ES/SO360 DESIGNING THE SUSTAINABLE CITY

DESCRIPTION:

"All the biggest problems that we face now (…) like global climate change or the pandemic, require collaborative efforts, not just the multiplication of the same sort of person a million times over." Peter Galison[1]

Cities are not only where most of the world's population now lives, they also use 78% of the world's resources and produce more than 60% of greenhouse gas emissions. At the same time, innovating cities around the world are leading the way in responding to the crises of climate change and resource depletion by developing models for sustainable, resilient, equitable living. Experience has shown that cities are more successful in achieving their goals when they cooperate with each other, working together, and learning from each other. In this course, students will be asked to identify the most pressing sustainability issues in your host city. Working in small teams, they will design a new housing community that can offer solutions to the issues they have identified at the local level, taking into account the environmental, historical and social characteristics of their host city. Fellow students will be from the multiple IES Abroad Centers and will represent a variety of academic backgrounds. Together, they will be part of a greater learning community, guided by faculty experts from diverse backgrounds, working towards solutions to the identified problems. Substantive field visits and connections with local NGOs will allow students to gather valuable data and information as they develop their projects; innovative technology will enable them to share their experience and findings across the three locations; and problem-based learning will culminate in each team delivering a multi-media presentation to the group. Upon successful completion of this course, students will earn a micro-credential in Sustainability and Development that will demonstrate their sustainability literacy and ability to find innovative solutions to complex problems.

CREDITS: 3

CONTACT HOURS: 45

LANGUAGE OF INSTRUCTION: English

PREREQUISITES: None

ADDITIONAL COST: None

METHOD OF PRESENTATION:
The main outcome of this course is the challenge given to each of the three teams to design a project aimed at tackling the sustainability problems identified in the students' host cities. The methods of presentation are designed to support the students in this challenge. The following approaches will be used:

- Classes: will be held both synchronously, across the participating centers with video links, and on-site in each location.
- Video lectures: the faculty will present key concepts from different disciplinary perspectives to explore the interconnectivity between them. These lectures will be available on the Moodle site.
- Team presentations: student teams will give short presentations to the other teams on their work on the assignments. Students will be expected to give feedback to the other teams.
- Moodle forums: before the synchronous classes, teams will outline their approach to the questions assigned on a Moodle forum, where they will be asked to comment on the other teams' work and give feedback and suggestions.
- Class discussion: the course will follow a flipped classroom approach, in which teaching will occur outside class time, and classes will be devoted to discussions and presentations.

[1] Peter Galison, founder of The Black Hole Initiative at Harvard University, in "Stranger than anything dreamed up by sci-fi: will we ever understand black holes?" The Guardian, 26 May, 2021

- Materials in Moodle: key readings, videos and online resources designed to develop a general understanding of the subject matter and foment discussion.
- Course-related trips: students will use these trips to inspire their designs and give them a chance to receive feedback from experts in the field. Teams will document the trips along with the faculty so they can share them with the other teams. Some longer trips will be held on Fridays.

REQUIRED WORK AND FORM OF ASSESSMENT:

- Participation – 20%
    - Including short quizzes and reflections on course materials
- Individual assignments – 20%
    - Including:
        - How sustainable is my hometown?
        - Sustainability storyboard
- Team assignments – 50%
    - Midterm project: 20%
        - Cross-center team assignment: comparative presentation on sustainability of three host cities
    - Final Project: 30%
        - Concept note and project presentation
- Field visit summaries – 10%

Participation
Participation is essential in this course. Students are required to engage with assigned materials, and to participate actively both in their team activities and in their discussions with other teams. A general participation rubric will be shared with students.

Individual Assignments
Students will be asked to complete two individual assignments to reflect on sustainability issues: sustainability analysis of home town; and sustainability storyboard

Team Assignments
Students will be placed in two teams: an inter-center team and an intra-center team, and will take part in two key assignments during the semester. The first will be a comparative analysis of the sustainability of the students' host cities. The second will consist of the identification of a key sustainability issue in their host city, and designing a project to tackle those problems. Teams will present reports on their responses to these assignments throughout the semester. At the end of the course, each team will deliver a multi-media presentation on their final design. The assignments will be guided by the faculty in a staged fashion, and each team will receive feedback from their peers. Rubrics will be provided to guide the students in completing their assignments, although the rubrics will leave space for originality and creativity. Grades will be awarded on the basis of the clarity and creativity of solutions, but also on the basis of the teams' ability to work together, and to exchange ideas. Collaboration, and adapting other teams' ideas to the local context will be positively evaluated.

