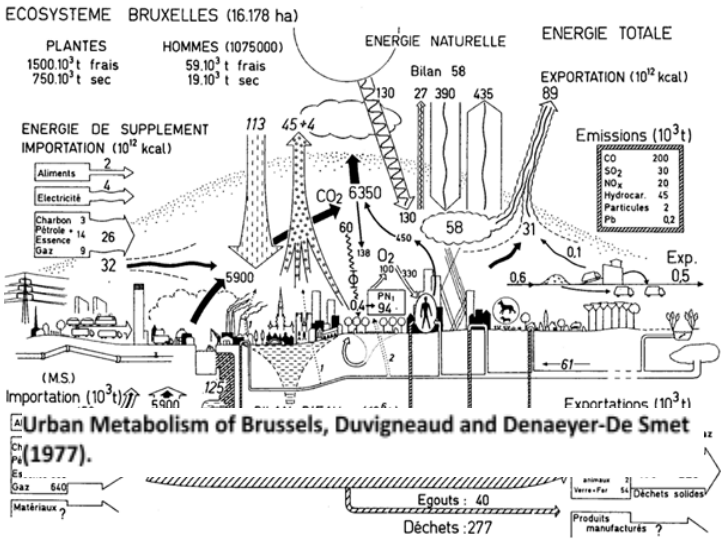
EAS 537: Urban Sustainability | Syllabus

University of Michigan | Fall 2023 | 3 Credits
Tuesday and Thursday, 2:30pm-3:50pm
Dana 1046

Course Information

Instructor:
Brandon Finn, Lecturer
SEAS
brafinn@umich.edu
Office Hours: Office Hours:
Wednesday 9:30 am - 11:30am
Book Zoom slots here or email for an appointment



Urban Metabolism of Brussels, Duvigneaud and Denaeyer-De Smet (1977).

Course Description

As engines of capital accumulation, cities have often been viewed as environmental sacrifice zones. Some critics have argued that 'sustainable cities' is an oxymoron. Nonetheless, the debate over sustainable development generally, and sustainable urbanism specifically, has succeeded in reshaping and broadening discourse around cities and attendant policies and outcomes – both in industrialized and industrializing countries. Implying that sustainable use of natural resources involves social justice and economic development as well as environmental concerns, the notion of sustainability has led away from narrower conceptions of urban environmentalism, toward more consideration for the future, greater integration of social and economic goals with environmental and ecological objectives, and hence a fundamental rethinking of how cities should be theorized, planned, and managed.

This course introduces graduate students to the emerging field of urban sustainability from multiple disciplinary perspectives, primarily industrial ecology, urban political ecology, urban ecology, and planning. The course provides students with the theoretical and methodological tools in which to explore the potential for a sustainable urbanism. Approaches to foster more sustainable and resilient forms of urbanization and urban life – ranging from localization, to industrial symbiosis, to ecological restoration – will be introduced and evaluated. Course deliverables include a midterm exam, a group case-project, a material flow analysis project, and a final exam. Meetings with stakeholders and other actors who shape the city form additional course components.

Learning Objectives

By the end of this course, you should be able to:

1. Connect sustainability concepts and technology to real-world urban challenges, including individual/social needs and political debates;
2. Understand the importance (and difficulty) of defining and fostering urban sustainability;
3. Present complex material to a diverse audience in a succinct and effective manner;

4. Facilitate effective discussions, while being attentive to diverse opinions and perspectives;
5. Read and write more effectively, both essential skills for your future.

Course Structure

The course is divided into four interdependent sections: 1. *Conceptual Foundations of Urban Sustainability; 2. Nourishing the city, introducing the case approach, and the Midterm; 3. Form and Flows of the City: Theory and Case Studies;* and *4. The final exam.* The course meets twice a week for 1.5 hours each time and includes lecture, discussion of readings, presentation of cases, and building-block activities. The course has an experiential component with periodic in-class exercises. The primary deliverables, which are graded, are as follows: 1) Course participation; 2) a midterm exam; 3) a group case study project; and 4) a final exam.

