Urban Sustainability
EAS 537: Syllabus
University of Michigan
Fall 2018
Tuesday and Thursday, 4:00pm-5:30pm, Dana 1046
3 Credits

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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, and three writing responses. A field trip to Detroit and meetings with stakeholders also form course components.

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

Required Texts
You are required to purchase two books: 1) Cronon, W. (2009). *Nature's Metropolis: Chicago and the
   Great West*. WW Norton & Company; and 2) Schimel, J. (2012). *Writing Science: How to write papers
   that get cited and proposals that get funded*. Oxford University Press. These texts are in your local
   bookstore and can also be purchased on amazon.com or other internet bookseller. The remaining
   readings, both required and supplemental, are available in digital form on Canvas. I will provide ample
   notice of these minor changes in class and a revised syllabus will be posted electronically on Canvas.
   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.

Course Structure
The course is divided into four interdependent sections: 1. *Conceptual Foundations of Urban
   Sustainability*; 2. *Learning through Cases*: Urban Agriculture and the Midterm; 3. *Form and Flows of the
   City: Theory and Case Studies*; and 4. *Synthesis and Moving Forward*. 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 consisting of an optional field trip to Detroit
   and periodic in-class exercises. The primary deliverables, which are graded, are as follows: 1) Course
   participation; 2) three essay papers; 3) a midterm exam; 4) and a group case study project.

Course Participation
All students are expected to attend and participate in the scheduled class sessions. Unexcused absences
will be reflected in final grades. Attendance will be taken ten times randomly during the semester,
which forms part of your course grade. In order to participate fully, completing the required reading for
each session is also essential.

Essay Papers
You are required to write three short essays. These essays should be a minimum of three pages in
length, and a maximum of five pages (double spaced, 1” margins, and 12 pt Times New Roman font). All
ideas, terms, and quotes that are not your own need to be properly cited in your essay. For these three
essays, please use the APA referencing style and include a bibliography at the end of your essay. This
bibliography does not count towards the length requirement. Your essays will be evaluated based on
the clarity and completeness, as well as on spelling, grammar, and referencing. The required text by
Schimel will form the basis for these essays. The essay assignments will be discussed in class and posted
on Canvas at least two weeks prior to their due date. The due dates for the essays are: Essay #1, September 25th; Essay #2, November 13th; Essay #3, December 11th. These essays should be submitted
through Canvas (as an uploaded Microsoft Word doc) and are due by the beginning of class on these
days. You will turn in and receive comments on your essays via Canvas. Be sure to answer the essay question(s) completely and be sure to proofread your essays carefully before submitting them.

Exam
There is an in-class midterm exam on October 11th. This exam covers the first portion of the course. There will not be any alternative date for this exam. As you make travel plans, please keep these dates in mind. There is no final exam.

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'll 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:

**Week 1: “Managing Citations in Mendeley”** - Whether you are seeking a career in research or plan to work as a sustainability expert in government or private industry, you’ll be reading papers, book, and reports. A citation manager is an essential tool for this purpose. We will use Mendeley, as it is freely available and works on all operating systems (available on Windows, Mac, and GNU/ Linux). Either during or after class, you will need to sign up for a (free) account with Mendeley, download the Mendeley software client, and join the “Urban Sustainability” group.

**Week 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. This will be handed in at the end of the class.

**Week 3: “Political Ecology and Urban Ecology Exercise”** – Here you will take another group’s MFA exercise and analyze it through urban political ecology and urban ecology lenses. 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 1-page document outlining your analysis.
Grading
Your course grade includes work completed as an individual and as a group. Your course grade will be based on a mid-term exam, three short essay papers, a group case study, and class participation as determined by attendance, by completion of in-class exercises, and by discussion of the course readings. The grading breakdown is as follows:

<table>
<thead>
<tr>
<th>Group Deliverable</th>
<th>Assignment</th>
<th>Percentage of total grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Summary</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Case Material</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Case Presentation</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Individual Deliverables</th>
<th>Assignment</th>
<th>Percentage of total grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essay Papers (3)</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Mid-term Exam</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>In-class exercises</td>
<td>5%</td>
<td></td>
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<tr>
<td>Discussion of reading</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>70%</td>
<td></td>
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</tbody>
</table>

Grades will be posted in the “Gradebook” tab in Canvas. Final grades are based on the total percentage received for the semester. Equivalent letter grades are as follows: A+ (98.50–100%), A (93.5-98.49%), A- (89.50–93.49%), B+ (87.50-89.49%), B (83.5-88.49%), B- (79.50–83.49%), C+ (77.50-79.49%), C (73.5-78.49%), and C- (69.50–73.49%).

