; water quality management

		(**) A 5-min in-class quiz in the lecture in week 11 (about the materials of water quality section
Group Project Presentations		
12	Group Project Presentations	Students have a chance to present their group project work, and respond questions and comments from other groups.
13	Group Project Presentations	Students have a chance to present their group project work, and respond questions and comments from other groups.

Appendix 1: Assessment Criteria for all the assessments

Group project	A (91-100)	B (76-90)	C (56-75)	D (36-55)	F (≤35)
1. Study Aims & grasp of subject area	Exceptional grasp of subject area and study aims.	Deep grasp of subject area & originality in main study aims.	Sound grasp of subject area & focused, relevant study aims.	Some grasp of subject area and reasonable study aims.	Very limited or no grasp of area. Muddled or derivative study aims.
2. Methods	Exceptional form of independent project work paired with an expert-level discussion of methods.	Substantial independent project work. High ability in selection, application & discussion of methods.	Significant project work. Clear familiarity with application of appropriate methods.	Evidence of project work. Familiarity with application of appropriate methods.	Very limited project work. Little familiarity with methods or serious flaws in use.
3. Literature review	Expert-level review & innovative synthesis.	Extensive reading & thorough grasp of literature consulted.	Evidence of plentiful relevant reading & sound grasp of literature.	Evidence of relevant reading & grasp of literature consulted.	Very limited or irrelevant reading.
4. Interpretation of evidence	Critical analysis & subsequent discussion.	Innovative critical analysis & originality in discussion of implications.	Sound critical analysis & meaningful discussion of implications.	Reasonable critical analysis & subsequent discussion of implications.	Primarily descriptive analysis; limited, summary discussion of findings.
5. Writing & communication	Reads as if professionally copy edited.	Style & word choice show fluency with ideas & flashes of verve.	Style, grammar & word choice rarely detract from conveying of ideas.	Style, grammar & word choice sometimes detract from conveying of ideas.	Style, grammar & word choice seriously interfere with comprehension.
6. Presentation & references [1]	Pioneering presentation with impeccable format & references.	Formatting, visuals & referencing are impeccable.	Formatting, visuals & referencing rarely detract from argument.	Formatting, visuals & referencing satisfactory.	Poorly formatted or inappropriate visuals; very limited references.
Term-end examination and In-class quizzes	**A**	**B**	**C**	**D**	**F**

1. Overall	Demonstrates comprehensive knowledge of factual information in the syllabus and a thorough command of concepts and principles. Selects and applies relevant information, concepts and principles in a wide variety of contexts. Constructs detailed explanations of complex phenomena and makes appropriate predictions. Solves most quantitative and/or qualitative problems proficiently. Communicates logically and concisely using appropriate terminology and conventions. Shows insight or originality.	Demonstrates broad knowledge of factual information in the syllabus. Shows sound understanding of most concepts and principles and applies them in some contexts. Constructs explanations of simple phenomena. Solves most basic or familiar problems and some new or difficult quantitative and/or qualitative problems. Communicates clearly with little or no irrelevant material.	Demonstrates limited knowledge of factual information in the syllabus. Shows a partial comprehension of basic concepts and principles and a weak ability to apply them. Shows some ability to manipulate data and solve basic or routine problems. Communicates with a possible lack of clarity and uses some repetitive or irrelevant material.	Demonstrates little recall of factual information in the syllabus. Shows weak comprehension of basic concepts and principles with little evidence of application. Exhibits minimal ability to manipulate data and little or no ability to solve problems. Offers responses which are often incomplete or irrelevant.	Recalls fragments of factual information in the syllabus and shows very little understanding of any concepts or principles

Appendix 2: ASE learning outcomes

At the completion of your course of study in ASE, you will be able to:

1) Demonstrate intellectual flexibility and critical thinking in order to apply environmental knowledge in the real world

2) Communicate environmental concepts with enthusiasm to varied audiences both orally and in writing

3) Formulate scientific questions, and be able to access and analyse quantitative and qualitative information to address them

4) Exhibit the motivation, curiosity and skills for lifelong learning

5) Demonstrate ethical values and responsibility

6) Collaborate and lead by influence

Appendix 3: Peer evaluation form for group project

Nanyang Technological University
Asian School of the Environment

ES5004 The Urban Environment: Issues, Assessment, and Management
2nd semester, 2021-22
Self and Peer Evaluation of Group Project

Student name	
Student ID	
Group number	

Please assess the work of you and your colleagues by using the following criteria. We will consider your feedback in assigning the grade for the project. Please try to be as honest and fair as possible in your assessment.

5 = Excellent work; was crucial component to group's success
4 = Very strong work; contributed significantly to group
3 = Sufficient effort; contributed adequately to group
2 = Insufficient effort; met minimal standards of group
1 = Little or weak effort; was detrimental to group[1]

[1] An assessment of "1" or "0" requires a written explanation

	Name	Participation in developing ideas and planning project	Willingness to discuss the ideas of others	Cooperation with other group members	Interest and enthusiasm in project	Participation in leading/facilitating discussion	Ease and familiarity with discussion material
Yourself							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Self-Reflection
What did you learn from the experience?

What do you think went well?

What would you have done differently, given the opportunity?

Do you have any other comments or suggestions about the project?