Course Resources

Canvas will be the primary vehicle of instruction. ***Students are required to attend class at the prescribed times (i.e. Tues and Thurs from 2:30-3:50).*** *Course lectures may be audio/video recorded and made available to students in this course. As part of your participation in this course, you may be recorded. If you do not wish to be recorded, please contact me the first week of class (or as soon as you enroll in the course, whichever is latest) to discuss alternative arrangements. Students are prohibited from recording/distributing any Class Activity without written permission from the instructor, except as necessary as part of approved accommodations for students with disabilities. Any approved recordings may only be used for the student's own private use. Please refer to the ITS Recording and Privacy Concerns FAQ.for additional details.*

Required Texts

You may want to purchase **Cronon, W. (2009). *Nature's Metropolis: Chicago and the Great West*. WW Norton & Company.** This text should be in your local bookstore and can also be purchased on Amazon.com or other internet booksellers (and relatively inexpensively). All readings, both required and supplemental, are available in pdf form on Canvas. I will provide ample notice of minor changes to readings in class and a revised syllabus will be shared. Readings have been carefully selected, with particular attention to the reading load, which varies considerably over the semester. For some class sessions, the reading load is considerable, and for others there is no required reading at all.

Assignments & Grading

Grading

Your course grade includes work completed as an individual and as a group. Your course grade will be based on a midterm exam, a final exam, a group case study, and class participation as determined by attendance, by completion of in-class exercises, and by discussion (Perusall) contributions. **All assignments are due by noon EST on the due date listed in the course schedule.** The grading breakdown is as follows:

Group Deliverable		*Individual Deliverables*	
Assignment	**Percentage of total grade**	**Assignment**	**Percentage of total grade**
Case Summary	4%	Mid Term Exam	23%
Case Material	15%	Final Exam	23%
Case Presentation	15%	Attendance	10%
		Discussion of reading (in class and on Perusall)	10%
Total	**34%**	**Total**	**66%**

Grades will be posted in the "Gradebook" tab in Canvas. Final grades are based on the total percentage received for the semester.

Exams

There is a midterm exam on **October 12th**. This exam covers the first portion of the course. There is a final exam on **December 5th**. This exam covers the second portion of the course. **Please bring your laptops for both exams. If this is not possible, please contact me so we can make alternative arrangements**

Case Study

Each student will contribute to presenting a case study as part of a student team (5-6 students in each team). These case studies are divided into three graded components:

1. **1-page Case Summary**
2. **Case Materials and Edge Notes (~3-4 pages)**
3. **Case Presentation,** with an in-class activity that you've designed to engage your classmates on the topic or in discussing the Case Materials.

These case studies will also include the following:

- **Use of mass media or interviews** (news articles, audio-visual media, etc.) to convey the multiple perspectives on the topic;
- **Use of Social Explorer** (SocialExplorer.com), **a "Story Map"** (https://storymaps.arcgis.com/en/), **or another interactive mapping tool** to convey the spatial, demographic, and socio-economic context of the topic;
- **Use of at least one urban sustainability indicator.**

We will talk more about the structure of a case study and how to develop one in class.

In-Class Exercises and Activities

Urban sustainability is a topic we will explore both through the lens of expert opinion (i.e. the lectures and assigned readings) as well as through class discussions, leveraging our diverse viewpoints and experiences. In-class activities, which form a component of your participation grade, are designed to help you to engage in thoughtful discussions with your classmates on the weekly topic. Examples of these activities include:

1. **Perusall:** We will use Perusall (embedded in Canvas) for collaborative note-taking on the required course readings. The readings are organized by topic within Perusall. Perusall is

intended to help you collaborate as a class to improve comprehension of the readings, to ask and answer clarifying questions about the readings, and to identify interesting/thought-provoking aspects of the readings for in-class discussion.

2. **"Material Flow Analysis"** - Material flow analysis (MFA) is a technique for identifying the major inputs and outputs of a material system, ranking the relative magnitudes of the flows, and opportunities for closing loops, minimizing waste, etc. You will be expected to construct a basic model of a city's metabolism, represent it visually as a Sankey diagram and calculate some simple indicators or circularity.
3. **"Political Ecology and Urban Ecology Exercises"** – Here you will take another group's MFA exercise and analyze it through urban political ecology and urban ecology lenses. These analyses will be done in class on two separate days. Think about the actors that shape and are affected by the metabolism of a city. Consider how the metabolism of a city nests within biogeochemical processes that act at different temporal and spatial scales. You will provide a brief document outlining your analysis; one page for your urban political ecology assessment, one page for your urban ecology assessment. This activity will be completed in class as a group.