Writing Help
A primary objective of this course is to develop your writing skills. 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/)

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).

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
<table>
<thead>
<tr>
<th>Day</th>
<th>Topic</th>
<th>Readings</th>
<th>Activity</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tues, Sept. 4</td>
<td>Introduction to Course</td>
<td>Cronon (2009) – Preface and Prologue; Ch 3 (Grain)</td>
<td>● Discussion guidelines</td>
<td>Think about your subject area interests</td>
</tr>
<tr>
<td>Thurs, Sept. 6</td>
<td>What is urban sustainability?</td>
<td>Revi et al. (2014); Seto et al. (2012)</td>
<td>● Discuss readings</td>
<td>Sign up for Mendeley; Join our “Urban Sustainability” Group on Mendeley;</td>
</tr>
<tr>
<td>Tues, Sept. 11</td>
<td>Three ‘Ecologies’: Industrial Ecology and Urban metabolism</td>
<td>Bai (2007); Brunner (2007); Kennedy (2007);</td>
<td>● Discuss readings</td>
<td>Sankey diagram of a city’s material flows</td>
</tr>
<tr>
<td>Tues, Sept 18</td>
<td>Three ‘Ecologies’: Urban Ecology &amp; Interdisciplinary Prospects</td>
<td>Grimm et al. (2008); Wu (2014); Schimel (2012), Chs. 2 and 3</td>
<td>● Discuss readings</td>
<td>UE analysis of Sankey Diagram</td>
</tr>
<tr>
<td>Thurs, Sept. 20</td>
<td>Smart Cities/Indicators of Urban Sustainability</td>
<td>Townsend (2013) - Introduction Science for Environment Policy (2018); Schimel (2012), Ch. 4</td>
<td>● Discuss readings</td>
<td></td>
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<tr>
<td>Tues, Sept 25</td>
<td>Sustainability Practice: City of Detroit and City of New York</td>
<td>New York City, OneNYC 2018 Progress Report (available online) TBD</td>
<td>● Guest Lecture: Joel Howrani, Director of Sustainability, City of Detroit and David Vega-Barachowitz, Senior Urban Designer, City of New York</td>
<td>Essay #1 Due</td>
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</table>
### Module #2: Nourishing the City, the ‘Case’ Approach, and Midterm

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Thurs, Sept. 27 | Topic #1: Nourishing the City    | McClintock (2010); Gallagher (2010) – Ch 3; Seto and Ramankutty (2016) | • Presentation of Sustainability Cases Project  
• Discuss readings |
| Sat, Sep 29  | Field Trip: Urban Agriculture in Detroit (Elective) | No required reading | • Visit Michigan Urban Farming Initiative (MUFI) |
| Tues, Oct 2  | Michigan Sustainability Case Initiative | Michigan Case Initiative Reading | • Guest Lecture: Meghan Wagner, MSCI and Summer Aldred, Doris Duke Scholar  
• Present Case |
| Thurs, Oct 4 | Case Presentation #1: Urban Agriculture in Detroit | Case #1 Material | • Case Activity |
| Tues, Oct 9  | Midterm Exam Review             | No required reading             | • Bring exam questions to class  
Essay #1 returned |
| Thurs, Oct 11 | Midterm Exam                    | No required reading             | • Multiple choice and short answer exam  
MIDTERM |
| Tues, Oct 16 | NO CLASS                        | No required reading             | |

