LA 459/559 Sustainable Energy Landscapes

** This course counts towards the Ecological Design Certificate. For LA students, this course counts as a Technical Workshop, regular LA elective or Area of Concentration requirement.*

CRN: 26874 (undergrad); 26875 (grad), 2 credits
Lawrence 231 on Thursdays 10:00 am -- 11:50 am, Winter 2019
Instructor: Yekang Ko (yekangko@uoregon.edu)
Office hours: Thursday 12:30 pm-2:30 pm or By appointment at Lawrence 213

*This syllabus is a revision in progress and some descriptions may change before the winter term begins.

This course explores sustainable energy landscapes that reduce energy consumption and increase renewable energy generation from site to regional scales. Due to more amplified urban heat islands effects and frequent heat waves, our communities urgently need to find ways to cool down to protect vulnerable lives. Additionally, in order to mitigate climate change, communities are seeking ways to reduce their energy consumption and to sustainably meet their energy demand through renewable energy sources.

Rapid energy transition from fossil fuels to renewables brings about new opportunities and challenges in urban, rural and wild landscapes. In the past decade, decentralized energy systems (e.g. rooftop solar photovoltaics) has been skyrocketing in urban areas. Utility-scale renewable energy facilities (e.g. solar and wind farms) have also been rapidly spreading in rural and remote areas. Utility-scale renewable energy, despite their contribution to combating climate change, has been controversial because of their environmental and social impacts on ecosystems, human health, and cultural landscapes.

In various complex challenges we face, this seminar seeks to answer how we can design and plan energy landscapes to meet our energy needs while addressing local extreme weather events and global climate change. The class will explore various case studies around the world. **For the final project, students will work with the Opportunity Village, a transitional micro-housing community for homeless in Eugene, to develop prototypes for flexible passive solar site design to address extreme heat risk and urban heat islands. Design skills are not required for the project. The project is more about exploring innovative and experimental design ideas rather than producing a professional quality representation. For interdisciplinary learning, students from all disciplines are more than welcome.**

Learning objectives
At the end of this course, you should be able to:

- Identify key principles of sustainable energy generation and consumption and their spatial implications
- Articulate opportunities and challenges of decentralized and utility-scale renewable energy generation
- Acquire an evidence-based design approach to reduce energy consumption and increase on-site renewable energy generation in urban areas
- Develop innovative design and strategic planning strategies for sustainable energy landscapes, especially for vulnerable populations

Required textbook
Required readings draw upon a range of sources and disciplines (see the reading sources). They will be available either on Canvas in PDF format or online.

Recommended textbooks are:
Apostol, D. Palmer, J. Pasqualetti, M., Smardon, R. and Sullivan, R. eds, 2017. *Renewable Energy Landscapes*. Routledge: London and New York

Stremke, S. and van den Dobbelsteen, A. (eds). 2013. *Sustainable Energy Landscapes: Design, Planning and Development*. CRC Press: Boca Raton

Reed, S. 2010. *Energy-wise Landscape Design: A New Approach for your Home and Garden*. New Society Publishers

Course format, assignments and grading
This seminar combines lectures, discussion, student presentations, and collaborative team work for the final project. Students are required to complete all assigned readings PRIOR to the class meeting in which they are listed on the schedule. Grades will reflect class preparation and participation (50%), a case study investigation (20%) and a final group project (30%). In 400/500 level courses, the university requires that graduate students fulfill requirements beyond those of undergraduates. To this end, graduate students will be asked to read more materials and to produce an additional deliverable for the final project. The student engagement inventory that includes assignments and hours engaged for each activity is available in the appendix. Students are expected to keep track of their performance throughout the term and seek guidance if their performance drops below satisfactory levels. More detailed guidelines and expectations follow:

Requirements	Evaluation	Weight (%)
Class Preparation & Participation (50%)	Attendance (3 pts each for nine classes)	27
	Class participation in discussion (low to high)	8
	Response papers – one page (3 pts each for five papers)	15
Case study Investigation (20%)	Case study presentation	20
Final project (30%)	Final Presentation	30
TOTAL		100

There will NOT be a curve. Final letter grades for the course will be assigned as follows:

$A^+ \geq 97\%$ $A \geq 93\%$ $A^- \geq 90\%$ $B^+ \geq 87\%$ $B \geq 83\%$ $B^- \geq 80\%$

$C^+ \geq 77\%$ $C \geq 73\%$ $C^- \geq 70\%$ $D^+ \geq 67\%$ $D \geq 63\%$ $D^- \geq 60\%$ $F < 60\%$

* The course is offered as either graded or pass/no pass. In either case, all assignments must be completed satisfactorily and submitted in a timely fashion to achieve a passing grade.