Summaries of field visits
One-page summaries of field visits and guest speakers for other teams.

LEARNING OUTCOMES:
By the end of the course students will be able to:

- Identify the key sustainability issues in a determined location
- Compare and critique sustainability policies in different locations
- Learn from the problem-solving experiences of people working in other locations
- Recognize and explain the complexity and interrelatedness of sustainability challenges
- Present their ideas to policy makers and sustainability experts in a range of fields and integrate these experts' advice into their designs.

- Work collaboratively with international teams
- Differentiate between realistic and unrealistic goals for sustainability solutions
- Analyze the successes and failures of sustainability initiatives in other locations

ATTENDANCE POLICY:
Attendance is mandatory for all synchronous and on-site classes, including course-related excursions. Any exams, tests, presentations, or other work missed due to student absences can only be rescheduled in cases of documented medical or family emergencies. If a student misses more than three class sessions or course-related excursions, 3 percentage points will be deducted from the final grade for every additional absence. Seven absences will result in a failing grade.

COURSE AND CLASS STRUCTURE:
The course will have two three-hour periods of time scheduled at the same time in all three participating centers.

These two blocks of time will be used to cover the following:

1. 3 contact hours per week, in online or onsite format.
2. Field visits in the city
3. Cross-center and inter-center teamwork.

CONTENT:

Week	Content	Assignments and Readings
	SECTION 1	
1	**Introduction to the course** **Cities, climate and sustainability**	• Berners-Lee, M., 2010, *How Bad are Bananas, The Carbon Footprint of Everything*, Green Profile, pp 7-14, 28-29, 32-33, 145-148 • United Nations Human Settlements Programme, 2011, *Cities and Climate Change: Global Report on Human Settlements, 2011,* Earthscan, London-Washington DC, available: http://www.zaragoza.es/contenidos/medioambiente/onu/538-eng-ed2011.pdf • Chelleri L. and Olazabal M. (eds.) 2012. *Multidisciplinary perspectives on urban resilience: a workshop report,* Bilbao: Basque Centre for Climate Change, Chapter 1, "Why Urban Resilience?", pp 7-19, available for download: https://www.urbanresilienceresearch.net/2016/02/04/our-first-book-on-urban-resilience-available-online/
	• Full group introductions • Why three centers? • How to solve sustainability problems •	
2	**What is sustainability, and what is climate change? A scientific ecosystem perspective**	• McKay, David J.C., 2009, *Sustainable Energy Without the Hot Air*, UIT, Cambridge, Chapter 15, "Stuff", available: https://www.withouthotair.com/c15/page_88.shtml

		• Fedkin, Mark V., "Sustainability, Definitions", in *Technologies for Sustainable Systems,* Department of Energy and Mineral Engineering, PSU, available: https://www.e-education.psu.edu/eme807/node/575 • Frey, Wolfgang, 2011, *Freiburg Green City*, "Thoughts On Sustainability" pp. 10-29 Herder Verlag • Chaplin et al, 2002, *Principles of Terrestrial Ecosystem Ecology*, Springer Verlag. 'The ecosystem concept', pp 3-13; 'Human Caused Changes in Earth's Ecosystem', pp 13-17; Landform effects on climate, pp 31-32; Vegetation influences on climate, pp 32-34 • Deutscher Forstwirtschaftsrat e.V., from Grober, Ulrich, 2012, *Sustainability – a cultural history* Green Books,. available: https://www.forstwirtschaft-in-deutschland.de/index.php?id=50&L=1, see the following tabs: "German forestry" and the 2 short chapters "Sustainability" and "Boundaries of Sustainability"
	• Creating a joint definition of sustainability and climate change • How to evaluate sustainability • Ecosystems and ecological concepts of sustainability • The basic science of climate change	• Production of joint definition of sustainability and climate change • Recorded lecture: "Brief introduction to the earth´s climate system and its changes over time"
3	**Designing for sustainability: an introduction to design thinking for cities**	• De Bono, Edward, 1995 Serious Creativity. The Journal for Quality and Participation, 18, 12-18. https://www.debono.com/serious-creativity-article • Manzini, Ezio 2015, Design, When Everybody Designs. An Introduction to Design for Social Innovation • Online Lecture, https://vimeo.com/122184793 • Geoff Mulgan, Julie Caulier-Grice, and Robin Murray 2010, The Open Book of Social Innovation. https://www.youngfoundation.org/publications/the-open-book-of-social-innovation/
	• Introduction to problem-solving design principles • The complexity of sustainability: the three pillars of sustainability	• Guided discussion on the results and towards formulating "design questions" • Formulation of questions for each of the cities, comparison of question • Understanding social innovation and creative thinking to guide the process of problem solving • Collection and presentation of best practices
4	**Culture, ideology and climate change: how we can adapt, and what we can learn from each other**	• Massey, Justine Marrion, 2020, *Climate Change, Culture and Cultural Rights,* OHCHR, available: https://www.ohchr.org/Documents/Issues/CulturalRights/Call_ClimateChange/JMassey.pdf

