

CEGE 4011/5580 COURSE SYLLABUS

Please note: readings and itinerary may change as we develop the course

Design for Sustainable Development: Nicaragua

May Term 2017: May 16 – June 5, 2017 (3 weeks)

3 Credits

INSTRUCTORS:

In-Country Partner:

Wesley Meier

Co-Founder & CEO

EOS International

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Faculty Instructors:

Bill Arnold, Ph.D, P.E (In Nicaragua May 16-May 26)

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Staff Instructor:

Megan Voorhees (In Nicaragua for the whole course)

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COURSE OVERVIEW:

The CE4011/5580: Design for Sustainable Development: Nicaragua is a partnership between the UMN [Department of Civil, Environmental, and Geo- Engineering, Acara](#) (a UMN program of the [Institute on the Environment](#)) and the non-profit organization [EOS International](#), an organization that provides under-served communities in Nicaragua with low-cost appropriate technologies that generate income, improve health, and preserve the environment. This interdisciplinary field course will introduce students to global grand challenges and different approaches to sustainable development through guest lectures, field visits and workshops. Students will investigate the role of engineers, designers, government ministries and community organizations in achieving sustainable access to products and services through a variety of different approaches. In addition, students will live with host families in San Isidro, Nicaragua throughout the course. By the end of the course students will have an understanding of the complex challenges of sustainable development in the poorest country in Central America, and for how effective sustainable solutions must fit within a broader socio-economic context.

This class is open to upper-level undergraduates (students with advanced standing - juniors or seniors - with a minimum 3.0 GPA) and graduate students at the University of Minnesota. The class will have three pre-departure meetings in Minnesota. The three week seminar in Nicaragua will occur May 16 to June 5, 2017, including travel time.

COURSE OBJECTIVES

To explore development, environment, engineering, and infrastructure issues in Nicaragua, with a focus on:

- Issues, challenges, and solutions in rural Nicaraguan communities.
- Agricultural challenges, resources, and constraints throughout the country.
- How communities can effectively participate in the design and management of products and services.
- Strategies for community-based needs assessment and qualitative research methods.
- Ways in which infrastructure engineering in Nicaragua differs from the United States.
- Theories and methods of international and sustainable development.

To explore the roles of different sectors and their approaches to sustainable development (top-down and bottom-up).

- Roles of institutions (government, NGOs, business) in sustainable development.
- Roles of engineers, designers, entrepreneurs, and appropriate technology in sustainable development to improve living conditions.
- Successes and failures in the use of technology and business to support development.
- How engineers and entrepreneurs create ventures to address social and environmental challenges.
- How to develop and communicate business models to address development challenges in Nicaragua.

EDUCATIONAL OBJECTIVES:

The course is designed so students will demonstrate the following:

- Global awareness of social, economic, and technical challenges in developing societies.
- Intercultural and interdisciplinary skills, including communication.
- Understand the role of creativity, innovation, discovery, and expression across disciplines
- Understanding of professional and ethical responsibility.
- Understanding of international and sustainable development.
- Understanding the role of entrepreneurs and engineers in sustainable development.
- Understanding of how to create effective market-based approaches to development challenges.

TEACHING METHODS:

- In-class presentations by invited experts, including researchers and practitioners from non-governmental organizations, businesses, entrepreneurial groups, government, and academia.
- Every student will be placed on an interdisciplinary team to research the viability of implementing a sustainable venture to launch either a solar panel project, a biochar reactor or water testing project to Nicaragua. Students will research the project, conduct community needs assessments and ultimately develop an implementation plan and set of recommendations.
- Field visits to communities and project sites in Nicaragua.
- Readings on sustainable development, engineering, business, and society in Nicaragua.
- In-class discussions & student presentations.

CREDITS AND WORKLOAD EXPECTATIONS:

Design for Sustainable Development: Discovery is an intensive three-credit field course. Expect to spend 25-30 hours before the class starts for pre-departure meetings, required reading, and travel preparation. Expect 8 or more hours per day in course-related activities while in Nicaragua.

GRADING:

Assignments	Possible Points
Participation	35
Introduction Flipgrid	
Video Flipgrid	
Issue Background Paper	
IDI Survey	
IDI Module/Flipgrid	

Photo blog Entry	5
Weekly Reflections	
Mid-term Reflection Journal to Bill and Megan	10
Final Reflection Journal to Santiago and Megan	10
Design Team Project	
Individual engagement in the project (design workshops, community assessments, demonstration of revised thinking in response to team's work, etc)	15
Final Implementation Paper	15
Final Reflection Paper	10
Tech elective (for students taking course for tech electives) - 10 points	
Total Points Possible (additional 10 points for students taking course as tech elective)	100
Participation Expectations:	
Complete the pre-departure assignments on time and satisfactorily	
On time for daily events	
Participate in all course activities	
Contribute with curiosity and rigor to reflection and/or discussion sessions.	
Ask questions and actively listen during organization visits.	
If you miss an activity for no reason you will lose 10 points.	