Discussion Participation

Class participation is awarded based on: **level of preparedness for class** (e.g., completing readings, coming to class prepared to engage in discussion), **engagement in class discussion** (e.g., oral contributions to class discussion, participation in class activities, completion of assigned posts on Canvas Discussion boards), **outside of class involvement** (e.g., group work), **number of absences**, and weekly **Perusall** engagement on the course readings. In order to participate fully, completing the required reading for each session is essential. We especially value discussions in which *you* are doing most of the talking. Aside from voicing comments, actively paying attention to each other is key. We understand that some students may feel uncomfortable sharing thoughts in groups, nevertheless we encourage you to express yourself. To facilitate ease, discussions will also vary in format (e.g., small-larger group discussions, activities, synchronous and asynchronous opportunities). There are required readings for each class, which are listed on Canvas and can be accessed through **Perusall** for **collaborative note-taking**. Collaborative note-taking is intended to ensure that students read the most important papers for the course, to facilitate peer-led learning, and to provide an opportunity for students to engage with each other. Course reading grades will reflect the consistency and quality of collaborative note-taking via Perusall.

Course Management & Policies

Attendance

All students are expected to attend and participate in the scheduled class sessions. Unexcused absences will be reflected in final grades. I will take periodic attendance, approximately 10 times over the course of the semester.

Academic Integrity

The University of Michigan seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. Plagiarism will not be tolerated and there will be severe consequences. For more information, please see http://www.rackham.umich.edu/current-students/policies/academic-policies/section10

Religious/Cultural Observance

Students who have religious or cultural observances that coincide with this class should let me know in writing within a week of the beginning of the term. Students who expect to miss classes, examinations, or other assignments as a consequence of their religious observance will continue to be provided with a reasonable alternative opportunity to complete their academic responsibilities. However, if a student does not contact me within this time period, I will assume the student plans to attend all class meetings. http://www.provost.umich.edu/calendar/

Accommodations for Students with Disabilities

Please contact me during the first week of class so that your needs can be accommodated. You may also wish to contact Services for Students with Disabilities (G-664 Haven Hall, 505 South State St.: 734-763-3000, http://ssd.umich.edu).

Student Sexual Misconduct Policy

Title IX prohibits discrimination on the basis of sex, which includes sexual misconduct — including harassment, domestic and dating violence, sexual assault, and stalking. We understand that sexual violence can undermine students' academic success and we encourage anyone dealing with sexual misconduct to talk to someone about their experience, so they can get the support they need. Confidential support and academic advocacy can be found with the Sexual Assault Prevention and Awareness Center (SAPAC) on their 24-hour crisis line, 734.936.3333 and at sapac.umich.edu. Alleged violations can be non-confidentially reported to the Office for Institutional Equity (OIE) at institutional.equity@umich.edu

Diversity, Equity, and Inclusion

In this class, we are committed to creating a culture of engaged learning and establishing a climate of inclusion and harmony. We are all here to learn from each other. In this spirit, we will work to actualize University of Michigan community standards of integrity and respect by practicing active listening and respectful communication. By acknowledging differences amongst us in our backgrounds, skills, interests, and values, we will collectively grow and improve our understanding of the world. Together, we strive to cultivate a class environment where each individual feels a sense of belonging and well-being. This atmosphere is most conducive to teaching, learning, and building community.

Resources for Student Success

Writing Help

You may find it helpful to contact the Sweetland Writing Center, which offers free individual

writing conferences for graduate students who are working on course papers, as well as dissertations, etc. In addition to the required text by Schimel, helpful research and writing aids include: *The Craft of Research* (Booth, Colomb, and Williams), *The Elements of Style* (Strunk and White), and A *Manual for Writers of Research Papers, Theses, and Dissertations* (Turabian). Online sources with useful guidance on writing include OWL on-line writing lab from Purdue University (https://owl.english.purdue.edu/) and the University of Wisconsin writing handbook (http://writing.wisc.edu/Handbook/)

Student Mental Health and Wellbeing

University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at 734.764.8312 and caps.umich.edu during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at 734.764.8320 and https://www.uhs.umich.edu/mentalhealthsvcs, or for alcohol or drug concerns, see https://www.uhs.umich.edu/aodresources. For a listing of other mental health resources available on and off campus, visit http://umich.edu/~mhealth/.