		• UNESCO, 2020, *Experts highlight the role of culture for climate change mitigation and adaptation*, available: https://en.unesco.org/news/experts-highlight-role-culture-climate-change-mitigation-and-adaptation • Hoffman, Andrew J., 2019, "Climate Change and Our Emerging Cultural Shift"*, Behavioral Scientist,* available: https://behavioralscientist.org/climate-change-and-our-emerging-cultural-shift/ • Ehrlich PR (2010) *The MAHB, the Culture Gap, and Some Really Inconvenient Truths*. PLoS Biol 8(4), available: e1000330. https://doi.org/10.1371/journal.pbio.1000330
	• The impact of culture on climate change and of climate change on culture • Cultural rights and traditional knowledge • How to change people's ideologies and worldviews, and how to learn from others	• Group online discussion on beliefs, values and climate change
	SECTION 2	
5	**What? Part I**	• Brown, L. R. (2009), "Can We Mobilize Fast Enough?" In *Plan B 4.0: Mobilizing to Save Civilization,* Norton, W. W. & Company, Inc. (Ch. 10, p.143-167). available: http://www.earthpolicy.org/images/uploads/book_files/pb4ch10.pdf •
	• What challenge can we identify in all three cities?	• *Whole group identification of sustainability challenge*
6	**What? Part II**	• Hauser, O. P., Hendriks, A., Rand, D. G., & Nowak, M. A., 2016, "Think global, act local: Preserving the global commons" in *Nature*, available: https://www.nature.com/articles/srep36079 (concentrate on the Abstract)
	• How will you tackle the sustainability challenge in your host city?	
7	**How? Part I**	• Brown, L. R. (2009) "Designing Cities for People", In *Plan B 4.0: Mobilizing to Save Civilization,* Norton, W. W. &Company, Inc. (Ch. 6, p.143-167). available: http://www.earthpolicy.org/images/uploads/book_files/pb4ch06.pdf

	• Identify the key features of your solution	
8	**How? Part II**	
	• Apply design principles to your key solutions	
9	**Who?**	• James, Paul, Liam Magee, Andy Scerri, Manfred Steger, 2015, *Urban sustainability in theory and practice : circles of sustainability,* New York: Routledge, Chapters 1 and 2, pp 3-37, available: https://www.academia.edu/9294719/Urban_Sustainability_in_Theory_and_Practice_Circles_of_Sustainability_2015_ • Diversity.social, *Social Sustainability, Everything You Need to Know.* Available: https://diversity.social/social-sustainability/ • Zivarts, Anna, "The '15-Minute-City' isn't made for disabled bodies", *Bloomberg CityLab,* April 2021, available: https://www.bloomberg.com/news/articles/2021-04-22/the-people-that-the-15-minute-city-leave-behind
	• Who will benefit from your project? Who will lose out? Who are you doing this for?	
10	**Course Conclusions**	•

COURSE-RELATED TRIPS:
Students will attend visits to a range of sustainability-related projects in each location, as well as visiting experts in different fields. Some of the trips will be designed before the semester starts, whereas others will be recommended by faculty in response to the development of the local team's research.

