LSM4265

COURSE PACKAGE

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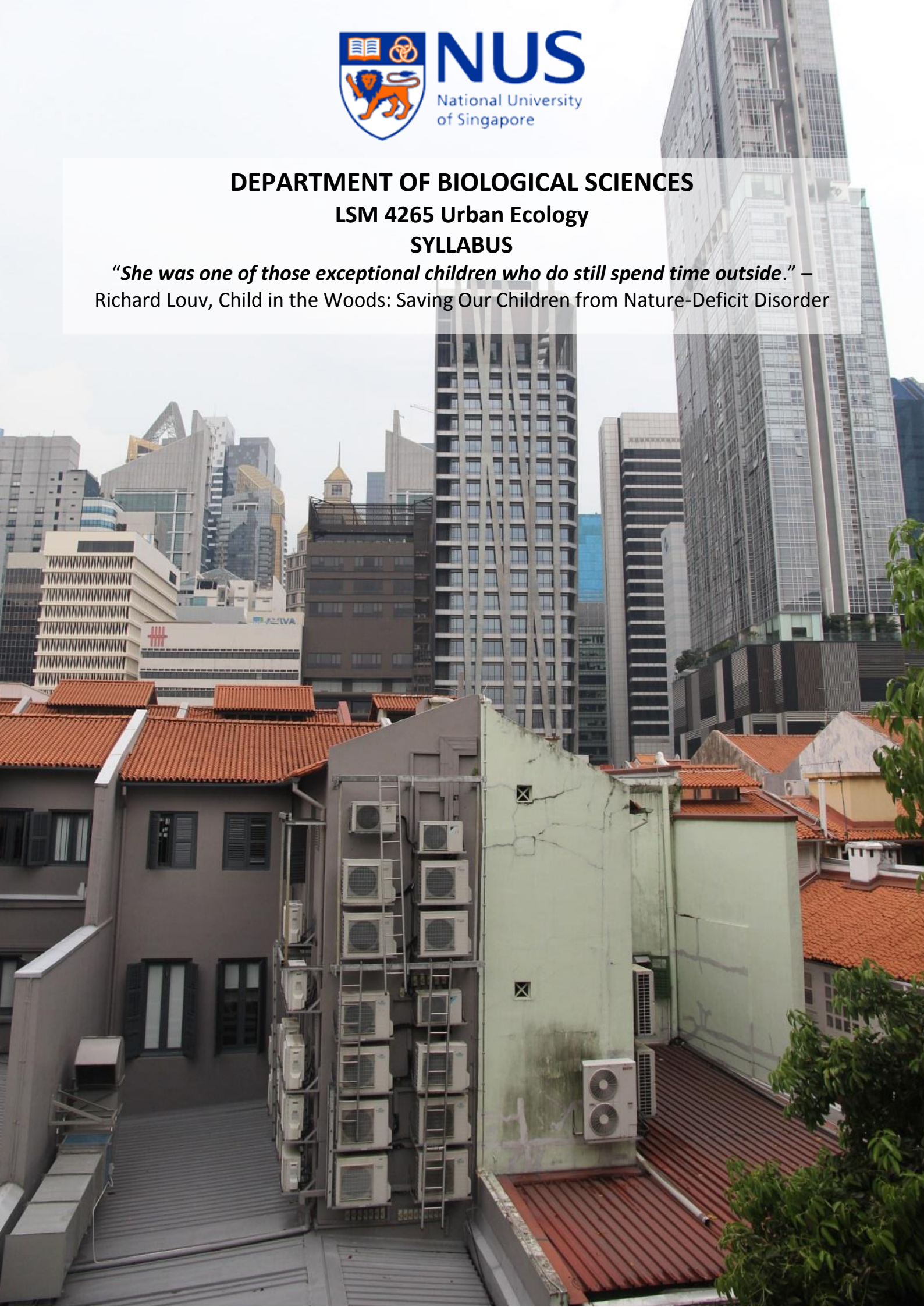
DEPARTMENT OF BIOLOGICAL SCIENCES

LSM 4265 Urban Ecology

SYLLABUS

"***She was one of those exceptional children who do still spend time outside***." –
Richard Louv, Child in the Woods: Saving Our Children from Nature-Deficit Disorder



LSM 4265: Urban Ecology

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Office hours	as needed	
Grading	Letter grade	**4 MODULAR CREDITS**

1. RATIONALE

Why urban ecology? After all, "*real* ecologists study wild and natural places" (Gaston, 2010), don't they? Well, here's a healthy dose of reality. Very few (if any) pristine environments are left, and Earth is now dominated by human-modified landscapes. To those who argue that cities are not true ecosystems, I counter that urban areas encompass far more than just the people who live there and the spaces we build for ourselves. They ***all*** contain Nature.

As these realities gain recognition, the emerging discipline of urban ecology expands and becomes increasingly complex. The aim of this very interdisciplinary field is to understand organisms (including humans) in cities – including their interactions with each other and with urban ecosystems – and it is steadily developing its own set of theories and paradigms.

Don't underestimate the relevance of this understanding to conservation in our world, which is urbanising very rapidly, and in which a city's influence extends well beyond its borders. Did you know that because of: [1]extremely high urban demand for resources, [2]conversion of land to urban use and [3]the fact that we tend to build our cities in places that have very high conservation value, urbanisation has been identified as the top driver of the most pressing environmental concerns (Grimm et al., 2008), including the sixth extinction (Czech et al., 2000)? Furthermore, as people move from rural to urban areas, we become more and more disconnected with Nature, all while getting urbanites to care about the environment becomes increasingly critical to conservation and sustainability.

From an academic standpoint, this course grows your awareness and understanding of: [1]human welfare and ecology in and near cities, [2]how cities affect ecological processes at local, regional and global levels and [3]cities as real ecosystems with distinct biotic communities. From a practical one, it is useful to those of you who are considering careers in [1]urban ecology (of course!), [2]urban or environmental planning, [3]education in the urban environment, [4]urban advocacy and [5]urban conservation, to name a few fields. They all require the ability to apply knowledge of urban ecology to solving urban issues that have social, ecological and political drivers and ramifications. Also, this course provides the foundation for thinking about the concept of the sustainable city (if there really is such a thing).