Course Schedule and Plan At-A-Glance

Day	Topic	Readings	Activity	Key Deliverables
Module 1: Conceptual Foundations of Urban Sustainability				
Tues, Aug. 29 Lecture 1	Introduction to Course		• Introductions • Discussion guidelines • Working in groups	Think about your subject area interests
Thurs, Aug. 31 Lecture 2	What is urban sustainability?	Cronon (2009) – Preface and Prologue; Ch 3 (Grain); World City Report (2022) XV-XXXI	• Discuss Cronon • Construct mental maps of urban sustainability	Urban/rural linkages; Understand complexity of sustainability
Tues, Sept. 5 Lecture 3	Global Urban Challenges	Seto et al (2012) World City Report (2022), 1-18	• Discuss readings • Reflect on mental maps	Learn core urban sustainability issues & priorities
Thurs, Sept 7 Lecture 4	Urban Indicators	European Commission (2018); Revi et al (2014) 585-596; IPCC (2022) 912-936; 978-982	• Discuss Readings • Discuss case topics, groups.	Urban sustainability indicators and their importance; introduction

				to cases
Tues, Sept 12 Lecture 5	Urban Informality	Finn and Cobbinah (2023) Roy (2009)	• Discuss Readings • Small group activities	Informality and its role within urban sustainability debates
Thurs, Sept. 14 Lecture 6	Three 'Ecologies': Industrial Ecology and Urban metabolism	Bai (2007); Brunner (2007); Kennedy (2007) Ellen MacArthur Foundation (2017)	• Discuss readings • Material Flow Analysis exercise • Guest: Joshua Newell	Sankey diagram of a city's material flows
Tues, Sept 19 Lecture 7	Three 'Ecologies': Urban Political Ecology	Robbins (2004); Heynen et al (2006);	• Discuss readings • UPE Exercise	PE analysis of Sankey Diagram
Thurs, Sept 21 Lecture 8	Three 'Ecologies': Urban Ecology & Interdisciplinary Prospects	Grimm et al. (2008); Newell and Cousins (2015); Wu (2014);	• Discuss readings • PE and UE Exercise	UE analysis of Sankey Diagram
• **Module #2: Nourishing the City, the 'Case' Approach, and Midterm**				
Tues Sept. 26 Lecture 9	Introduction to Urban Sustainability Cases	Boone et al, 2018. Browse Learngala.com	• Discuss readings • Presentation of Sustainability Cases Project	
Thurs, Sept 28 Lecture 9	Topic: Nourishing the City	McClintock (2010); Gallagher (2010) – Ch 3; Seto and Ramankutty (2016)	• Present Case	
Tues, Oct 3 Lecture 10	Case Presentation: Urban Agriculture in Detroit	Read Urban Agriculture Case	• Discuss Case • Meet the Experts: Jason Hawes	
Thurs, Oct 5	Case Prep		• Work in groups • Finalize case summary	
Tues, Oct 10	Case Prep		• Work in Groups	Case Summary Due
Thurs	Midterm Exam	No required reading	• Multiple	MIDTERM

Oct 12			choice and short answer exam	
● **Module #3: Form and Flows of the City, Theory and Case Studies** ● Tues, Oct 17 ● Fall Break NO CLASS				
Thur, Oct 19 Lecture 10	Topic #1 Flows of Transport	Gallagher (2010), Ch 4; Romero-Lankao et al., (2022); Benevenuto & Caulfield (2019)	● Discuss readings ● Team #1 introduces case	
Tues, Oct 24	Case Presentation #1 Flows of Transport	Case #1 Material	● Student-led case activity ● Meet the Experts: TBD	
● ***Urban Green Space***				
Thur, Oct 26 Lecture 11	Topic #2 Flows of Minerals	Gulley (2023) Sovacool (2019)	● Discuss readings ● Team #2 introduces case	Midterm Exam returned
Tues, Oct. 31	Case Presentation #2 Flows of Minerals	Case #2 Material	● Meet the Experts: ● Andrew Gulley	
● ***Flows of Water***				
Thur, Nov 2 Lecture 12	Topic #3 Flows of Water	Gandy (2004); Rentschler et al. (2022)	● Discuss readings ● Team #3 introduces case	
Tues, Nov 7	Case Presentation #3 Flows of Water	Case #3 Material	● Student-led case activity ● Meet the Experts: Jun Rentschler	
● ***Buildings and Energy***				
Thur, Nov 9 Lecture 12	Topic #4 Buildings and Energy	Ivanova et al. (2016); Rees (2009); Goldstein et al. (2020)	● Discuss readings ● Team #4 introduces case	
Tues, Nov 14	Case Presentation #4 Buildings and Energy	Case #4 Material	● Student-led case activity ● Meet the Experts: Dimitrios Gournaridis	
● ***Flows of Food***				