- **Class Preparation & Participation:** Students are expected to attend class on time, contribute to discussions, and consistently demonstrate that they have completed the readings. For each class, students are expected to submit a one-page response to the weekly assigned reading materials to Canvas by no later than 6pm on Sunday (total six essays). The essay is for students to prepare for each class and engage with active discussion. Graduate students are assigned additional readings, as noted as "G" in the course schedule. Undergraduate students are encouraged to read these additional sources, but it is not required to fulfill course requirements.

- **Case Study Investigation**: Each student find a precedent of an appropriate, flexible, and innovative passive and active solar design techniques that could be possibly applied to the Opportunity Village, a transitional micro-housing community for homeless in Eugene, or similar marginalized and/or transitional communities such as urban shelters and refugee camps. Students will make a 10-minute oral presentation that includes: project sites, system size, stakeholders involved, design plan and features, costs, performance (e.g. cooling, heating, energy generation), critiques and potential design improvements. Graphic communications (maps, figures, charts, etc.) are highly recommended. Rubrics for evaluating the presentation will be available on Canvas.

- **Final Project:** Students will directly work with the residents and leadership of the Opportunity Village Eugene (OVE), to develop prototypes for flexible passive solar site design to address extreme heat risk and urban heat islands. Permitted as a "homeless shelter," OVE holds 30 tiny house unites (mostly 8x 8 ft and some 8 x 10 ft for couples) with a maximum capacity of 35 people on one acre of city owned property. The tiny house units have some insulation but are not connected to electricity or plumbing. Roughly 70% of the site is impervious surfaces and there is minimal tree canopy. Due to the small unit size of the tiny houses and features of the site, the residents are vulnerable to extreme seasonal temperature variations. Of specific concern are heat waves and urban heat island effects, which are becoming hotter and more frequent due to climate change. Students will present their ideas based on the case studies for precedents, a site analysis, and a meeting with residents. Design skills are not required for this project. The evaluation will be based on: how the design concept is logically evolved from an innovative precedent, how the design is appropriately adjusted for the site and users, and how the design assumptions are tested through prototyping using basic representation tools (e.g. simple sketches, storyboards). The project is more about exploring innovative and experimental ideas rather than producing a professional quality representation. More details are TBA.

Course schedule

	Class	Reading Assignment	Assignment Due
W1	**Course Overview: Sustainable Energy Landscapes** Introduction and project description	No reading	
W2	**Climate responsive design – passive heating and cooling techniques to control microclimate**	ASLA; Ko, 2013; Stremke and Koh, 2010; TBA	Reading Response 1
W3	**Decentralized energy systems: urban solar energy designs and planning**	APA, 2013; Staley, 2015; TBA; Adill and Ko, 2016 (G)	Reading Response 2
W4	**Field Trip to Opportunity Village (Site analysis and a meeting with residents)**	TBA	Reading Response 3
W5	**Oregon Best Practices**		
W6	**Case study presentations**	No reading	
W7	**Utility-scale renewable energy design for landscape conservation**	Apostol et al., 2017a; Apostol et al., 2017b; Pasqualetti and Stremke, 2017 (G)	Reading Response 4
W8	**Utility-scale renewable energy planning for resolving Conflicts of Greens**	Gasparatos et al., 2017; The Nature Conservancy; DRECP Independent Science Advisors, 2010; Pearce et al. 2016 (G)	Reading Response 5
W9	**Instructor attending a conference; No class – substituted by individual meetings**	Working on the project	
W10	**Final Review Week – No Class**		
W 11	**Final Presentation**		Final presentation file submitted to Canvas

* G indicates “required for graduate students only and recommended for undergraduate students.

**As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.*

Information for Students with Disabilities
The University of Oregon is working to create inclusive learning environments. If there are learning or health considerations that may affect your ability to participate fully in this course, please meet with Prof. Ko as soon as possible to discuss possible accommodations. If this is a documented disability, please request that the Counselor for Students with Disabilities send a letter of verification. You are also encouraged to contact the Accessible Education Center in 164 Oregon Hall at 541-346-1155 or uoaec@uoregon.edu.

Policy Statement on Academic Honesty and Student Conduct
All work submitted must be your own (or your team's) and originally produced for this course. The use of sources (ideas, quotations, paraphrases) must be properly acknowledged and documented. Students are encouraged to work together and assist one another, but unless an assignment is specifically designated as a team project, each student is expected to complete their own work individually. Plagiarism means using the ideas or writings of another as one's own. It includes, but is not limited to (a) the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgement and (b) the unacknowledged use of materials prepared by another person.

Academic Misconduct
The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at researchguides.uoregon.edu/citing-plagiarism.