No other course at NUS occupies the niche that LSM 4265 does (i.e., deals with environments where urbanisation is the key ecological factor). But it does not focus specifically on Singapore or the Tropics. After all, (1) urbanisation is a global phenomenon, and Singapore is just one city that is, in many ways, anomalous; and (2) most urban-ecology studies to date have been conducted in developed regions, especially North America and Europe, producing an obvious bias in the literature. Still, most weeks, we see examples from the Tropics (including SE Asia).

2. ABOUT YOUR EDUCATOR

I'm a lecturer in the Bachelor of Environmental Studies Programme and hold the following degrees: BSc in Agriculture (Environmental Biology, McGill University), MSc (Wildlife Biology, McGill University), PhD (Urban Wildlife Ecology, University of Calgary).

I'm an ecologist and conservation biologist, with a specialisation in urban wildlife in general, and bats in particular. I favour a bottom-up approach to understanding higher-level processes, so I typically study how urbanisation affects populations and individuals, by asking questions about physiology, behaviour and fitness. My research also examines the interactions between humans and Nature, including in relation to urbanisation. My students study diverse aspects of urban ecology in Singapore, and I'm currently studying the ecology and population biology of our street dogs.

When it comes to education, I'm big on active learning, especially project-based and experiential learning. When not working, I'm really into music and dance, and I love to travel, SCUBA dive and (above all) downhill ski. My personal website is www.urban-ecologist.com.

3. OBJECTIVES AND OUTCOMES

Objectives

LSM 4265 has four specific objectives, which are to:

- Develop a thorough understanding of the influence of urbanisation and urbanised areas on populations, communities, ecosystems and human societies,
- Demonstrate the need for and application of urban ecology as a discipline,
- Discover current research in urban ecology as well as future directions,
- Conduct urban ecology research.

Learning Outcomes

By the end of LSM 4265 (having successfully completed it), you will be able to:

- Describe, categorise, and analyse interactions among organisms that inhabit urban environments and between those organisms and their environment,
- Describe and explain connections among diverse aspects of urban ecological systems,
- Explain the relevance of urban ecology to conservation, urban planning and urban living,
- Draw on interdisciplinary methods and paradigms to promote an understanding of urban ecology,
- Participate meaningfully in class discussions on specific topics in urban ecology,
- Conduct urban ecology research,
- Raise our understanding of urban ecosystems and the organisms that inhabit them, with an emphasis on Singapore,
- Develop skills in teamwork, oral presentation and critical inquiry, and flex your creativity muscles.

4. PREREQUISITES: LSM2251, LSM3255

5. FORMAT AND PROCEDURES

Modes of learning/how this course is run

Current educational theory dictates that in many ways, educators are like the leaders of companies who, because they rely upon the hard work of their employees, should provide an environment that is conducive to their employees' productivity. In other words, why should I shoulder the responsibility for your learning? I'm not omniscient. Instead, I should rely on you (at least to some extent) to discover things for yourselves and share knowledge with the rest of us and facilitate this by creating an environment that encourages learning. By holding you accountable and implicating you in acquiring knowledge, I am promoting deep learning (the kind that sticks with you).

Academically speaking, we will examine urban ecology using readings from the primary and secondary literature that cover diverse topics related to urban ecology. Practically speaking, class time will be used in various ways. There will be some lecturing, but it may be a bit more interactive than you may be used to, with questioning and short activities. Each class will start with a series of learning objectives and end with a series of take-home questions. You won't submit answers to these questions for grades, but instead will use them to hone your abilities to think critically, synthesise information and apply knowledge to solving novel problems. In short, to prepare for the final exam. In some cases, I ***may*** ask you to return the following week prepared to share your answers and we ***may*** use these questions as the basis for a flipped classroom approach, but more often you can answer them according to your own timeline.

In addition, to encourage you to read widely and participate in class, I welcome submissions of quality discussion questions. You may submit them through the IVLE site, by 17h00 the day before class. I'll go through submitted questions and select one or a few to use in class. I might even put one on the exam.

My assumptions

This is an elective course, so I assume you're interested in learning about and discussing urban ecology. I also expect that because we're all interested in the same thing, we'll all actively monitor current events to bring fresh material to the table – the learning experience is bound to be enhanced by relating course content to the real world.

Assessments

Assessment	Value (contribution to final grade)
Participation	20 %
Group project	40 %
Final exam	40 %

Please see the assessment description (provided separately) for details on the above.

Also, be advised that I believe in total transparency. So, I give all rubrics used to grade you in this course ahead of time. This way, you know exactly what I expect of you and what criteria I will use to evaluate your performance.

Standards of conduct (class professionalism policy)

I expect you to behave in a professional manner and to show respect for me and your classmates. If you violate this policy, then your participation grade will be affected (and I may ask you to leave the room). Violations of the policy include doing any of the following during class (non-exhaustive list):

- Using mobiles or other handheld electronic devices to do anything other than work related to this class, e.g., texting, etc. Please put mobiles in silent mode.
- Sleeping
- Arriving late or leaving early (unless agreed upon with me beforehand)
- Checking and responding to email / Facebook, etc.
- Surfing the Internet (unless directly related to current topic, i.e., searching for info about what we're discussing so you can add something – which I welcome)
- Doing work for another course
- Engaging in any activity that prevents you from fully participating (including during project presentations by your peers)

Lectures are two hours long. Tutorials are four hours long. We will begin five minutes past the hour and end 15 minutes before the hour. There will be a 15-minute break during tutorials but not during lectures.

6. ACADEMIC INTEGRITY

You are expected to abide by the NUS code of conduct, including its policy on honesty in academic communication. For more details on plagiarism and how to avoid it, consult the NUS website. For the purposes of this syllabus, be advised that should any form of academic dishonesty occur, you will automatically, and at a minimum, receive a grade of zero for the assessment in question. Penalties may be extended to include failure of the course and disciplinary action by the University.

7. ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

I am available to discuss appropriate accommodations for students with disabilities. Requests for academic accommodations should be made at the start of the course.

8. STUDENT FEEDBACK AND GROUP DISCUSSION

I always strive to offer you the best possible learning experience. So I'm very interested in your opinions. To that end, I welcome timely feedback (as opposed to only at the end of the semester), because that gives me the chance to make adjustments (where possible). You may use the anonymous feedback feature on IVLE or just talk to me (in person or by email). And if you have issues / questions that you want to open up to the entire class, please use the forum feature on IVLE. Finally, please do remind me if and when I forget to post lecture slides or any other promised material on IVLE – that happens, and I really appreciate the reminder.