Thur, Nov 16 Lecture 13	Topic #5 Flows of Waste	Guibrunet et al. (2017); Daum et al., (2017)	• Discuss readings • Team #5 introduces case	
Tues, Nov 21	Case Presentation #5 Flows of Waste	Case #5 Material	• Student-led case activity • Meet the Experts: TBD	
Thurs, Nov 23	Thanksgiving, NO CLASS	No required reading		
• ***Flows of Waste***				
Tues, Nov 28 Lecture 14	Topic #6 Flows of Food	Goldstein et al. (2017); VanderWilde et al., (2023)	• Discuss readings •	
Thur, Nov 30	Flows of Food Course review	Case #6 Material	• Meet the Experts: • Callie VanderWilde	
• **Module #4: Final Exam**				
Tues, Dec 5	Final Exam		• Multiple choice and short answer exam	Final Exam

READING LIST

Note: <u>This list may change slightly over the term.</u>
<u>You will have ample advance notice should such changes occur</u>

Course Introduction; **What is Urban Sustainability?**
Aug. 29; Aug. 31
<u>Goals/ Tasks/ Deliverables</u>

- Introductions, course guidelines and expectations
- Explore research interests, "What is urban sustainability?"
- Discuss readings

No Required Readings for Tuesday August 29

Required Readings for Thursday, August 31:

- Cronon, W. (1992). <u>Nature's Metropolis: Chicago and the Great West.</u> WW Norton & Company. (Preface: pp. xv- xxv and Prologue: pp. 5-19).
- Cronon, W. (1992). <u>Nature's Metropolis: Chicago and the Great West.</u> WW Norton &

Company. (Ch. 3 Pricing the future: Grain: pp. 97-130).
- World City Report. (2022). https://unhabitat.org/wcr/ (pp. XV-XXXI).

Global Urban Challenges; Urban Indicators
Sept 5 and Sept 7

Goals/ Tasks/ Deliverables
- Learn core urban sustainability issues and challenges
- Understand different indicators that are used to measure, assess, and improve urban sustainability outcomes
- Discuss readings

Required Readings for Tuesday, September 5:
- Seto, K. C., Reenberg, A., Boone, C. G., Fragkias, M., Haase, D., Langanke, T., ... Simon, D. (2012). Urban land teleconnections and sustainability. PNAS, 109(20), 7687–7692.
- World City Report. (2022). https://unhabitat.org/wcr/ (pp. 1-18).

Required Readings for Thursday, September 7:
- European Commission (2018). Science for Environment Policy In-Depth Report: Indicators for sustainable cities.
- Revi, A., Satterthwaite, D. E., Aragón-Durand, F., Corfee-Morlot, J., Kiunsi, R., Pelling, M., ... Solecki, W. (2014). Urban Areas. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, ... L. L. White (Eds.), Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects (pp. 535–612). Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press. (pp. 585-596).
- Intergovernmental Panel on Climate Change (2022). https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter06.pdf (pp. 912-936; 978-982)

Urban Informality
Sept 12

Goals/ Tasks/ Deliverables
- Learn about informality and sustainability
- Discuss readings

Required Readings for Tuesday, September 12:
- Finn, B.M. and Cobbinah, P.B., 2023. African urbanisation at the confluence of informality and climate change. *Urban Studies*, *60*(3), pp.405-424.
- Roy, A., 2009. Why India cannot plan its cities: Informality, insurgence and the idiom of urbanization. *Planning theory*, *8*(1), pp.76-87.