At the start of the program, students will be given guided and self-guided tours of their host cities, designed to introduce them to the key sustainability issues and concerns in the local context.

Some of the longer trips will be scheduled on Fridays. Students will be informed of the dates of Friday trips at the beginning of the semester.

REQUIRED READINGS:

- Berners-Lee, M., 2010, *How Bad are Bananas, The Carbon Footprint of Everything,* Green Profile, pp7-14, 28-29, 32-33, 145-148
- Brown, L. R. (2009) "Designing Cities for People", In *Plan B 4.0: Mobilizing to Save Civilization*, Norton, W. W. &Company, Inc. (Ch. 6, p.143-167). a: http://www.earthpolicy.org/images/uploads/book_files/pb4ch06.pdf
- Brown, L. R. (2009), "Can We Mobilize Fast Enough?" In *Plan B 4.0: Mobilizing to Save Civilization*, Norton, W. W. & Company, Inc. (Ch. 10, p.143-167). available: http://www.earthpolicy.org/images/uploads/book_files/pb4ch10.pdf

- Chaplin et al, 2002, *Principles of Terrestrial Ecosystem Ecology*, 'The ecosystem concept', pp 3-13, 'Human Caused Changes in Earth's Ecosystem', pp 13-17, Springer Verlag
- Chelleri L. and Olazabal M. (eds.) 2012. *Multidisciplinary perspectives on urban resilience: a workshop report,* Bilbao: Basque Centre for Climate Change, Chapter 1, "Why Urban Resilience?", pp 7-19, available for download: https://www.urbanresilienceresearch.net/2016/02/04/our-first-book-on-urban-resilience-available-online/
- Diversity.social, *Social Sustainability, Everything You Need to Know.* Available: https://diversity.social/social-sustainability/
- Ehrlich PR (2010) *The MAHB, the Culture Gap, and Some Really Inconvenient Truths*. PLoS Biol 8(4), available: e1000330. https://doi.org/10.1371/journal.pbio.1000330
- Deutscher Forstwirtschaftsrat e.V., from Grober, Ulrich, 2012, *Sustainability – a cultural history* Green Books,. available: https://www.forstwirtschaft-in-deutschland.de/index.php?id=50&L=1, see the following tabs: "German forestry" and the 2 short chapters "Sustainability" and "Boundaries of Sustainability"
- Eurostat*, Sustainable Development in the European union: Overview of Progress towards the SDGs in an EU context,* available: https://ec.europa.eu/eurostat/documents/4031688/11010788/KS-01-20-192-EN-N.pdf/ae63aff0-a6f3-1d47-da83-c6886b9daaab?t=1592486268000
- Fedkin, Mark V., "Sustainability, Definitions", in *Technologies for Sustainable Systems,* Department of Energy and Mineral Engineering, PSU, available: https://www.e-education.psu.edu/eme807/node/575
- Frey, Wolfgang, 2011, *Freiburg Green City*, "Thoughts On Sustainability" pp. 10-29 Herder Verlag
- International Institute for Sustainable Development, *Sustainable Development,* available: https://www.iisd.org/about-iisd/sustainable-development
- James, Paul, Liam Magee, Andy Scerri, Manfred Steger, 2015, *Urban sustainability in theory and practice: circles of sustainability,* New York: Routledge, Chapters 1 and 2, pp 3-37, available: https://www.academia.edu/9294719/Urban_Sustainability_in_Theory_and_Practice_Circles_of_Sustainability_2015_
- McKay, David J.C., 2009, *Sustainable Energy Without the Hot Air*, UIT, Cambridge, Chapter 15, "Stuff", available: https://www.withouthotair.com/c15/page_88.shtml
- Stevens, Jess, 2020, "Urban Forests: Nature as a Resource", *Biophyllic Cities/Law and Policy,* Vol 3, No 2, available: https://static1.squarespace.com/static/5bbd32d6e66669016a6af7e2/t/5eff40c2f00dfd0e1790aab0/1593786570683/Urban+Forest+Law+and+Policy.pdf
- United Nations, Department of Economic and Social Affairs, *Sustainable Development Goals*, available: https://sdgs.un.org/goals
- Zivarts, Anna, "The '15-Minute-City' isn't made for disabled bodies", *Bloomberg CityLab,* April 2021, available: https://www.bloomberg.com/news/articles/2021-04-22/the-people-that-the-15-minute-city-leave-behind

RECOMMENDED READINGS:

This is a list of readings recommended by the faculty which students can draw on during the semester to help them tackle issues or questions that arise during their research. The faculty team will also recommend additional other readings and materials throughout the semester, adapting to the direction that the teams' research is taking.

