



CE 4571: Design for Sustainable Development

Fridays 9:00am – 12:00pm

4 credits

Fall 2013, Location: SSTS 512A

Instructors:

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Office hours are by appointment.

Course Description:

Students will work in teams developing sustainable business and technical solutions to address an environmental or social challenge in India. Teams may address a challenge related to water supply, energy availability, food/agriculture production or distribution/marketing. During the semester a product or service must be designed, and a sustainable business model must be created around it.

Typical UMN team size is 4-6 students. Each UMN team will be associated with a collaborative team from the Xavier Institute of Management Bhubaneswar (XIMB) in Orissa. Technical and business development professionals based in the US and India will be available as mentors to provide advice to each team. Each team will have one US-based mentor and one India-based mentor. Strong involvement of all team members and communication between UMN and XIMB teams, mentors and outside experts is critical to success.

The teams are expected to use a discovery process, design thinking, ideation and input from field research in solving the challenge. A primary focus of the course is up-front work to identify the "right" problem to solve. Teams must then develop a product or service, and corresponding financially sustainable business model for delivery of the product or service. A sustainable business model means the venture delivering the product or service can do so by generating revenue. The business model could be either for-profit or non-profit, but in either case the same evaluation criteria would be used. The model should be built around the customer's needs and wants, as they will need to pay for the product or service to achieve a scalable model. Presentations will be required on the preliminary and final solutions. Each team member is expected to participate in the preparation of the business plan and presentation. The final course deliverables will be a well-designed business plan and presentation before a panel of business professionals.

Students must be graduate students or advanced undergraduates. There are no prerequisites, other than a strong interest in the topic. Instructor permission is required to register for the course.

Required Reading:

Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers by Alexander Osterwalder and Yves Pigneur.

Poor Economics by Abhijit Banerjee and Esther Duflo.

Human Centered Design Toolkit: Can be downloaded at: <http://www.ideo.com/work/human-centered-design-toolkit/>

Emerging Markets, Emerging Models: Report from the Monitor Group. Can be downloaded at: http://www.mim.monitor.com/downloads/emergingmarkets_full.pdf

Other, shorter, readings will be assigned during the semester.

Recommended Reading:

A collection of relevant readings can be found through dropbox at: <https://www.dropbox.com/sh/0fhlypse2b9olt/5GuyxWNUe>

Teaching Methods:

- In-class presentations by instructors, practicing professionals and other invited speakers.
- Ongoing communication with collaborative teams from XIMB.
- Weekly interaction between mentors and team members.
- Feedback on written documents from instructors and mentors.
- Feedback on oral presentations from instructors, mentors, and audience.
- In-class discussion on written and oral communication of technical material.

Credits and Workload Expectations:

1 credit is defined as equivalent to an average of 3 hours of learning effort per week (over a full semester) necessary for an average student to achieve an average grade in the course. A student taking a 4-credit course should expect to spend at least 12 hours of effort per week. This amount is the minimum effort expected in this course. Thus, a total effort of about 180 to 190 effort hours per students is expected during the semester. You will spend more time as you develop your solutions and business plans. Time must also be spent communicating with your mentors and Indian partner teams.

Educational Objectives:

The course is designed so students will be able to demonstrate

- An ability to apply core knowledge of the student's major to problems,
- Teamwork skills,
- An ability to identify, formulate, and solve problems,
- Self management skills,
- Leadership skills,
- Inter-cultural skills,
- An understanding of professional and ethical responsibility,
- An ability to communicate effectively, in writing and orally,
- Recognition of the need, and an ability, to engage in life-long learning.

Course Foci:

- Problem Solving:
 - Address a real-world problem.
 - Synthesize knowledge from various courses.
 - Design thinking, discovery and ideation skills.
- Teamwork:
 - Interact with international team members, peers and mentors.
 - Collaborate across disciplines and cultures.
- Communications:
 - Concise, thorough professional report.
 - Concise, thorough, and persuasive oral presentations.
- Project Management:
 - Project planning.
 - Financial planning.
 - Time management.

Liberal Education and Global Perspectives Requirements

This class is consistent with the University of Minnesota's Liberal Education (LE) requirement and Global Perspectives (GP) requirement.