9. READINGS

Consult the schedule of course topics for weekly readings / resources. By year 4, I'm sure you know how to access journal articles. Also, there are great books (most available electronically through NUS libraries), and several main readings will come from them. Note that all five are very different to one another in style and content.

Forman, RTT (2014) Urban Ecology – Science of Cities. Cambridge University Press. Cambridge, UK. Note – *not available electronically through NUS – I will post relevant chapters on IVLE*

Gaston, K, Ed (2010) Urban Ecology. Cambridge University Press. Cambridge, UK.

Marzluff, JM, Shulenberter, E, Endlicher, W, Alberti, M, Bradley, G, Ryan, C, Simon, U and C ZumBrunnen, Eds (2008) Urban Ecology: An International Perspective on the Interaction between Humans and Nature. Springer. New York, NY, USA.

McLeery, RA, Moorman, CE and MN Peterson, Eds (2014) Urban Wildlife Conservation: Theory and Practice. Springer. New York, NY, USA.

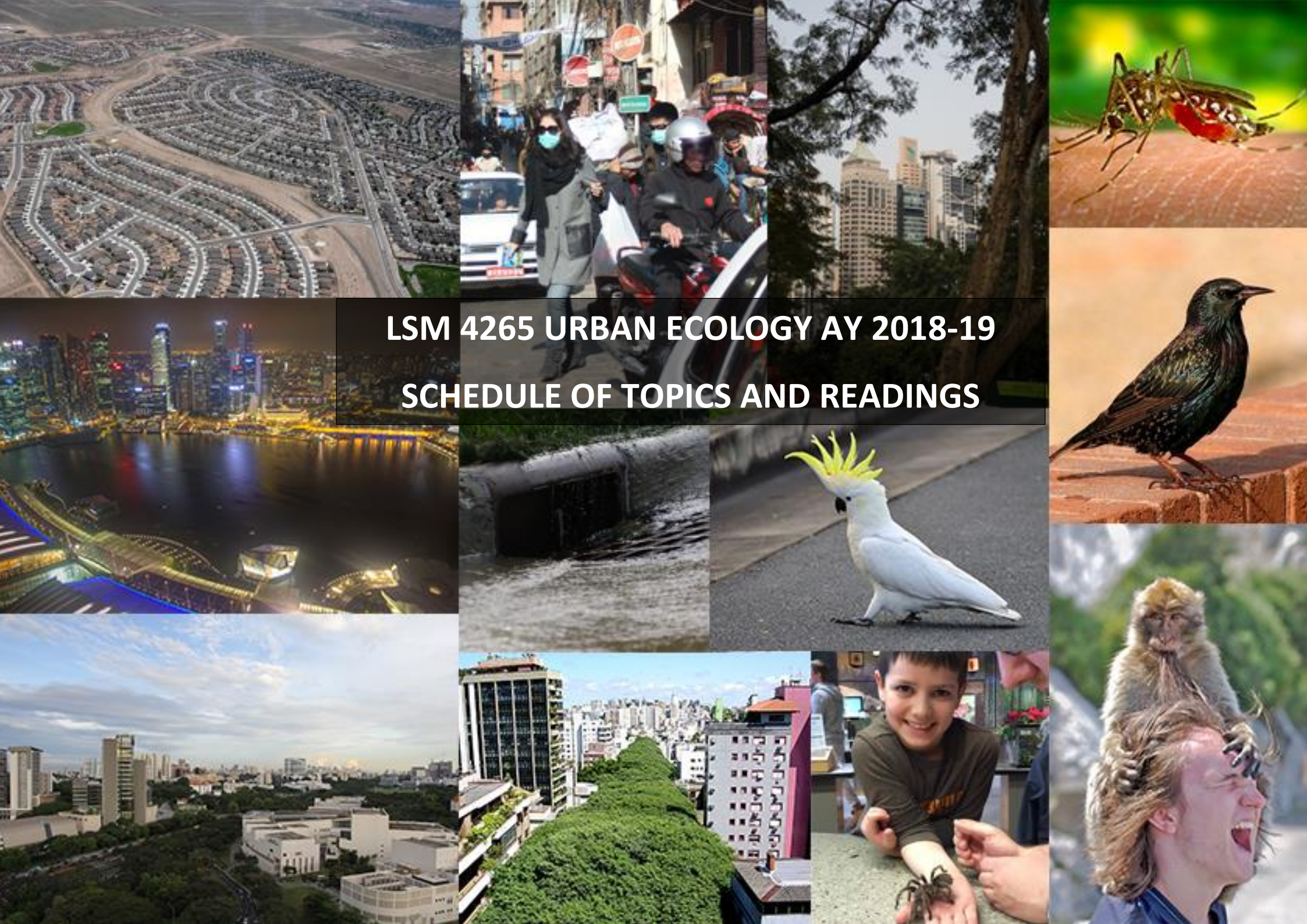
Niemelä, J, Breuste, JH, Elmqvist, T, Guntenspergen, G, James, P and NE McIntyre, Eds (2011) Urban Ecology: Patterns, Processes, and Applications. Oxford University Press. New York, NY.

REFERENCES

Czech B, Krausman PR, Devers PK (2000) Economic associations among causes of species endangerment in the United States. *Biosci* **50**, 593-601.

Gaston KJ (2010) Urban ecology. Pp 1-9 in *Urban ecology* (Gaston KJ, ed.). Cambridge University Press. Cambridge, UK.

Grimm NB, Faeth SH, Golubiewski NE, Redman CL, Wu J, Bai X, Briggs JM (2008) Global change and the ecology of cities. *Science* **319**, 756-760.