PRE-DEPARTURE COURSE MEETINGS & ASSIGNMENTS

<p>Meeting 1 – Course Introduction (Megan, Bill and Wes) February 27, 6:00-8:00 pm in IonE R380 (dinner included)</p> <p>Key Questions:</p> <ul style="list-style-type: none"> • What is Design for Sustainable Development: Discovery in Nicaragua? What are the course objectives? What are next steps to prepare for this class? <p>Activities:</p> <ul style="list-style-type: none"> • Introductions • Introduction to course, Acara and instructors: Review of course content and outline. • Introduction to Nicaragua: Wes Meier, CEO of EOS International • Logistics preparation: Review of next steps to prepare for Nicaragua. • Assignments <p>Assignments Given:</p> <ul style="list-style-type: none"> • Personal Introduction, Due by Sunday, March 26 at noon: Introduce yourself to the class with a FlipGrid video, up to 90 seconds: Go to www.flipgrid.com and enter “cege5580”. • “Big Questions”, Due by Sunday, March 26 at 10 pm: Submit 4 big questions via Moodle assignment. Submit 2 questions on Nicaragua (e.g. culture, politics, economics, environment,

society, gender, etc.) and 2 questions on the class (logistics, academics, finance, etc). We will discuss your questions in the March meeting.

- **Watch class's introductions on Flipgrid by Monday, March 27 at 6 pm**
- **Social or Environmental Challenge, Due by Monday, April 3 at 5 pm:** Select a social or environmental challenge in Nicaragua that is in an area of interest for you and write one to two pages about it and submit on Moodle. Be prepared to discuss findings in Meeting 2.

Meeting 2 – Continued introduction to Nicaragua and Human-Centered Design (Megan, Santiago and Wes)

Monday, March 27 6-8 pm in IonE R380 (dinner included)

Activities:

- **World quality of life quiz:** Test assumptions of quality of life indicators.
- **Nicaragua Panel** (Panelists TBA)
- **Workshop: Introduction to Human Centered Design** (Fred Rose, Acara Director)
- **Design Teams-First meeting**
- **Review logistics preparation:** Review next steps for preparing for Nicaragua.

Assignments Given:

- **Introductory Readings on Nicaragua, Due by Monday, April 17:** Read packet of readings handed out in first class. Submit a one page reflection using “what, so what, now what” approach outlined in Appendix A. Be prepared for discussion in meeting 3.
- **Intercultural Development Inventory, Due April 10 at 5 pm:** You will each be sent a personalized link to an online assessment of your intercultural development. It should take about 20 minutes to complete. Your results will not be shared with anyone (including you), but facilitators will come into class in April and share their assessment of our "group profile".
- **Intercultural Learning Tutorial, Due April 24 at noon:** Take the Intercultural Learning Tutorial and complete cultural FlipGrid. The tutorial will be posted on Moodle. Submit 90-second video on FlipGrid video at <http://flipgrid.com/#cege5570> addressing the following: What goals and expectations do you have for the trip with regard to building intercultural competence? What do you think will be the biggest challenge for you?
- **Read IDEO Human Centered Design Toolkit** before you meet with your design team: <http://www.designkit.org/resources/1>. Please incorporate ideas from it into your workplan.
- **Design Team Workplan, Due Monday, April 24 by noon:** Each of you will be assigned to an interdisciplinary team to assess the viability of implementation of sustainable solution (biochar reactor, solar panels or water testing). You should start working together to research your topic, meet with experts and begin to prepare for community assessment once you arrive in Nicaragua. Submit one page per team about what you have accomplished in April and what you plan to do in May.
- **Go to travel clinic if you haven't already**

Meeting 3– Ready, set, . . . here we go!: Final Nicaragua preparations (Megan, Bill, and Santiago)

April 24 @ 6:00-8:00 pm in IonE R370 (dinner included)

Activities:

- **Discussion:** IDI tutorial results-what is your cultural identity and perspective, research summaries.

- **Expected behavior:** Discuss behavior expectations for the course.
- **Logistics:** Follow up with final logistics issues.

