TO: The Faculty of the College of Engineering

FROM: Global Engineering Program

RE: New Undergraduate Course, GEP 10100, Global Design Team Travel

The faculty and staff of the Global Engineering Program have approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

GEP 10100 Global Design Team Travel
Semesters 1 & 2, Class 0, Cr. 0

Description:
Global Design Teams (GDTs) bring together undergraduate and graduate students from different disciplines, inside and outside of engineering, to solve real-world problems over the course of one academic semester. Depending on the size and scope of the project, teams may range from two to twenty students under the advisement of a faculty member. GDTs partner student teams with non-governmental organizations (NGOs), businesses or other research institutions in international development projects to accomplish three primary goals:

1. Give Purdue students real-world, full-cycle design experience
2. Raise the global awareness of Purdue students through global experiences
3. Increase Purdue's global humanitarian impact

The structure of Global Design Teams is that interested students (first-year through graduate students) apply for a position on a GDT, and faculty leaders choose which students are best suited to address the design challenge at hand.

This particular EFD covers the optional travel component associated with Global Design Teams. Through this zero-credit course listing, students will be assessed a flat fee, regardless of travel location by the Bursar's office and credited to the Global Engineering Program to cover the students' portion of the expense of travel. This course is repeatable, and department (GEP) approval is required for registration.

Reason:
Global Design Team provides students with the opportunity to put their technical engineering skills to work in an unfamiliar, real-world setting. Some engineering fundamentals transcend location, however, many attributes of a competent global engineer require experience in order to obtain. These attributes include things like understanding issues of sustainability in different cultures and regions of the world and the ability to communicate and partner effectively across cultures. Global Design Team provides students with an experience that increases their global competence by giving them a problem which may be technically familiar, but contextually unique. Students are also required to communicate directly with international partners via

conference calls, Skype, emails, and in person during travel. This interaction increases students' competence and confidence for communicating across cultures. Furthermore, designing for communities divergent from one's own provides students with an opportunity to consider problems and related influencing factors in a holistic manner. In future situations encountered by the engineer, the problem and factors may not be the same, but the mindset for thinking about problems will be familiar.

Rabi H. Mohtar, Director, Global Engineering Program

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #40

Date 4/20/11

Chairman ECC

Variance

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Rabi H. Mohtar, Director, Global Engineering Program

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #10

Date 4/20/11

Chairman ECC R. Cipra

Global Design Team Impact in Brief

The Purdue University Global Engineering Program (GEP) Learning Portfolio (https://engineering.purdue.edu/Engr/Academics/Global) hosts a number of high-impact programs. One of these is the Global Design Team (GDT), which partners with academic institutions, NGOs and corporations around the world to offer collaborative, service-learning opportunities. GDT combines international cultural exchange with service-learning projects that address grand challenges and provides a real-world, full-cycle design experience that raises global awareness. With its partners, Purdue strives for positive, sustainable interaction with stakeholder communities and attempts to utilize the technical skills and competencies of our students for positive benefit. Costs are shared by all, including the students themselves.

In 2010, 52 students from nine schools in the College of Engineering participated in five Global Design Teams that delivered outcomes in Cameroon, Kenya and Palestine. Of these, 29 students traveled to the host country to assist in the implementation of the designs. GEP matched contributions from schools to assist the traveling students to cover travel costs. In country lodging, food and travel costs are addressed through in-kind provisions by the host. Overall expenses are offset by research grants, corporate gifts, and the International Programs office at Purdue. Since the program's inception in 2008, Global Design Teams have sent 41 students to four countries and delivered/implemented eight projects.