LSM 4265 URBAN ECOLOGY AY 2018-19

SCHEDULE OF TOPICS AND READINGS

WK	**Topic(s) and <u>format</u> –** subject to change/evolve (but not tremendously)	**Hours**		**Relevant resources –** subject to change; includes suggested journal articles that we ***MAY*** refer to in class and you ***MAY*** consult for additional understanding (ones I consider mandatory are indicated)
		lecture	tutorial	
1	<u>Interactive (active learning) lecture</u> • Urban ecology as a field of study • Urbanisation (definition, process and forms) • Historical and current trends in urbanisation • Size, structure and composition of cities • Introduction to urban land use	2		**<u>READINGS</u>** 1. **MANDATORY**: EITHER Gaston (2010) chapters 1 & 2 OR Niemelä et al (2012) Pp 1-13. 2. **MANDATORY:** McPhearson et al (2016) Advancing urban ecology toward a science of cities. *Biosci* **66**, 198-212. 3. Montgomery (2008) The urban transformation of the developing world. *Science* **319**, 761-764. 4. Schneider et al (2015) A new urban landscape in East–Southeast Asia, 2000-2010. *Env Res Lett* **10(3)**, 034002. **<u>EXPLORE</u>** the UN 2018 Revision of World Urbanization Prospects https://population.un.org/wup/ **<u>VIDEOS</u> – WATCH THEM ALL (especially # 4)** 1. https://www.youtube.com/watch?v=3PWWtqfwacQ why cities are where they are. 15 min 2. http://www.youtube.com/watch?v=9AF3Aq8OuTY importance of urban ecology. 6 min 3. https://www.youtube.com/watch?v=7vqm4i8xaWs history & future of cities (disregard the future part – it's too idealised – I just want you to know why the first cities formed). 4 min 4. https://www.youtube.com/watch?v=mPi4zwEpswE current & projected urbanisation. 3 min

2-4	<u>Interactive (active learning) lectures, e-lecture wk 4 (CNY)</u>
	• Urban land use, habitat fragmentation
	• The urban environment & ecosystem function, including pollution
	  ○ Air
	  ○ Climate
	  ○ Water and hydrology
	  ○ Soils
	  ○ Biogechemistry
	  ○ Roads
	  ○ Lighting
	  ○ Acoustics
	
	<u>Tutorials (WEEK 2 – NONE in WK 4 CNY)</u>
	• Group project work, review
		6	8	**<u>READINGS</u>**
				1. **MANDATORY: EITHER** Gaston (2010) chapter 3 **OR** Niemelä et al (2012) chapter 1 (more in-depth).
				2. Forman (2014), Pp 279-287. Roads and associated features. (WK 2-4)
				3. Grimm et al (2008) Global change and the ecology of cities. *Science* **319**, 756-760. (WK 2-4)
				4. Kaye et al (2006) A distinct urban biogeochemistry? *TREE*, **21**, 192-199. (WK 2-4)
				5. Pickett et al (2011) Urban ecological systems: Scientific foundations and a decade of progress. *J Environ Manage* **92**, 331-362. (WK 2)
				6. Pouyat et al (2010) Chemical, physical, and biological characteristics of urban soils. Pp 119-152 *in* Aitkenhead-Peterson & Volder (eds) Urban ecosystem ecology. Agronomy Monograph 55. American Soc of Agronomy, Crop Science Soc of America, Soil Science Soc of America. (WK 2)
				7. Heisler & Brazel (2010) The urban physical environment: temperature and urban heat islands. Pp 29-56 *in* Aitkenhead-Peterson & Volder (eds). (same book as # 6 above). (WK 3)
				8. Warren et al (2006) Urban bioacoustics: it's not just noise. *Anim Behav* **71**, 491-502. (WK 4)
				9. Longcore & Rich (2004) Ecological light pollution. *Frontiers Ecol & Environ* **2**, 191-198. (WK 4)
				<u>VIDEOS</u> – TO EXPLORE THE VARIOUS CONCEPTS USING THIS MEDIUM
				1. http://www.youtube.com/watch?v=Cv6fr371PT4 urban-rural transition. 3.5 min
				2. https://www.youtube.com/watch?v=NrKJhGYUQlA impervious surfaces & water cycle. 3.5 min
				3. https://www.youtube.com/watch?v=lnBO4vX82Fs urban heat islands. 2 min

AND NOW, THE STAGE IS SET				

WK	**Topic(s) and <u>format</u> –** subject to change/evolve (but not tremendously)	**Hours**		**Relevant reading(s) –** subject to change; includes suggested journal articles that: we may refer to in class and you ***MAY*** consult for additional understanding
		lecture	tutorial	
5-6	<u>Interactive (active learning) lecture</u> Urban plants • How plants end up in cities • Presence of non-natives • Urban tree cover • Vegetation distribution patterns • Relationship to socioeconomics <u>Tutorial (WK 6)</u> TBA	2	4	1. **MANDATORY: EITHER** Chapter 8 in Forman (2014), which is long, but easy to read and comprehensive **OR** Chapters 2.2, 2.3, 2.4, 3.2 in Niemelä et al (2012). 2. Hope et al (2003) Socioeconomics drive urban plant diversity. *PNAS* **100**, 8788-8792. 3. Duncan et al (2011) Plant traits and extinction in urban areas: a meta-analysis of 11 cities. *Global Ecol Biogeogr* **20**, 509-519. Very interesting and SG is one of the cities. **OTHER RESOURCES** Peter Del Tredici is an expert on urban flora. These are links to a written interview with him and an article he wrote. What's nice about the article, though a bit long, is it's written for the general public, but with references – so it's easy to read, but reliable. https://scenariojournal.com/article/peter-del-tredici/ https://placesjournal.org/article/the-flora-of-the-future/
7	<u>Interactive (active learning) lecture</u> Urban biodiversity • Impacts of urbanisation on biodiversity • Specific urban threats to wildlife • Urban "biodiversity hotspots" • Schemes to classify species • Biotic homogenisation	2		1. **MANDATORY:** Chapter 5 in Gaston (2010) 2. Coffin (2007) From roadkill to road ecology: a review of the ecological effects of roads. *J Transp Geog* **15**, 396-406. 3. McKinney (2006) Urbanization as a major cause of biotic homogenization. *Biol Conserv* **127**, 247-260. 4. Güneralp & Seto (2013) Futures of global urban expansion: uncertainties and implications for biodiversity conservation. *Environ Res Lett* **8**, 014025. 5. Faeth et al (2011) Urban biodiversity: patterns and mechanisms. *Ann NY Acad Sci* **1223**, 69-81. 6. Aronson et al (2014) A global analysis of the impacts of urbanization on bird and plant diversity reveals key anthropogenic drivers. *Proc R Soc B* **281**, 20133330. **<u>VIDEO</u> – A GOOD REMINDER** https://www.youtube.com/watch?v=2RC3Hsk90t8 how human activity threatens bioD – 13 min