Introduction to "The Three Ecologies:" Industrial Ecology and Urban Metabolism; Urban Political Ecology
Sept. 14 and Sept. 19

Goals/ Tasks/ Deliverables

- Understand and practice Material Flow Analysis (MFA); turn in the MFA assignment
- PE Exercise
- Discuss readings

Required Readings for Thursday, September 14:

- Bai, X. (2007). Industrial Ecology and the Global Impacts of Cities. Journal of Industrial Ecology, 11(2), 1–6.
- Brunner, P. H. (2007). Reshaping urban metabolism. Journal of Industrial Ecology, 11(2), pp. 11-13.
- Kennedy, C., Cuddihy, J., & Engel-Yan, J. (2007). The changing metabolism of cities. Journal of Industrial Ecology, 11(2), pp. 43-59.
- Ellen MacArthur Foundation (2017). *Cities in the circular economy: an initial exploration.*

Required Readings for Tuesday, September 19:

- Robbins, P. (2004). The Hatchet and the Seed. In Political Ecology: A Critical Introduction (pp. 3–16).
- Heynen, N. C., Kaika, M., & Swyngedouw, E. (2006). Urban political ecology: Politicizing the production of urban natures. In In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism (1st ed., pp. 1–20). Routledge.

Supplemental Reading Material (Optional)

- Andrews, C. J. (1999). Putting industrial ecology into place evolving roles for planners. *Journal of the American Planning Association*, 65(4), pp. 364-375.
- Campbell, S. (1996). Green cities, growing cities, just cities? Urban planning and the contradictions of sustainable development. Journal of the American Planning Association, 62(3), pp. 296-312.
- Goldstein, B., Birkved, M., Quitzau, M. B., & Hauschild, M. (2013). Quantification of urban metabolism through coupling with the life cycle assessment framework: Concept development and case study. *Environmental Research Letters*, *8*(3), 035024.
- Graedel T.E. and Allenby B.R. (1995). *Industrial Ecology*. Prentice Hall. (Ch. 1: Introduction: pp. 2-10, Ch. 2: Overview of the industrial ecology intellectual framework: pp. 11-16, Ch. 3: Sustainable development: pp. 17-39, Ch. 4: Industrial ecology: pp. 40-62).
- Hendrickson, C. T., Lave, L. B., & Matthews, H. S. (2006). *Environmental Life Cycle Assessment of Goods and Services: An Input-Output Approach*. Routledge. (Ch. 1: Exploring environmental impacts and sustainability through life cycle assessment: pp. 3-20 and Ch. 16: Development of regional economic input-output life cycle assessment models: pp.160-168).
- Kennedy, C., Pincetl, S., & Bunje, P. (2011). The study of urban metabolism and its applications to urban planning and design. *Environmental Pollution*, *159*(8), pp. 1965-1973.
- Leach, M. A., Bauen, A., & Lucas, N. J. (1997). A systems approach to materials flow in

sustainable cities: A case study of paper. *Journal of Environmental Planning and Management*, *40*(6), pp. 705-724.
- McGranahan, G., & Satterthwaite, D. (2003). Urban centers: An assessment of sustainability. Annual Review of Environment and Resources, 28(1), pp. 243-274.

Urban Ecology & Interdisciplinary Prospects; Introduction to Urban Sustainability Cases
Sept. 21 and Sept 26

Goals/ Tasks/ Deliverables
- Discuss Readings
- UE exercise
- Connect theory to practice
- Introduction to cases

Required Readings for Thursday, September 21:
- Cousins, J.J., Newell, J.P. (2015). A political–industrial ecology of water supply infrastructure for Los Angeles. *Geoforum,* 58, 38–50.
- Grimm, N. B., Faeth, S. H., Golubiewski, N. E., Redman, C. L., Wu, J., Bai, X., & Briggs, J. M. (2008). Global change and the ecology of cities. Science, 319(5864), 756–60.
- Wu, J. (2014). Urban ecology and sustainability: The state-of-the-science and future directions. Landscape and Urban Planning, 125, 209–221.

