Travel Abroad-Sustainable Design and Construction
CSU: CON/INTD450
January 2-13, 2016
Colorado State University
In cooperation with Earth University

Summary:
The course will focus on the principle components of sustainable design and construction, energy, healthy buildings, natural resources, and other environmental issues. The participants will gain knowledge on the best sustainable practices through renowned international examples and will execute a short project utilizing those principles.

Course Instructors:
Rodolfo Valdes Vaquez, Ph.D., Assistant Professor, CSU Dept. of Construction Management
Svetlana Olvina, Ph.D., Associate Professor, CSU Dept. of Construction Management

Course Objectives:
• Define concepts of sustainability and climate adaptive design, development, and construction
• Build a cross-disciplinary, cross-cultural, learning environment through student diversity, teamwork, and interdisciplinary project work
• Complete a sustainably oriented service experience
• Apply concepts related human centered design and sustainability in a tropical climate

Course Requirements and Evaluation:
Students will create a personal definition of sustainability, a personal mission statement, and outline steps to take to achieve personal sustainability. Class assignments and reflections will be compiled in a journal provided by the course.

Four major components comprise the course:
• Class lecture and discussion
• Site tours and observation
• Assignments / Team Project
• Service Learning Activity

Evaluation of performance will be based on:
• Participation (individual profile, readings, art piece, eco-footprint, etc.) (30%)
• Journal entries and reflections (30%)
• Case Study (15%)
• Final Team Project (25%)
Readings:


References (optionals):
- Browning, B., Uncapher, J. *Green Development: Integrating Ecology and Real Estate*.
- Kennedy, J.F. and Smith, M.G. and Wanek, C. *The Art of Natural Building*.
- Odel, W., *The HOK Guidebook to Sustainable Design*.
- Pearson, D., *The Natural House Book*. Fireside, NYC.
- Pearce, A., Han Ahn, Y. and HanmiGlobal (2012), *Sustainable Buildings and Infrastructure: Paths to the Future*

Program (subject to change):

**Saturday 1/2 – San Jose**

4:00pm  Last bus departure from San Jose Airport to Hotel
6:00pm  Welcome Dinner at Hotel (Tryp Sabana - San Jose)

Safety instructions, San Jose orientation
Student Case Study Schedule Sign-Up

**Sunday 1/3 – San Jose**

7:00am  Breakfast at Hotel in San Jose

**Personal Sustainability**

Ground rules, expectations and consensus
Instructor Introductions
8:30-3:00pm Field trip (Poas volcano - near San Jose)

On bus possible activities:
- Meet your partner
- Dueling conversations

Site visit (hiking and observation)
- Student introductions
- Introduction to Human Centered Design
- Student Case Studies (1, 2)

Lunch near by the volcano
Visit to Coffee farm (~20 min)

3:00pm Break
4:00-5:30pm Overview of Integrated Project Delivery/ Integrated Design process
- Personal Definition of Sustainability (Journaling 1)
5:30pm Stop at souvenir market
6:15pm Dinner at Restaurant in San Jose (Restaurante Mi Tierra)

Monday 1/4 – San Jose and Earth
7:30am Check-out and Breakfast at Hotel in San Jose
9:00am Presentation organized by Roberto Meza- LEED AP
- LEED projects from Costa Rica and Panama
- Visit to the Interior Design: SPHERA’s office space – LEED Gold.
10:30am Tour #1
1:00pm Lunch between projects
2:30pm Tour #2
- Commercial: Aerocentro (office building) - LEED Certified
3:30pm Transportation to Earth (2.5 hours travel)
6:00pm Check-in and Dinner at Earth
7:00pm Orientation to Costa Rica, culture, nature / man interface
(Costa Rica video: http://www.youtube.com/watch?v=58nbhSzFzZg)
Video about CSU – Facility Management
(http://www.fm.colostate.edu/sustain/index.cfm?page=projects/building)
Student Case Studies (3, 4)
Journaling / Reflection 2

Tuesday 1/5 – at Earth
7:00am Breakfast at Earth
8:00-10:00am Overview of Earth’s mission and history /Tour of Earth by Earth Students
10:00-12:00pm Personal Sustainability (cont.)
Need for sustainability
- Wonderful World, Louis. Armstrong
- Wombat Video (http://youtu.be/IHyH3MPgZDo)
- Cats of Borneo (http://www.youtube.com/watch?v=fBFBaIOky54)
Discuss Eco-footprint Assignment (student to bring printouts of assignment
to class)
Student Case Studies (5, 6)
12:00pm Lunch at Earth
1:00-3:30pm Tour/Presentation of Biodigestors
4:00pm Break
4:30-6:00pm  **Guiding Principles of Sustainable Design**  
Sustainability Principles  
*Student Case Studies (7, 8)*  
*Journaling / Reflection 3*  
6:30pm  
Dinner at Earth  