WK	**Topic(s) and <u>format</u> –** subject to change/evolve (but not tremendously)	**Hours**		**Relevant reading(s) –** subject to change; includes suggested journal articles that: we may refer to in class and you ***MAY*** consult for additional understanding
8-9	<u>Interactive (active learning) lecture</u> Urban animals • How animals end up in cities • Presence of non-natives • Animals' distribution patterns • Specific threats to wildlife <u>Tutorial (WK 8)</u> TBA	4	4	1. **MANDATORY:** Chapters 3.1, 3.3, 3.4 in Niemelä et al (2012) 2. Chapter 15 in McLeery et al (2014) 3. Bonebrake & Cooper (2014) A Hollywood drama of butterfly extirpation and persistence over a century of urbanization. *J Insect Conserv* **18**, 683-692. 4. Wells et al (2014) Shifts from native to invasive small mammals across gradients from tropical forest to urban habitat in Borneo. *Biodivers Conserv* **23**, 2289-2303. 5. Parris & Hazell (2005) Biotic effects of climate change in urban environments: The case of the grey-headed flying-fox (*Pteropus poliocephalus*) in Melbourne, Australia. *Biol Conserv* **124**, 267-276.
10	<u>Interactive (active learning) lecture</u> Urbanisation related changes at individual and population levels • Phenology • Life history • Morphology • Physiology (e.g., stress, colouration) • Behaviour • Evolutionary impacts	2	4	1. **MANDATORY:** Partecke (2014) Mechanisms of phenotypic responses following colonization of urban areas: from plastic to genetic adaptation. Pp 132-142 in Avian Urban Ecology: Behavioural and Physiological Adaptations. Diego & Brumm (eds.). Oxford University Press, New York, NY. 2. Neil & Wu (2006) Effects of urbanization on plant flowering phenology: A review. *Urban Ecosyst* **9**, 243-257. 3. Partecke & Gwinner (2007) Increased sedentariness in European blackbirds following urbanization: a consequence of local adaptation? *Ecology* **88**, 882-890. 4. Partecke et al (2006) Stress and the city: urbanization and its effects on the stress physiology in European blackbirds. *Ecology* **87**, 1945-1952. 5. Lowry et al (2013) Behavioural responses of wildlife to urban environments. *Biol Rev* **88**, 537-549. 6. Alberti et al (2017) Global urban signatures of phenotypic change in animal and plant populations. *PNAS* **114**, 8951-8956. **<u>VIDEOS</u> – MUST-WATCH – introduce the study system we will look at – so interesting** https://vimeo.com/49198879 introduces the dark-eyed junco – just under 3 minutes https://vimeo.com/59871689 Evolution-in-Action: the Campus Juncos at UCSD – 16 min
11	<u>Interactive (active learning) lecture</u> Urbanisation and diseases of humans and wildlife	2		1. Chapter 11 in McLeery et al (2014). 2. Neiderud (2015) How urbanization affects the epidemiology of emerging infectious diseases. *Infect Ecol Epidemiol* **5**, 27060. 3. Bradley & Altizer (2007) Urbanization and the ecology of wildlife diseases. *TREE* **22**, 95-102. 4. Kilpatrick (2011) Globalization, land use, and the invasion of West Nile Virus. *Science* **334**, 323-327. 5. Deplazes et al (2004) Wilderness in the city: the urbanization of *Echinococcus multilocularis*. *Trends Parasitol* **20**, 77-84. (just because this study is so super interesting)

WK	**Topic(s) and <u>format</u> –** subject to change/evolve (but not tremendously)	**Hours**		**Relevant reading(s) –** subject to change; includes suggested journal articles that: we may refer to in class and you ***MAY*** consult for additional understanding
12	<u>Interactive (active learning) lecture</u> Some social dimensions of urban conservation • Nature-deficit disorder (NDD) • Human-wildlife interactions • Rising wealth and demand <u>Tutorial</u> Group project presentations – note – **may be same wk FYP theses are due !**	2	4	1. Chapter 7 in Gaston (2010) 2. Chapter 11 in McLeery et al. 3. Turner et al (2004) Global urbanization and separation of humans from nature. *BioScience* **54**, 585-590. 4. Zhang et al (2014) How contact with nature affects children's biophilia, biophobia and conservation attitude in China. *Biol Conserv* **177**, 109-116. **<u>SO INTERESTING</u>** https://www.humansandnature.org/urban-land-ethic-liam-heneghan **<u>VIDEOS</u> – MUST-WATCH – time well-spent** https://www.youtube.com/watch?v=1e6_cY3-J3o&t=87s Richard Louv talks about NDD – 12 min. https://www.youtube.com/watch?v=8Q2WnCkBTw0 Free the Kids - Dirt is Good – 2.5 min – I dare you not to be affected by this.

13	<u>Interactive (active learning) lecture or case study</u>
	• Mitigation strategies to combat:
	  ○ Air pollution
	  ○ Soil pollution
	  ○ Water pollution
	  ○ Noise and light pollution
	  ○ Habitat fragmentation
	• Benefits and pitfalls of urban greening
	• Sustainable city – an oxymoron ?
		2		1. Chapters 11 & 12 in Gaston (2010)
				2. Any of the chapters in Newman & Matan (2013) Green Urbanism in Asia - The Emerging Green Tigers. World Scientific Publishing Co Pte Ltd, Singapore. Interesting stuff.
				3. Rees & Wackernagel (2008) Urban ecological footprints: why cities cannot be sustainable – and why they are a key to sustainability. Pp. 537-555 *in* Marzluff et al (Eds.). Originally published in 1996 – a bit outdated, but worth reading.
				4. Wittig et al (2008) What should an ideal city look like from an ecological view? – Ecological demands on the future city. Pp. 691-697 *in* Marzluff et al (Eds.)
				5. Yokohari et al (2000) Beyond greenbelts and zoning: a new planning concept for the environment of Asian mega-cities. *Landsc Urban Plann* **47**, 159-171.
				6. Clery (2008) Imagining a city where (electrical) resistance is futile. Science **319**, 753.
				7. Bhattacharjee (2008) Choking on fumes, Kolkata faces a noxious future. Science **319**, 749.
				8. Normile (2008) China's living laboratory in urbanization. *Science* **319**, 740-743.
				9. Vogel (2008) Upending the traditional farm. *Science* **319**, 752-753.
				<u>VIDEOS</u>
				http://www.youtube.com/watch?v=T4N0XeMadjc Important and inspirational video about Christie Walk (an eco-city)

SUGGESTED READINGS TO LINK LEARNING TO THE SINGAPORE STORY (E.G., USED IN CLASS, AND TO HELP YOU ANSWER WHAT NOW QUESTIONS)