Cameroon (2009, 2010) ***Basic Utility Vehicle (BUV), Micro-Hydroelectric, and Wind Energy*** - The African Centre for Renewable Energy and Sustainable Technology (ACREST) of Bangang, Cameroon, has hosted three projects over the last two years. BUV, developed by the Indianapolis based Institute for Affordable Transportation (IAT), has been the focus of a team for the past two years. BUVs provide simple, low-tech, low-cost vehicles to serve in rural areas of Africa and Central America with the goals of increasing productivity, agricultural capacity and efficiency, trade, education, and health care. During the team's visit to Cameroon in 2009, it laid the foundation for the 2010 projects in hydroelectric and wind energy. These teams assessed the ACREST site, determined capacity for energy generation and shared a design for a low-cost wind turbine that could be installed throughout the region.

West Bank, Palestine (2009, 2010) ***Water Resources Assessment*** - Palestinian Hydrology Group (PHG) continued work begun in 2008 by supporting the Purdue team that developed a method for assessing the water resources of the city of Jericho, including environmental and socio-economic aspects of efficient water management. Birziet University in Ramallah also provided a team of students to work with the Purdue team. The work funded in part by Aramex Corporation's Sustainability and Compliance office.

Kenya (2010) ***Water Purification*** - Moi University, in partnership with Aqua Clara Foundation, a not-for-profit organization, partnered with a Purdue GDT to develop a method to provide potable water for St. Catherine's Girls' School in Eldoret, Kenya. The team developed and tested reactors to reduce concentrations of microbial pathogens and fluoride in the water supply, and installed a full-scale reactor in situ.

Ghana (2009) ***Small-Scale Irrigation System Design*** - The International Water Management Institute (IWMI) partnered with GDT to develop a software tool to aid farmers in the design of irrigation and water management systems in West Africa. Students evaluated their model in two separate locations in Ghana, made required adjustments and trained local farmers in the use of the tool.

In 2011, the Global Engineering Program will host ten projects in eight different locations, including: Lebanon, Jordan, Palestine, Indonesia, India, Colombia, Kenya, and Cameroon.

Global Design Team Course Learning Outcomes

(1=Knowledge, 2=Comprehension, 3=Application, 4=Analysis, 5=Synthesis, 6=Evaluation, 7=Valuation, 8=Not Applicable)

Outcome I.1: *An awareness of varying regulations, codes of practice, standards, technical specifications testing/inspection procedures, environmental regulations, and systems of measurement between countries and regions.*
Students will have:
1. an awareness that standards very between countries and regions (2)
2. a knowledge of how to find standards for different countries (1)
3. an ability to apply such standards to design (3)
4. an understanding of the factors that influence the difference in standards between regions (4)

Outcome I.2.: *Familiarity with the concept of a "global product platform."*
Students will have:
1. a knowledge of the concept of a global product platform (1)
2. an understanding of the interconnectedness of the globe with respect to economies and the environment (2)
3. an understanding of global issues and trends (4)
4. an understanding of the need to be innovative and add value to the field of engineering in order to be competitive (2)

Outcome I.3: *The ability to apply familiar concepts to unfamiliar, real-world problems.*
Students will have the ability to:
1. identify basic engineering principles that transcend location (5)
2. identify problem constraints (6)
3. consider and incorporate various design factors and constraints (such as economics, safety, manufacturability, sustainability, environmental) (4)
4. evaluate relevance and quality of engineering solutions (6)

Outcome I.4: *The ability to use design tools to solve engineering problems.*
Students will have the ability to:
1. use basic software tools (word processing, spreadsheets, graphics, and Internet) (3)
2. use engineering analysis software tools (3)
3. use data analysis software (3)

Outcome II.1: *The ability to adapt to cultural norms in a professional arena and act appropriately.*
Students will have:
1. the ability to analyze a situation and react appropriately (3)
2. an understanding of relevant cultural norms (4)
3. an awareness of the language and demeanor appropriate for a given situation (6)
4. respect for the opinions and interaction styles of others (6)
5. the ability to promote oneself in a cultural-appropriate professional manner (3)