In-country Course Assignments:

- **Photo Blogs – Due in Nicaragua XX:** Two photo-blog entries per student, to be posted on the course blog. Guidelines and dates for posting will be discussed pre-departure. See Appendix A for helpful questions to guide reflection. You may check out past Acara blogs: [2015](#), [2014](#).
- **Journal Entries – Due by on May 24 and June 4:** Daily journal documenting experiences and observations (~200 words/day). The journal may be submitted electronically or as legible photographs/scans via the course Moodle, or by hard copy to Megan Voorhees.
- **Participate in all group reflection discussions,** including every day before returning to dinner with your host family.
- **Final Team Project Implementation Plan:** Each team should submit a team implementation plan outlining your assessment of the viability of implementation of your team's technology, including research and data from community assessments.
- **Final Reflection Paper:** 1500 word paper reflecting on these questions:
 - How have your perspectives on strategies for sustainable development changed and/or been reinforced?
 - How has your worldview changed and/or remained the same?
 - How have your views of your own country and culture changed?
 - What changes have you noticed in yourself?
 - What are the parts of your experience abroad that you wish did not have to end?
 - What would you say is the most profound learning that you will take away from this course?
- **Only for undergraduate students seeking CSE technical elective credit: Due by June 15** – Add a technical design to your team's implementation plan. The technical assignment should be submitted via Moodle (please name it YOURLASTNAME_CE5570_TECELECTIVE). Questions about Tech Elective Credit should be directed to Professor Bill Arnold.

APPENDIX A: EXPERIENTIAL LEARNING REFLECTION

During the course we'll reflect and analyze our readings and experiences using three questions: What? So What? Now What? Explanation follows.

What? Report the facts and events of an experience, objectively.

- What happened?
- What did you observe?
- What issue is being addressed or population is being served?

So What? Analyze the experience.

- Did you learn a new skill or clarify an interest?
- Did you learn, hear, smell, or feel anything that surprised you?
- How is your experience different from what you expected?
- What impacts the way you view the situation/experience? (What lens are you viewing from?)
- What did you like/dislike about the experience?
- What did you learn about the people/community?
- What are some of the pressing needs/issues in the community?
- How does this project address those needs?

Now What? Consider the future impact of the experience on you and the community.

- What seems to be the root causes of the issue(s) addressed?
- What other work is currently happening to address the issue?
- What learning occurred for you in this experience?
- How can you apply this learning?
- What would you like to learn more about, related to this project or issue?
- What follow-up is needed to address any challenges or difficulties?
- What information can you share with your peers or the community?
- If you could do the project again, what would you do differently?

This content originates from the University of Minnesota Community Service-Learning Center. For more information see: <http://www.servicelearning.umn.edu/info/reflection.html>.

APPENDIX B: Nicaragua TRAVEL GUIDE

About the guide: This travel guide will help you prepare for Nicaragua. If you have questions, you may contact Wes Meier (wesley.meier@eosintl.org) or Megan Voorhees (voorhees@umn.edu).

Disclaimer: The content within this guide is intended to serve as a supplement. It is not meant to be a sole source of information for students traveling to Nicaragua. UMN staff can help address questions and guide planning, but it is up to each student to take care of his/her own preparation. We encourage each student to talk with the appropriate contacts at the Learning Abroad Center, financial institutions, and medical facility in order to ensure full preparation for time abroad. We hope this guide provides useful information that will help you be prepared for Nicaragua! The University of Minnesota, Acara and any employees of the University of Minnesota are not liable for any losses due to inaccurate information, misguidance or omissions provided in this guide.

A. FLIGHTS.

Students that which to travel together will be booked on a group flight departing Minneapolis (MSP) to Managua (MGA) on Tuesday, May 16 and returning Managua to Minneapolis Monday, June 4. A UMN faculty member will accompany students on the group flight to Nicaragua. If students prefer a deviation from the group itinerary, they should discuss their situation with Megan Voorhees.

B. ARRIVAL

Transportation. All students will fly to Managua with the group on Tuesday, May 16. We will stay that night in a hotel near the airport and will travel by private transportation to San Isidro XX days later.

Money. You can withdraw Córdobas from an ATM by debit card either at the airport or at an ATM after arrival. We recommend withdrawing Córdobas at an ATM in San Isidro and having some US dollars on hand to exchange as a back up. Be sure to notify your financial institutions of travel plans prior to departure. Visa (Visa Plus network) and MasterCard (Maestro/Cirrus network) are accepted in Nicaragua. American Express may not be accepted.

C. LODGING

Lodging will be provided throughout your stay in San Isidro. The students will be staying in organized homestays. Students will be paired with a proper homestay based on their spanish level, family preference, and other basic needs. The homestays consist of families living around San Isidro who have been trained to host students from the US. The experience has been memorable for previous visitors, as students will gain the first-hand experience of living in a Nicaraguan home, within a controlled setting.

D. COMMUNICATION

Cell Phones. The host organization will provide students with a simple cell phone to communicate while in Nicaragua. The phones will be loaded with a few minutes, but students can add more as they wish. Students will also have access to internet and recommend using voice over IP applications such as Skype, What's App, or Google Hangout to communicate with people back in the US if they wish. Students may choose to bring down their US smart phone and purchase a SIM card, but this is not recommended. Your US SIM card should work in Nicaragua, but using it would be expensive. To avoid data charges, keep your phone on airplane mode when turned on with a US SIM inserted outside the US.