1. Corlett (1992) The ecological transformation of Singapore, 1819-1990. *J Biogeog* **19**, 411-420. 27 yrs old, but still great to understand land use change in this country.
2. NParks Board (2009) Conserving our Biodiversity – Singapore's National Biodiversity Strategy and Action Plan. Nparks, Singapore.
3. Sodhi et al (2004) Southeast Asian biodiversity: an impending disaster *TREE* **19**, 654-660.
4. Hau et al (2005) Beyond Singapore: Hong Kong and Asian biodiversity *TREE* **20**, 281-282.
5. Sodhi et al (2005) Response to Hau et al *TREE* **20**, 282.
6. Chapter 6 in Newman & Matan (2013) Green Urbanism in Asia - The Emerging Green Tigers. World Scientific Publishing Co Pte Ltd, Singapore. Interesting stuff.
7. Khew et al (2014) Public perceptions of nature and landscape preference in Singapore *Hum Ecol* **42**, 979-988
8. Tan et al (2014) Urban ecological research in Singapore and its relevance to the advancement of urban ecology and sustainability. *Landsc Urban Plann* **125**, 271-289.
9. Gulsrud & Ooi (2015) Manufacturing green consensus: urban greenspace governance in Singapore. Pp 77-92 in Sandberg et al (Eds) Urban Forests, Trees, and Greenspace – A Political Ecology Perspective. Routledge, New York, NY.
10. Siva et al (2017) Green buildings in Singapore; analyzing a frontrunner's sectoral innovation system. *Sustainability* **9**, 919.

LSM4265 Urban Ecology

CONTINUOUS ASSESSMENT

My teaching philosophy hinges on the use of authentic assessments, i.e., meaningful activities and tasks that allow students to demonstrate their ability to apply essential knowledge and skills. By meaningful, I am referring to realistic, complex tasks that replicate the contexts in which professionals are tested.

But I also believe in designing assessments that cater to different preferences and styles when it comes to learning and working. This is why both CA components of LSM4265 incorporate some flexibility.

With that in mind, this is a description of how you will be assessed. I will also give you the rubrics that I will use to grade your assessments well in advance, so you know what my expectations are.

1. GROUP PROJECT (40 %) DUE IN WK 12 TUTORIAL

WHAT IS IT (BRIEFLY)?

The entire class examines one common theme together and *MAY* collect data together, but is divided into small groups to carry out projects that use collected data. Each group gives a **15-minute** presentation of its project to the entire class **(in final tutorial)** and receives constructive feedback from the audience.

WHY DO IT?

The group project is an authentic assessment for several reasons. **First**, you practice one of the most critical workplace skills: teamwork. Even though you won't choose your colleagues in the workplace, I let you form your own groups so that they're based on common interests and work strategies. But I insist on diversity in each group (with a mix of students from different programmes / years) so you can capitalise on the unique insights of people with different experiences. **Second**, you develop communication (oral and presentation) skills, a key requirement in most jobs and professions. **Third**, you have the chance to be creative (and we'd better get creative if we're going to solve environmental challenges, such as urbanisation). **Finally**, with its two peer-review processes (each presentation is critiqued by the rest of the class, and each group member is evaluated by each other member), this assessment lets you practice giving and receiving feedback – another key skill in life and in the workplace.

WHAT DOES IT CONSIST OF?

Imagine the whole class is a team of creative professionals working for a non-profit, whose mission is to ***promote sustainable urban development***, and I am its executive director. Such organisations do exist:
http://urbanecologycenter.org/
http://www.urbanecology.org/
With offices in a few cities around the world, we plan to open a branch in Singapore (SG). I've assigned the entire team this task: travel to SG (lucky you!) to **document the nature of urban development** over a two-month period, before **mounting an awareness campaign and possibly a business plan**.

Form groups (number of groups & members depend on total class size), and **study one or more quantifiable aspect(s) of urbanisation** (physical, chemical, biotic, socioeconomic, etc.) to **contribute meaningfully to our knowledge of urban ecology** in SG. The campaign must be composed of various deliverables, using the medium of each group's choice (each one must be unique, so communication within the entire team is key). Possibilities include: **collaborative mapping project**, **documentary / educational video** (aimed at adults *OR* kids), **poster**, **website**, **brochure**, **proposal / business plan** for an urban ecology project or sustainability initiative, etc. The possibilities are limited only by your imagination and relevance to urban ecology (so check ideas with me).

The final presentation must involve the whole group, i.e., each member must present. Your goal is to showcase your group's accomplishments from start to finish and put your work in context.

Grades are calculated according to one of these options (which you will vote on). **Option 1**: all group members get the same grade. **Option 2**: combo of base group grade (32 %) and grade for individual contribution (8 %) based on peer reviews by all teammates. Please fill out this form https://goo.gl/forms/zNkJAhNy5KlFqKru1 to give me the info I need to evaluate you and vote on your preferred grading scheme. I will also ask you to give feedback to your peers on their projects later.

2. PARTICIPATION (20 %)

WHAT IS IT?

By year 4, you should be aware that being responsible for your own learning allows you to exercise your ability to think independently, critically and creatively. Therefore, your full participation is both expected and essential, and it counts toward your final grade.

WHY DO IT?

Grading participation is an authentic assessment because in the real world, employees are evaluated on more than just tangibles and deliverables – soft skills are key to success. Active participation helps develop your communication and critical-thinking skills, especially when it comes to issues that are complex and/or controversial. Sharing your thoughts forces you to articulate your ideas and submit them to critical examination, while actively listening to others exposes you to alternate ways of interpreting and using information. Studies also show that students who participate are better able to recall and apply knowledge later on than those who do not.

WHAT DOES IT CONSIST OF?