### Module #3: Form and Flows of the City, Theory and Case Studies

<table>
<thead>
<tr>
<th>Date</th>
<th>In-Class Case Prep</th>
<th>Reading</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thurs, Oct 18</td>
<td></td>
<td>Schimel, Chapters 5 and 6 (Recommended)</td>
<td>• Work in groups</td>
</tr>
</tbody>
</table>
| Tues, Oct 23 |                   | No required reading              | • Work in groups  
Midterm Exam Returned Case Summary Due |
| Thurs, Oct 25 |                   | No required reading              | • Work in groups |
| Tues, Oct 30 | Topic #2 Urban Green Space   | Wolch et al. (2014); Heynen et al. (2006); Gallagher (2010) - Ch 5, Ch 6 | • Team #2 introduces case |
| Thurs, Nov 1 | Case Presentation #2 Urban Green Space | Case #2 Material | • Student-led case activity |
| Tues, Nov 6  | Topic #3 Flows of Water     | Gandy (2004); Hoff et al. (2014) | • Discuss readings  
• Team #3 introduces case |
| Thurs, Nov 8 | Case Presentation #3
Flows of Water | Case #3 Material | ● Student-led case activity |
| Tues, Nov 13 | Topic #4
Buildings and Energy | Ivanova et al. (2016)
Rees (2009); Kennedy (2015) | ● Discuss readings
● Team #4 introduces case | Essay #2 Due |
| Thurs, Nov 15 | Case Presentation #4
Buildings and Energy | Case #4 Material | ● Student-led case activity |
| Tues, Nov 20 | NO CLASS | No required reading | ● |
| Thurs, Nov 22 | Topic #5
Transportation and Urban Form | Fishman (2015);
Gallagher (2010), Ch 4;
Gillham (2002) | ● Discuss readings
● Team #5 introduces case |
| Tues, Nov 27 | Case Presentation #5
Transportation and Urban Form | Case #4 Material | ● Student-led case activity | Essay #2 Returned |
| Thurs, Nov 29 | Topic #6
Marvin (2006) | ● Discuss readings
● Team #6 introduces case |
| Tues, Dec 4 | Case Presentation #6
Flows of Waste | Case #6 Material | ● Student-led case activity |
| **Module #4: Synthesis and Moving Forward** | | | |
| Thurs, Dec 6 | Towards Synthesis: In the Academy | Cronon (1992), Epilogue;
BROTO et al (2012);
Newell and Cousins (2014) | ● Mental Maps Revisited |
| Tues, Dec 11 | Synthesis and Policy: Next Steps | National Academy of Sciences (2016), Ch. 1, 2 and 5 | ● Policy and Planning Exercise | Essay #3 Due |
READING LIST
(Note: this list may change slightly over the term. I will give you ample advance notice should such changes occur)

Week 1: What is Urban Sustainability?
Sept. 4 and Sept. 6

Goals/ Tasks/ Deliverables
- Explore research interests, “What is urban sustainability?”
- Discuss readings

Required for Tuesday, September 4:

Required for Thursday, September 6:

Supplemental Reading Material (Optional)

Sept. 11 and Sept. 13

Goals/ Tasks/ Deliverables
- Understand and practice Material Flow Analysis (MFA); turn in worksheet
- Discuss readings
**Required for Tuesday, September 11:**

**Required for Thursday, September 13:**

**Supplemental Reading Material (Optional)**

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**Week 3: Urban Ecology and Interdisciplinary Prospects**
**Sept. 18 and Sept. 20**

**Goals/ Tasks/ Deliverables**
- PE and UE Exercise
- Understand and critique urban sustainability indicators
- Discuss Readings

**Required for Tuesday, September 18:**


Required for Thursday, September 20:


Supplemental Reading Material (Optional):

Week 4, Sept. 25

Indicators of Urban Sustainability in Practice (in Detroit & New York)

Goals/ Tasks/ Deliverables
- Discuss Readings
- Essay #1 due Tuesday, September 25

Required Readings for Tuesday, September 25:

TBD
**Week 4, Sept. 27**  
**Nourishing the City and the “Case” Approach**

**Goals/ Tasks/ Deliverables**
- Understand the advantages of a case study in exploring a debate
- Understand how a case study is constructed
- Discuss Readings