**Wednesday 1/6 – at Earth**

7:00am  
Breakfast at Earth  
8:30-10:00am  **Community Development / Social Sustainability**  
Lecture: Social Sustainability / Community Development  
RMI Video- Daybreak Community  
10:00-10:30am  
Break  
*Student Case Studies (9, 10)*  
Introductory lecture to Natural Construction-Guest Lecture: Eduardo Valverde  
*Introduce Community Project and Resources*  
12:00pm  
Lunch at Earth  
1:00-2:30pm  
Travel to construction site/host families  
2:00-3:00pm  
Brief demonstration of soil testing for bahareque construction technique  
3:00-5:00pm  
Initial project planning  
Get resources for construction project  
6:00pm  
Dinner with Host Family  
Host Family Stay (Night 1, ~4 students per host family)  
*Journaling / Reflection 4 related to host family experience*  
Start discussion of *Needs Assessment* with host family/community stakeholders  

**Thursday 1/7 – with Host families**

7:00am  
Breakfast with Host Family  
8:00am  
Transportation to Jobsite Community Project  
9:00am  
Community Project Work using bajareque or bamboo construction techniques  
12:00pm  
Lunch in Community (jobsite)  
1:00-4:30pm  
Community Project Work using bajareque or bamboo construction techniques (cont.)  
6:00pm  
Dinner at Earth with Host Family  
7:00-8:30pm  
Cultural Event (Costa Rica’s National Youth Orchestra)  
Travel to host families after cultural event (1 hr travel time)  
Host Family Stay (Night 2)  
*Journaling / Reflection 5 related to community needs*  

**Friday 1/8 – with Host families and then at Earth**

7:00am  
Breakfast with Host Family  
8:30-11:00am  
Visit community farms and community projects build the day before.  
11:00-12:00am  
Discussion of Community Project Concept with Community Stakeholders  
Mini Design Charrettes with Community Stakeholders (if time allows)  
12:00pm  
Lunch in Community  
1:00-1:30pm  
Return to Earth  
2:00-5:30pm  
Free time to explore Earth
6:00pm Dinner at Earth
6:30pm Behavioral Change by Bret Shaw
   Journaling / Reflection 6
9:00pm Movie Night (Optional)

**Saturday 1/9 – at Earth and then Puerto Viejo**

7:00am Breakfast at Earth
8:00-9:30am Building Flows
   Discussion of Sustainable Strategies
   Solar Angles
   Student Case Studies (11,12)
10:00-12:30am Travel to East Coast (Travel time 2.5 hours)
12:30pm Lunch at Puerto Viejo
1:30pm Check-in (Ciudad Perdida)
2:00-5:00pm Free time at beach
5:00pm Sun Angle Yoga
7:00pm Dinner in Cajuita

**Sunday 1/10 – at Puerto Viejo then Earth**

7:00am Check-out (Ciudad Perdida)
7:30am Breakfast at hotel or near Puerto Viejo
8:30-9:30am Travel to Eco-lodge (1 hour travel time)
9:30-11:30am Tour Organic Permaculture Farm & Eco-Lodge
   **Guest Presenter: Ian Macaulay & Ana Gaspar**
11:30am Travel to Beach in Puerto Viejo (1/2 hour travel time)
12:00–1:30pm Lunch and Student Case Studies at beach (13,14)
1:30-3:00pm Travel to Veragua Zip-line
   **Note: This is an optional activity (self-pay ~ 35USD)**
3:00-5:00pm Zip-line experience
5:00-6:30 Return to Earth (2 hr travel time)
6:30pm Dinner at Earth
7:00pm Journaling / Reflection 7 related to Finca Tierra Tour

**Monday 1/11 – at Earth**

7:30am Breakfast at Earth
8:30-10:00am Discussion of Final Project Concept
10:00-10:30am Break
10:30-noon Group Work in computer lab
12:00pm Lunch at Earth
2:00-4:00pm Group Work in computer lab
4:00-6:30pm Free time to explore Earth and Draw/create art piece
6:30pm Dinner at Earth
7:00-8:30pm Sustainable Rating Systems
   LEED, Living Building Challenge, and Envision
   Student Case Studies(15, 16)
   Journaling / Reflection (Related to Final Project)
   Journal Submission to professors for grading and comment
Tuesday 1/12 – at Earth