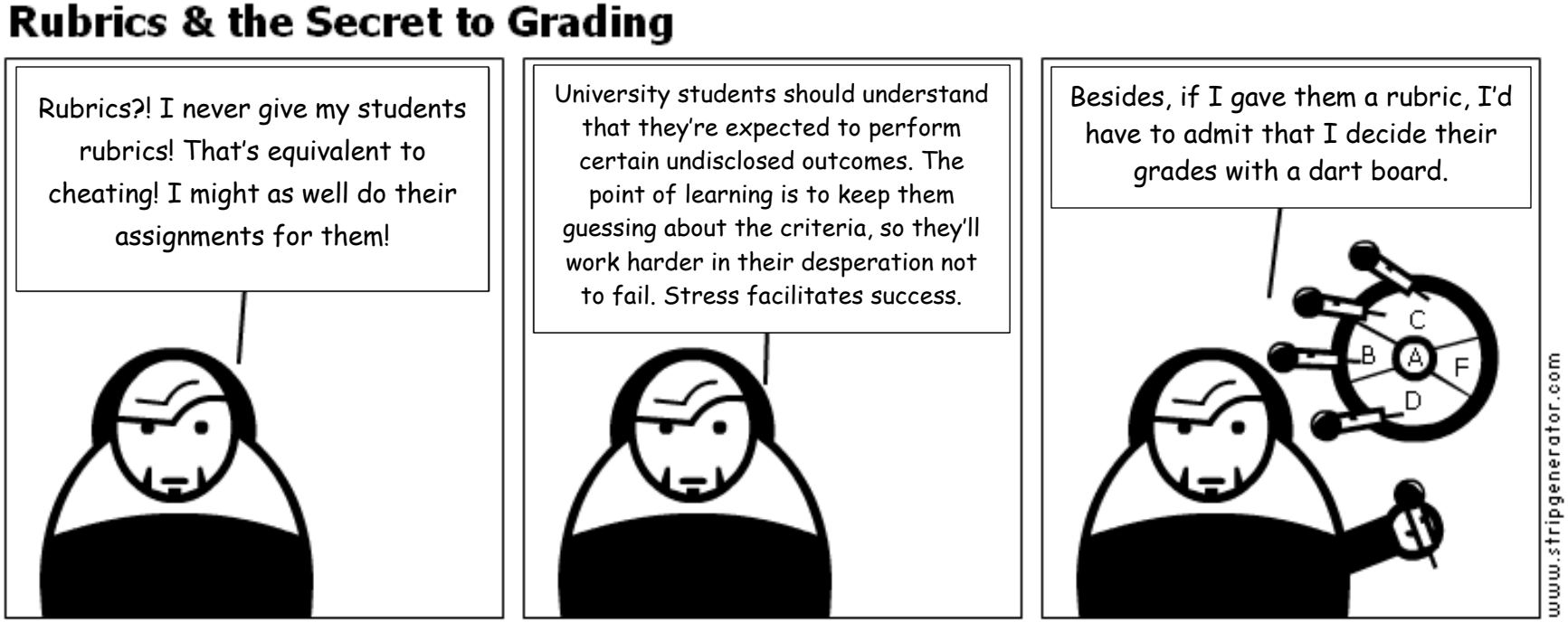
Grading participation is not without pitfalls. In particular, students (and instructors) note problems of subjectivity and unclear expectations. Some argue that grading participation penalises students who are more introverted and quieter than their more talkative peers. But people who are slower to speak up are not necessarily any less engaged than those who do so readily, and sometimes, very extroverted students can dominate class time, to the detriment of the overall group dynamic. Some also argue that instructors can't observe everything that goes on in the class, and so can't appreciate the entirety of a student's contribution. With this in mind, your participation grade is based on a holistic evaluation of your overall contribution during the course. It is based on two key components.

1. **Holistic rubric**: in class, I note your: oral contributions and questions, level of preparation, attentiveness and desire to learn, responsiveness to your peers, etc. I grade you on a rubric that you receive ahead of time. You can also contribute via the class blog or other means (laid out in rubric and/or below).
2. **Self-assessment:** You ***may*** use the rubric to assess yourself and argue for the grade you think you deserve, so please document your contributions. About halfway through the term, you ***may*** ask to chat with me about how you're doing so far.

You can also influence your grade by contributing to our course blog http://blog.nus.edu.sg/env3102. I welcome all contributions, which ***may*** enhance your participation. And you may earn ***a maximum of 5 %*** toward your final grade by writing a ***review or informed opinion piece***. It can be about ***anything related to urban ecology in SG***. For example, how about visiting a site that (at least ostensibly) fits in with SG's visions for sustainability and evaluating it? Or reviewing one of the govt's urban sustainability initiatives? With the blog visible to the public, tact matters, so please consult me before posting a piece (as opposed to doing it directly). And keep in mind that: (1) the ideal post is 500 to 1 000 words, (2) photos help (but saved for web – we don't want the page to load slowly or readers to 'steal' your high-res photos), (3) the NUS code of conduct and academic dishonesty principles apply, (4) posts should be written in plain, everyday language, as opposed to academic writing that may alienate readers.

LSM 4265 URBAN ECOLOGY

AY 2018-19



Group :

LSM4265 – GROUP PROJECT RUBRIC (32 or 40 % of final grade)

CONTENT AND DELIVERABLE (30 pts)

Criterion	Exemplary	Learned	Basic	Apprentice - Inadequate	SCORE
Research project	**14 - 15**	**10 - 13**	**6 - 9**	**0 - 5**	
	☐ Grows our knowledge of urban ecology in SG ☐ Idea / approach is original ☐ All info is accurate ☐ All info is relevant ☐ Just the right amt of detail ☐ Good use of references	Like project receiving exemplary rating, but some elements not quite at the same standard	Like project receiving apprentice rating, but several elements at a noticeably better standard	☐ Contributes no new knowledge of urban ecology in SG ☐ Idea / approach unoriginal ☐ Contains major errors ☐ Contains irrelevant info ☐ Content glossed over / too detailed ☐ References not used / used poorly	
Deliverable	**10 - 12**	**7 - 9**	**4 - 6**	**0 - 3**	
	☐ Creative and original ☐ Quality is impressive ☐ Usefulness is clear ☐ Linked to research findings	Like deliverable receiving exemplary rating, but some elements not quite at same standard	Like deliverable receiving apprentice rating, but some elements at noticeably better standard	☐ Not creative / original ☐ May be sloppy / just not well-done ☐ No clear, practical use ☐ Not linked to research findings	
Cohesion	**3**	**2**	**1**	**0**	
	Project ***clearly linked*** to a cohesive awareness campaign by class	***Linked*** to cohesive awareness campaign, but not clearly enough	***Tenuous link*** to awareness campaign, ***OR*** campaign not cohesive enough	Relationship to awareness campaign is unclear, ***OR*** cohesive campaign not achieved by class	
				TOTAL	
Comments					

KNOWLEDGE AND PRESENTATION SKILLS (10 pts)