The Association of American Colleges and Universities defines liberal education as that which “empowers individuals with broad knowledge and transferable skills, and a strong sense of value, ethics, and civic engagement”, and is “characterized by challenging encounters with important issues” (AACU, “Liberal Education Resources”, [link](#)). That definition reflects the goals of the course. Students in the course grapple with Grand Challenge problems facing communities in India. Doing so highlights several aspects regarding the ethics of action (or inaction). Students work together in teams to identify feasible solutions and to put together a plan that would allow someone to implement that solution. That process requires broad knowledge of developing-country issues and broadly transferable skills, including problem solving, working on diverse teams, and a combination of brainstorming with empathy for others.

The Global Perspectives requirement is that students have “at least one significant academic exposure to the world beyond U.S. borders, and the opportunity to consider the implications of this knowledge for the international community and their own lives.” Consistent with that requirement, this class focuses on how, in the Indian context, individuals and small teams can make a difference on Grand Challenge problems.

Final Report:

The final report is a significant effort, and includes a written and an oral portion. The written portion is up to 10 pages, including figures and tables. Appendices outside of the 10 pages are allowed. The report needs to be concise yet provide sufficient detail so that the solution can be demonstrated. The report will be reviewed by instructors and by professionals from outside the University, and will need to make a strong case for the proposed solution.

Technical competence, numerical accuracy, documentation, neatness, organization, timeliness and clarity of presentation will be considered in evaluating students' work.

The oral presentation requires a concise, persuasive pitch to audience members from inside and outside the University.

The oral and written reports must answer, concisely and persuasively, these questions:

1. What problem are you addressing? Why is it important? Why are you passionate about solving it?
2. Why do you think it is a problem, and what evidence do you have? A “problem” is not one to the student, but to the customer or group you wish to engage.
3. What is your solution, and how does it work? What gap or opportunity have you realized? What is the value proposition?
4. Why do you think your solution will work / what evidence do you have? Why hasn't someone else done it already? Who are your customers and key partners?
5. How will your solution be sustainable and scalable? What is your financial model?

Key Course Dates:

Sept 6, 2013, 9am-noon – Course introduction
 Sept 9, 2013, 5pm-7:30pm – Acara Open House (lonE)
 Sept 13, 2013, 9am-noon – Team selection
 Nov 8, 2013, 9am-noon – Mid-term presentations
 December 6, 2013, 9am-noon – Final business plan, grunt fund, online business models due
 December 13, 2013, 9am-noon – Final presentations

Grading:

The overall course grade will include the following components:

Individual Assignments (4)	10%
Team Evaluation (includes Grunt Fund)	15%
Business Model Canvas Online	10%
India Reviews	10%
Presentations (3: problem, solution, midterm)	20%
Final Plan	25%
Final Presentation	10%

The University of Minnesota's Uniform Grading Policy is:

A	Achievement that is outstanding relative to the level necessary to meet course requirements.
B	Achievement that is significantly above the level necessary to meet course requirements.
C	Achievement that meets the course requirements in every respect.
D	Achievement that is worthy of credit , even though it fails to meet fully the course requirements.
F	Represents failure and signifies that the work was either: 1) completed but at a level not worthy of credit , or 2) not completed and there was no agreement between the student and instructors that the student would be awarded an Incomplete.

Miscellaneous grade contributions: attendance, punctuality of document submittals, participation, etc. Attendance at all



sessions is mandatory. Participation in class discussions is also required, including reading assigned materials before class (see class schedule). If you cannot make a date, you are required to notify the instructor in advance via email, and to supply a written note from a doctor stating that you were unable to attend class. Late assignments may not be accepted.

This class aims to be a real-world experience in the needs and solutions for sustainable development. The mentors should be treated with respect, as future offerings of the course will depend on their continued involvement to make it a success.

Readings must be done before class, as preparation for that day's lecture and discussion. Students should read business plans from prior years, available at <http://acara.umn.edu> under the Acara Challenge menu listed by year.

A detailed course schedule is attached.



University Policies

Persons with disabilities that require accommodations will be assisted on an individual basis. Contact Disability Services (626-1333) and the instructor in advance to arrange accommodations.

Cheating is not allowed in the course and will not be tolerated. Anyone found cheating will immediately receive a grade of zero on that assignment. If such behavior occurs more than once, the student will receive a grade of F in the class.

Harassment and disruptive and disturbing behavior will not be tolerated; students will be asked to leave immediately if such behavior occurs, as defined in the Student Conduct Code.

Grading:

<http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html>

Student conduct code:

http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf

Makeup work:

<http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html>

Student responsibilities:

<http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html>

Sexual harassment:

<http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf>

Equity, diversity, equal opportunity and affirmative action:

http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf

Academic freedom and responsibility:

http://regents.umn.edu/sites/default/files/policies/Academic_Freedom.pdf