7:00am Breakfast Earth
8:00-11:00am Group Work / Holcim Award Submission
11am-noon Group Presentations / Submittal of Community Projects
12:00pm Lunch at Earth
1:00-2:00pm Visit to the Earth’s Renewable Energies Laboratory
2:30-3:30pm Leverage Points
  Individual Visioning Exercise
  Course Evaluations
2:30-4:30pm Free time to explore Earth and finish art piece
6:30pm Dinner at Earth
7:00-9:00pm Course Wrap-up
  Final Discussion
  Art & Photo Contest and Awards
  Celebration and Farewell

Wednesday 1/13 – at Earth to airport and back to U.S.

6:30am Breakfast at Earth and Check-out
8:00am - 11:00am Return to San Jose Airport
  Stop at bamboo shop
  Stop at souvenir shop (option 2)
11:30am At airport to depart per flight schedule (starting at 1:00pm)
Pre-trip Assignments

The following assignments are to be completed prior to beginning the course.

- **Sustainable Case Study:**
  Each student will identify a project (building, construction process, or land development) with clearly articulated sustainable features, and develop a 2-page (printed on a single sheet, front-and-back) written project description. Students will bring 18 copies to provide to each student on-site in Costa Rica. Students must also email or post on Dropbox a copy of the handout by 1/2/2015. When presenting the case study, students should be prepared to address the sustainable features (sustainable site, water efficiency, material and resources, indoor environmental quality, energy efficiency, unique strategies for efficiencies, natural materials, etc.) of the project as well. Include three (3) clear, representative images on the handout. Please include references where students can learn more information.

  Suggested topics, elements or focus of the case studies could include:
  - Biomimicry
  - Natural Construction
  - Green Roof or Living Walls
  - Net-zero buildings
    - Net-zero water
    - Net-zero energy
  - Living Building Challenge Buildings
  - Envision Projects
  - LEED Projects
  - Human Centered Design Projects
  - Community Development
  - Low-tech building strategies
  - Constructions in the tropics
  - Vertical Farming

- **Eco-Footprint** ([http://cooleclimate.berkeley.edu/calculator](http://cooleclimate.berkeley.edu/calculator) [only USA] or [http://www.carbonfootprint.com/calculator.aspx](http://www.carbonfootprint.com/calculator.aspx))
  Prior to arriving on-site, all students should prepare and calculate their personal eco-footprint based on their current location (either Costa Rica or the United States). Bring to class (time noted above) 1 copy of the complete printouts with pie charts etc. for your calculations.

- **Readings:** Prior to arriving to Costa Rica, students will be responsible for reading the following material:
On-site Assignments

The following assignments will be completed during the course, and incorporated into student journals (students to bring). Student journals will serve as a working record of course materials and activities (including a catalog of student selected case studies). It is intended to serve as a reference and benchmark to support future evolution of student personal thinking, goals and careers related to sustainability.

- Trip Journal. Including a minimum of seven (7) reflections. Suggested topics include:
  o Definition of Sustainability: Students will write and may be asked to present a personal definition of sustainability.
  o Five Personal reflections (Short narrative entries in journals discussing ideas or observations learning during course).
  o Reflection on Group Project: Include a brief summary of project work. Comment on the integrated design process, and team dynamics.

- End of Course Vision Exercise /Personal Mission Statement: Students will fill out a questionnaire and may be asked to present vision outlining, “What am I going to do with the information of this course.”

- Drawing or creating an art piece of favorite flora or fauna during the trip. This piece of art will be included in the art show/contest (RAM/EARTH price TBD)

- Group Project Assignment: Students will be assigned to groups. Groups will seek to be diverse and represent a variety of cultures, genders, educational backgrounds and experiences. Teams will be expected to apply integrated design practices and work together collaboratively. The goal of the project will be to apply lessons-learned in the course to a real-world situation.
  Project deliverables may include:
  1. Guiding Principles for the Team
  2. Need / Vision Statement for the Project
  3. Project Goals
  5. Project drawings:
     o Site plan
     o Floor Plans
     o 2-3 Building Elevation Section
       o Perspective Sketch (Optional)
     o Materials List with Cost Estimate (think of ways to get funding or donations)

Supporting reference: http://www.holcimfoundation.org/

http://sbio.vt.edu/people/faculty/quesada-pineda/