- Eurostat*, Sustainable Development in the European union: Overview of Progress towards the SDGs in an EU context,* available: https://ec.europa.eu/eurostat/documents/4031688/11010788/KS-01-20-192-EN-N.pdf/ae63aff0-a6f3-1d47-da83-c6886b9daaab?t=1592486268000
- United Nations, Department of Economic and Social Affairs, *Sustainable Development Goals*, available: https://sdgs.un.org/goals
- Bowerman, T., 2014, "How much is too much? A public opinion research perspective" *Sustainability: Science, Practice, & Policy.* Volume 10, Issue 1, p.1-15. Available online at: http://sspp.proquest.com/static_content/vol10iss1/1209-044.bowerman.pdf
- Deutscher Forstwirtschaftsrat e.V., from Grober, Ulrich, 2012, *Sustainability – a cultural history* Green Books,. available: https://www.forstwirtschaft-in-deutschland.de/index.php?id=50&L=1, see the following tabs: "German forestry" and the 2 short chapters "Sustainability" and "Boundaries of Sustainability"
- DMA Europa, *WEG helps to generate hydro-electricity for Windsor Castle, available*: https://www.youtube.com/watch?v=wG-TBJC1R4c
- Ellen MacArthur Foundation, 2012, *Towards the Circular Economy Vol. 1*: "An economic and business rationale for an accelerated transition", Available online at:

https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf
- Fournier, V, 2008, "Escaping from the economy: the politics of degrowth", *International Journal of Sociology and Social Policy,* Vol. 28 No. 11/12, (pp. 528-545). Available online at: http://www.web.ca/~bthomson/degrowth/fournier_the_politics_of_degrowth_13mar08.pdf
- Freiburg Town Hall, *Environmental and Climate Protection in Freiburg*, Chapter 1.4, pages 27-33, available: https://greencity.freiburg.de/pb/site/freiburg_greencity/get/params_E1778569723/1693283/environmental%20and%20climate%20protection%20in%20Freiburg.pdf
- Green City Times, *Green City: Europe's solar city, Freiburg*, 4 pages, available: https://www.greencitytimes.com/freiburg/
- Hoornweg, Daniel; Bhada-Tata, Perinaz, 2012. "What a Waste : A Global Review of Solid Waste Management" *Urban development series;knowledge papers no. 15*. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/17388
- Smil, Vaclav, 2017, *Energy and Civilization*, Cambridge: MIT Press, ch 6, "Fossil-fuelled Civilization", pp 295-381
- Spanner Re2 GmbH, *Wood gasifier at Scotston Farm – Biomass Power Plant,* available: https://www.youtube.com/watch?v=i9xmWJ4hAGs
- The B1M Limited, *3 Cool Ways to Cool Our Cities*, available: https://www.youtube.com/watch?v=V4Y7VYVVD68 (8min.)
- Umwelt Bundesamt, 2019, *Rebound effects,* available: https://www.umweltbundesamt.de/en/topics/waste-resources/economic-legal-dimensions-of-resource-conservation/rebound-effects
- US department of agriculture: *Sustainability*, pp 1-3 (Introduction plus 'Planning Rule Requirements'), page 9 (chapter 'Describe the ecological context'), available: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5130669.pdf
- Wirth, H., *Recent facts about photovoltaics in Germany,* Frauenhofer Institute ISE, ch. 2 and 3 (pp 5-6), ch. 13 and 14 (pp 38-43)
- WWAP (United Nations World Water Assessment Programme)/UN-Water. 2018. *The United Nations World Water Development Report 2018: Nature-Based Solutions for Water.* (P. 21-36 and 79-87) Paris, UNESCO. Available online at: http://www.unwater.org/publications/world-water-development-report-2018/