**Required Readings for Thursday, September 29:**

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**Week 5**  
**Urban Agriculture in Detroit**

**Oct. 2 and Oct. 4**

**Goals/ Tasks/ Deliverables**
- Discuss Readings
- Optional field trip to MUFI in Detroit: Saturday, September 29

**Required Reading for Tuesday, October 2:**
Michigan Case Initiative Reading

**Required Reading for Thursday, October 4:**
Urban Agriculture in Detroit

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**Week 6**  
**Midterm Exam (Review and Test)**

**Oct. 9 and Oct. 11**

**Goals/ Tasks/ Deliverables**
- Prepare for the midterm on Tuesday, Oct. 9
- Take the midterm exam on Thursday, Oct. 11
- Essay #1 returned

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**Week 7**  
**In-Class Preparation of Case Studies**

**Oct. 18**
Goals/ Tasks/ Deliverables
- **NO CLASS on Tuesday, October 16**
- Work in groups preparing case studies on Thursday, October 18

Supplemental Reading Material (Optional):

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**Week 8**  
*In-Class Preparation of Case Studies*  
Oct. 23 and Oct. 25

Goals/ Tasks/ Deliverables
- Work in groups preparing case studies
- Midterm exam returned
- **Case Summary due Tuesday, October 25**

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**Week 9**  
*Topic #2 Urban Green Space*  
Oct. 30 and Nov. 1

Goals/ Tasks/ Deliverables
- Discuss readings
- Team #2 presents its case study on an urban green space topic

**Required Readings for Tuesday, November 1:**

**Required Readings for Thursday, November 1:** Team #2’s Case Materials and Edge Notes
**Week 10**  
**Topic #3: Flows of Water**

**Nov. 6 and Nov. 8**

**Goals/ Tasks/ Deliverables**
- Discuss readings
- Team #3 presents its case study on an urban water flows topic

**Required Readings for Tuesday, November 6:**

**Required Readings for Thursday, November 8:** Team #3’s Case Materials and Edge Notes

**Supplementary Reading:**

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**Week 11**  
**Topic #4: Buildings and Energy**

**Nov. 13 and Nov. 15**

**Goals/ Tasks/ Deliverables**
- Discuss readings
- Team #4 presents its case study on a buildings and energy topic
- **Essay #2 due Tuesday, November 15**

**Required Readings for Tuesday, November 15:**

**Required Readings for Thursday, November 15:** Team #4’s Case Materials and Edge Notes

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**Week 12, Nov. 22**  
**Topic #5: Transportation and Urban Form (Introduction)**

**Goals/ Tasks/ Deliverables**
- Discuss readings
• NO CLASS on Tuesday, November 20
Required Readings for Tuesday, November 22:

Supplemental Reading Material (Optional):

Week 13, Nov. 29 Topic #5: Transportation and Urban Form (Case Presentation)

Goals/ Tasks/ Deliverables
● Team #5 presents its case study on a transportation and urban form topic
● Essay #2 returned

Required Readings for Tuesday, November 22: Team #5’s Case Materials and Edge Notes

Week 13, Nov. 29 Topic #6: Flows of Waste (Introduction)

Goals/ Tasks/ Deliverables
● Discuss readings

Required Readings for Thursday, November 29:

Week 14, Dec. 4 Topic #6: Flows of Waste (Case Presentation)

Goals/ Tasks/ Deliverables
● Team #6 presents its case study on an urban waste topic

Required Readings for Tuesday, December 4: Team #6’s Case Materials and Edge Notes
**Dec. 6 and 11  Synthesis and Moving Forward**

**Goals/ Tasks/ Deliverables**
- Discuss readings
- **Essay #3 due Tuesday, December 11**

**Required Readings for Thursday, December 6:**

**Required Readings for Tuesday, December 11: TBD**
Committee on Pathways to Urban Sustainability: Challenges and Opportunities; Science and Technology for Sustainability Program; Policy and Global Affairs; National Academies of Sciences, Engineering, and Medicine (2016). *Pathways to Urban Sustainability: Challenges and Opportunities for the United States*. The National Academies Press. Chapters 1, 2 and 5