Required Readings for Tuesday, September 26:
- Boone L., Ultee L., Waisanen E., Newell J., Thorne J., Hardin R. (2018). Collaborative creation and implementation of a Michigan sustainability case on urban farming in Detroit. *Case Studies in the Environment* 2(1): 8-13. doi: https://doi.org/10.1525/cse.2017.000703
- Browse: Learngala.com

Supplemental Reading Material (Optional):
- Folke, C., Å. Jansson, J. Larsson and R. Costanza. (1997). Ecosystem appropriation by cities. Ambio 26: pp. 167-172.
- Jones, P., Williams, J., & Lannon, S. (2000). Planning for a sustainable city: An energy and environmental prediction model. *Journal of Environmental Planning and Management*, 43(6), pp. 855-872.
- Michael Hough. 1995. Cities and Natural Process. Routledge. (Ch. 2: Water: pp. 33-96, Ch. 3: Plants: pp. 97-164).
- Cook, I. R., & Swyngedouw, E. (2012). Cities, social cohesion and the environment: Towards a future research agenda. *Urban Studies*, *49*(9), pp. 1959-1979.
- Gibbs, D., & Deutz, P. (2005). Implementing industrial ecology? Planning for eco-industrial parks in the USA. *Geoforum*, *36*(4), pp. 452-464.
- Walker, R. A. (2001). California's golden road to riches: Natural resources and regional capitalism, 1848–1940. *Annals of the Association of American Geographers*, *91*(1), pp.

167-199.

Nourishing the City; Case Presentation: Urban Agriculture
Sept. 28 and Oct. 3

Goals/ Tasks/ Deliverables

- Discuss Readings
- Understand the advantages of a case study in exploring a debate
- Understand how a case study is constructed
- Meet the experts: Jason 'Jake' Hawes

Required Readings for Thursday, September 28

- McClintock, N. (2010). Why farm the city? Theorizing urban agriculture through a lens of metabolic rift. Cambridge Journal of Regions, Economy and Society, 3(2), 191–207.
- Gallagher, J. (2010). Potential and Problems in Urban Agriculture. In Reimagining Detroit: Opportunities for Redefining an American City (Chapter 3, pp. 39–72).
- Seto, K. C., & Ramankutty, N. (2016). Hidden linkages between urbanization and food

Required Readings for Tuesday, Oct. 3:

- Case material: Urban Agriculture

Case Preparation and Mid-term review; Mid-term Exam
Oct. 5 and Oct. 10

Goals/ Tasks/ Deliverables

- Work in groups preparing case studies

Required Readings for Thursday, October 5

- None

Required Reading for Tuesday October 10

- None

Mid-term Exam
Thursday Oct 12

Bring your laptops!

Introduction to Topic #1 Urban Form & Transportation; Case presentation Urban Transportation
Oct. 19; Oct 24

Goals/ Tasks/ Deliverables

- Discuss readings
- Team #1 introduces case on Urban Transportation
- Team #1 presents its case study on an Urban Transportation

Required Readings for Thursday, October 19:

- Benevenuto, R. and Caulfield, B., 2019. Poverty and transport in the global south: An overview. *Transport Policy*, *79*, pp.115-124.
- Gallagher, J. (2010). Road Diets and Roundabouts. In Reimagining Detroit: Opportunities for Redefining an American City. Detroit, MI, U.S.A.: Wayne State University Press. (Chapter 4, pp. 73-84)
- Romero-Lankao, P., Wilson, A. and Zimny-Schmitt, D., 2022. Inequality and the future of electric mobility in 36 US Cities: An innovative methodology and comparative assessment. *Energy Research & Social Science*, *91*, p.102760.

Required Readings for Tuesday, October 24:

- Team #1's Case Materials and Edge Notes

Introduction to Topic #2 Flows of Minerals; **Case Presentation Topic #2 Flows of Minerals**

Oct. 26 and Oct. 31

Goals/ Tasks/ Deliverables

- Meet the experts: Andrew Gulley
- Discuss readings
- Team #2 introduces case study on Flows of Minerals
- Team #2 presents its case study on Flows of Minerals
- Mid-term exam returned

Required Readings for Thursday, October 26:

- Gulley, A.L., 2023. China, the Democratic Republic of the Congo, and artisanal cobalt mining from 2000 through 2020. *Proceedings of the National Academy of Sciences*, *120*(26), p.e2212037120.
- Sovacool, B.K., Martiskainen, M., Hook, A. and Baker, L., 2019. Decarbonization and its discontents: a critical energy justice perspective on four low-carbon transitions. *Climatic Change*, *155*, pp.581-619.