Criterion	Exemplary (2 pts)	Learned (1.5 pts)	Basic (1 pt)	Apprentice – Inadequate (0 – 0.5 pts)	SCORE
Knowledge of topic	Extensive and impressive	Solid, with minor gaps	Good (some aspects) or basic grasp overall	Lacking	
Speaking	☐ Appropriate terminology ☐ Easy to hear and understand	Like presentation receiving exemplary rating, but somewhat less polished	Like presentation receiving apprentice rating, but noticeably better	☐ Language too advanced or basic ☐ Generally difficult to hear/understand	
Audience engagement	☐ Confident, enthusiastic ☐ Eye contact, humour, body language used effectively ☐ Involves audience (!)			☐ Lacking confidence / enthusiasm ☐ Boring ☐ Distracting habits / tics	
Visuals	☐ All visuals support content, all content represented ☐ Eye-catching, attractive, effective, not distracting			☐ Unclear relationship between content and visuals ☐ Bland (e.g., text-heavy), poorly-done, ineffective, distracting	
Questions from audience	***All*** answered accurately, thoughtfully and honestly	***Most*** answered as described for exemplary rating	***Several*** not answered as described for exemplary rating	Considerable difficulty answering questions	
				TOTAL	
Comments					

ORGANISATION, TEAMWORK AND PROFESSIONALISM (5 pts)

Criterion	Exemplary	Learned	Basic	Apprentice – Inadequate	SCORE
Organization, professionalism	**3**	**2 – 2.5**	**1 – 1.5**	**0 - 1**	
	☐ Well-organised with logical flow, smooth transitions between presenters ☐ Unanticipated difficulties handled with aplomb ☐ Very well-prepared	Like presentation receiving exemplary rating, but somewhat less polished	Like presentation receiving apprentice rating, but noticeably better	☐ Poorly organised or unorganized, transitions may be rough ☐ Flustered in the face of unanticipated difficulties ☐ Lack of preparation	
Teamwork	**2**	**1.5**	**1**	**0 - 0.5**	
	☐ Great coordination and cooperation ☐ All equally involved and well-informed	☐ Good coordination and cooperation ☐ 1 member less involved and/or not well- informed	☐ Problems with coordination and/or cooperation ☐ 2 members less involved and/or not well- informed	☐ Lack of coordination and/or cooperation ☐ 1 person dominates, rest seem ill-prepared	
				TOTAL	
Comments					

GRAND TOTAL (MAXIMUM 45 PTS – will be converted to /32) =

NOTE DEDUCTION OF 2 PTS PER MINUTE OVER TIME (LIMIT = 15 MIN)

LSM 4265 – GROUP PROJECT TEAM MEMBER ASSESSMENT RUBRIC

Please provide a candid assessment of each member of your team. There are two criteria – use this rubric as a guide, and then evaluate your teammates using this form (https://goo.gl/forms/WDm1NwbixMmkPiaG2). There is space for additional comments (optional) about the person you are evaluating and/or the group dynamics – you can indicate whether I should keep these confidential. Rest assured I will not share your identity with the person you are evaluating.

The group project is worth 40 % of your final grade, and this individual assessment counts for 20 % of that (if your group chooses option 2). Please complete one assessment ***for each of your teammates*** before 18h00 on 15-April-2019. ***If you fail to grade all your team members by this deadline, you will receive a zero for your individual contribution***.

Criterion	Exemplary 4	Milestone 3	Average 2	Benchmark 1	Unacceptable 0
Individual contributions: • Contributes good ideas • Helps team move forward by articulating merits of alternate ideas / proposals • Completes all assigned tasks on time • High quality of work advances the project • Proactively helps teammates complete their assigned tasks to a similar standard	A driving force, this teammate really deserves to be recognised for her/his ideas, hard work and the high quality of it.	This teammate's contribution is above average, and her/his work is consistently done on time and to a high standard.	This is someone you can count on to do her/his part, but not necessarily much more than that.	This teammate may have had to be prodded to share ideas, to get work done, etc.	This teammate may have shirked her/his obligations.
Fosters constructive team climate: • Treats teammates respectfully • Conveys a positive attitude about the team and its work • Facilitates contributions of other members (builds on their contributions / notices when they aren't participating and invites them to engage) • Actively helps and/or encourages others • Addresses conflict directly & constructively	Deserves to be singled out for contributing to a constructive team climate. This person is consistently a very positive influence.	Generally promotes a constructive team climate. This person is usually a positive influence.	Tries to foster a constructive team climate. This person exhibits some very positive behaviours, but not consistently.	Sometimes fosters a constructive team climate. This person exhibits some positive behaviours, but on the balance, is not a positive force.	Does little to nothing to foster a constructive team climate. This person may be a negative influence.

LSM4265 – PARTICIPATION (20 % of final grade) – RUBRIC

	SCORE			
CRITERION	**0-4**			
Attendance	Please show up to every class / tutorial on time – each unexcused absence / late arrival / early departure is a deduction.			
In class participation	**9-10**	**6-8**	**3-5**	**0-2**
	VERY ACTIVE, HIGH-QUALITY • Contributes proactively • Asks relevant questions • Readily answers questions asked • Enthusiastic! • Contributions are thought-provoking • Demonstrates critical-thinking • Arrives fully-prepared • Raises questions / comments on material consulted outside of class • Actively listens (evident from comments that build on others' remarks and nonverbal cues) • This student's presence greatly enhances the class dynamic • Consistently interacts with lecturer(s) and peers	**ACTIVE**	**PASSIVE**	**APATHETIC / DESTRUCTIVE**
Other types of participation	**6**	**4-5**	**2-3**	**0-1**
	ENTHUSIASTIC PARTICIPANT • Engages in blog community • Seizes additional opportunities to participate (e.g., during group project discussions & presentations, feedback exercises, etc.)	**MAKES A REAL EFFORT**	**COULD ENGAGE MORE**	**NEEDS AN OVERHAUL**

YOU MAY POSITIVELY AFFECT YOUR PARTICIPATION GRADE BY:

1. Becoming more active and/or making more effective comments that raise overall level of discussion and set examples for others.
2. Asking thoughtful questions that will enhance discussion and engage peers.
3. Listening carefully to, supporting, and engaging your peers in discussion. This will essentially improve others' learning experience.
4. Contributing to the course blog.

YOU MAY NEGATIVELY AFFECT YOUR PARTICIPATION GRADE BY:

1. Dominating class discussions, thereby restricting others' participation.
2. Distracting others or otherwise compromising their ability to listen and/or participate.
3. Making negative, offensive and/or disrespectful comments.
4. Using electronic devices such as, but not limited to, a mobile phone, iPod, or computer for personal or other coursework reasons during class unless instructed to do so.
5. Sleeping / looking visibly bored / talking with the person next to you.