Laptop and Internet. You do not need a laptop but many students bring one, or a tablet. Wireless internet is commonly available in guest houses and cafes in Nicaraguan cities. Once in Nicaragua you may purchase a prepaid wireless 3G USB internet device. Pre-paid Internet device options are available via XXXXXX and other providers. They work well in most areas.

E. MONEY

Acquiring Cordobas. The currency in Nicaragua is the Cordoba. Students are recommended to bring down crisp/clean \$20 bills that can be exchanged while in Nicaragua. Students may also use a debit card at ATMs in Nicaragua to withdraw Cordobas. Debit and credit cards serviced by Visa/MasterCard/occasionally Amex are accepted in major shops and stores in Nicaragua. While some restaurants and supermarkets may accept credit/debit cards, many businesses only accept cash. Before departing the US, please call your financial institution(s) or update your online account to inform them of travel plans.

F. HEALTH

Vaccinations. Ensure you are up to date on shots and boosters. You should consult your physician and/or travel clinic for Nicaragua-specific immunizations. UMN students can make a travel clinic appointment at Boynton at 612-625-3222. More info: <http://www.bhs.umn.edu/east-bank-clinic/international-travel-clinic.htm>.

Travel registration and international CISI insurance: All UMN students must have CISI insurance to travel internationally. You will be automatically enrolled in CISI as part of the program and do not need to apply separately. Questions on CISI insurance can be directed to Kaoru Nunn at nunnx016@umn.edu or 612-626-8832. Note that students traveling abroad should maintain standard health insurance coverage through a US provider while overseas.

Medications. You may want to bring a small supply of preferred over-the-counter drugs for headaches, upset stomach, etc but you'll be able to find most over-the-counter medications at pharmacies in Nicaragua. You should bring prescription medications you use regularly from the US in sufficient quantity and with any needed documentation.

Healthcare. Healthcare services in Nicaragua are mostly excellent and affordable. Unlike the US, most folks are able to pay for their health needs even without insurance (in the worst case). While local clinics are able to attend to most primary health care needs, state-of-the-art secondary and tertiary care hospitals with competent doctors address most critical-care needs. It is best to seek recommendations from colleagues/Nicaragua coordinator (if in San Isidro) for preferred practitioners. A number of Tier 2 cities also boast great hospitals and healthcare providers. Please carry all your medical documents, which any doctor will be able to refer to while treating you. If possible, scan your documents and carry soft copies.

G. GROUND TRANSPORTATION.

The majority of group transportation will be organized by the class. San Isidro is fairly small in size and the majority of the events and locations are within a walkable distance. Students will be taking truck rides to communities and larger-group trips will be in a van or bus.

Local 'tricyclos' or adult-sized tricycles are available as a taxi within San Isidro. Check with the program coordinator to get the latest rates.

H. FOOD.

Food and water safety. Nicaragua has awesome food! Unsafe food and water, though, are common sources of stomach issues. Cooked food is generally safe. Street food from informal vendors can be more risky, but is very tasty. There are exceptions here too. More sanitized versions of street food are available at select outlets (sugarcane juice made with filtered water, for instance). Once again, rule of thumb – check with locals.

A general rule to avoid problems: if it is served hot, eat it. If it is served cold, watch out. Be cautious about eating uncooked vegetables at restaurants or on the street. An advantage with street food is that you see it being made in front of you, so ask if there is anything amiss. Most vendors are cooperative.

Drinking tap water or consuming food that has been exposed to unboiled tap water is not advised. Bottled water and filtered water are reliable. Restaurants often serve filtered water by the pitcher or glass, and you may want to ask to make sure it is filtered water prior to drinking or ask for a bottled water.

Our team will work with those students that have food allergies or food preferences. Veganism and being sensitive to those who are gluten-free (for instance) is catching on (mostly in big cities), so you might need to explain the bare-bones of your choices. Please be upfront with the program coordinator if you have any preferences. Also, a lot of Nicaraguans don't have too many varied food allergies (this is changing as we speak), so you might have to deconstruct explanations, and be watchful.

I. Nicaragua TRAVEL RESOURCES.

Travel Info:

Lonely Planet Travel Guide – Nicaragua: <https://www.lonelyplanet.com/nicaragua>

US State Dept. – Nicaragua Travel Info:

http://travel.state.gov/travel/cis_pa_tw/cis/cis_1139.html

US State Dept. – Nicaragua Background Note:

<http://www.state.gov/r/pa/ei/bgn/3454.htm>