Required Readings for Tuesday, October 31

- Team #2's Case Materials and Edge Notes

Introduction to Topic #3:Flows of Water; Case Presentation Topic #3: Flows of Water
Nov. 2 and Nov. 7

Goals/ Tasks/ Deliverables

- Meet the Experts: Jun Rentschler
- Discuss readings
- Team #3 introduces case study on Urban Flows of Water
- Team #3 presents case on Urban Flows of Water

Required Readings for Thursday, November 2:

- Gandy, M. (2004). Rethinking urban metabolism: water, space and the modern city. *City*, 8(3), 363–379.
- Rentschler, J., Salhab, M. & Jafino, B.A. Flood exposure and poverty in 188 countries. *Nat Commun* 13, 3527 (2022). https://doi.org/10.1038/s41467-022-30727-4

Required Readings for Tuesday, November 7:

- Team #3's Case Materials and Edge Notes

Introduction to Topic #4: Buildings and Energy; Case Presentation Topic #4: Buildings and Energy
Nov.9 and Nov. 14

Goals/ Tasks/ Deliverables

- Meet the experts: Dimitris Gournaridis
- Discuss readings
- Team #4 introduces its case study on a buildings and energy topic
- Team #4 presents case on buildings and energy topic

Required Readings for Thursday, November 9:

- Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R., Vita, G., Tukker, A., & Hertwich, E. G. (2015). Environmental Impact Assessment of Household Consumption. Journal of Industrial Ecology, 20(3).
- Rees, W. E. (2009). The ecological crisis and self-delusion: implications for the building sector. Building Research & Information, 37(3), 300–311.
- Goldstein, B., Gounaridis, D., & Newell, J. P. (2020). The carbon footprint of household energy use in the United States. Proceedings of the National Academy of Sciences, 117(32), 19122-19130.

Supplemental Reading Material (Optional):

- Winner, L. (1980). Do Artifacts Have Politics? Daedalus, vol. 109, no. 1, 1980, pp.

121–136. JSTOR, JSTOR, www.jstor.org/stable/20024652.

Required Readings for Tuesday, November 14:

- Team #4's Case Materials and Edge Notes

Introduction to Topic #5: Flows of Waste; Case Presentation #5: Flows of Waste Nov. 16 and Nov. 21

Goals/ Tasks/ Deliverables

- Meet the Experts: Patrick Brandful Cobbinah
- Discuss readings
- Team #5 introduces its case study on flows of waste
- Team #5 presents its case on flows of urban waste

Required Readings for Thursday, November 16

- Guibrunet, L., Calvet, M. S., & Broto, V. C. (2017). Flows, system boundaries and the politics of urban metabolism: Waste management in Mexico City and Santiago de Chile. *Geoforum*, 85, 353-367.
- Daum, K., Stoler, J. and Grant, R.J., 2017. Toward a more sustainable trajectory for e-waste policy: a review of a decade of e-waste research in Accra, Ghana. *International journal of environmental research and public health*, *14*(2), p.135.

Required Readings for Tuesday, November 21:

- Team #5's Case Materials and Edge Notes

Introduction to Topic #6: Flows of Food; Course Review Nov. 28; Nov 30

Goals/ Tasks/ Deliverables

- Meet the Experts: Callie VanderWilde
- Discuss readings/ final exam review

Required Readings for Tuesday, November 28

- Goldstein, B., Birkved, M., Fernández, J., & Hauschild, M. (2017). Surveying the environmental footprint of urban food consumption. *Journal of Industrial Ecology*, *21*(1), 151-165.
- VanderWilde, C.P., Newell, J.P., Gounaridis, D. and Goldstein, B.P., 2023. Deforestation, certification, and transnational palm oil supply chains: Linking Guatemala to global

consumer markets. *Journal of Environmental Management*, *344*, p.118505.

Required Readings for Thursday, November 30

- Callie VanderWilde presentation
- Course review

Final Exam

Tuesday, December 5
Final exam

Bring you laptops!