Outcome II.2: *The ability to make ethical and socially responsible decisions in the context of a culture divergent from my own.*
Students will have:
1. an awareness of what is generally considered culturally appropriate in regions of practice (3)
2. an awareness of the existence of varying cultural norms (3)
3. the ability to analyze an engineering solution to determine its relevance and acceptability in a given culture (4)
4. an awareness of their ethical responsibility to the community (7)

Outcome II.3: *The ability to analyze problems from a different cultural frame of reference.*
Students will have the ability to:
1. analyze the relevance of engineering solutions from the perspective of their client (4)
2. understand the contextual complexities of engineering problems (4)
3. add or remove design constraints depending on their cultural relevance (6)

Outcome II.4: *The ability to communicate professionally in a culturally-appropriate manner.*
Students will have:
1. knowledge of differences in communication across cultures (3)
2. the ability to present and discuss technical and non-technical information (7)
3. the ability to utilize appropriate interpersonal skills (3)

Outcome III.1: *The ability to practice social and cultural responsibility, e.g. resource sustainability.*
Students will have:
1. an awareness of their ethical responsibility to the community (7)
2. the ability to incorporate resource-conserving (with respect to cost, the environment, natural resources, labor, etc.) practices into engineering design (6)
3. an awareness of the impact their work will have on the community (6)

Outcome III.2: *Proficiency in a second language.*
Students will have the ability to:
1. communicate effectively in a second language in social settings (8)
2. communicate effectively in a second language in professional settings (8)
3. feel comfortable in situations where a foreign language is being spoken (7)
4. learn terms in a second language which will enhance their experience in a foreign country(7)

Outcome III.3: *The ability to be cross-culturally adaptable/flexible.*
Students will have:
1. an understanding of relevant cultural norms (4)
2. the ability to adapt to unfamiliar cultural settings (3)

Outcome III.4: *The ability to contribute to a culturally-diverse team.*
Students will have the ability to:
1. work effectively with individuals from different cultural backgrounds (3)
2. articulate multiple and divergent perspectives when debating and proposing a solution to a problem (4)
3. understand the norms of team dynamics in different cultures (5)

Office of the Registrar
FORM 40 REV. 10/10

EFD 33-11

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

DEPARTMENT: Global Engineering Program

EFFECTIVE SESSION: Spring 2011

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

- [x] 1. New course with supporting documents
- [ ] 2. Add existing course offered at another campus
- [ ] 3. Expiration of a course
- [ ] 4. Change in course number
- [ ] 5. Change in course title
- [ ] 6. Change in course credit/type
- [ ] 7. Change in course attributes (department head signature only)
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites/restrictions
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

PROPOSED:		EXISTING:	
Subject Abbreviation	GEP	Subject Abbreviation	
Course Number	10100	Course Number	
Long Title	Global Design Team Travel		
Short Title	Global Design Team Travel		

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

TERMS OFFERED (Check All That Apply)

- [x] Fall
- [x] Spring
- [ ] Summer

CAMPUS(ES) INVOLVED

- [ ] Calumet
- [ ] Cont Ed
- [ ] Ft. Wayne
- [ ] Indianapolis
- [ ] N. Central
- [ ] Tech Statewide
- [x] W. Lafayette

CREDIT TYPE

1. Fixed Credit: Cr. Hrs. 0
2. Variable Credit Range:
   Minimum Cr. Hrs
   (Check One) To [ ] Or [ ]
   Maximum Cr. Hrs
3. Equivalent Credit: Yes [ ] No [x]

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only	[ ]	6 Registration Approval Type	
2. Satisfactory/Unsatisfactory Only	[ ]	Department	[x]
3. Repeatable	[ ]	Instructor	[ ]
Maximum Repeatable Credit:	[ ]	7 Variable Title	[ ]
4. Credit by Examination	[ ]	8 Honors	[ ]
5. Special Fees	[x]	9 Full Time Privilege	[ ]
		10 Off Campus Experience	[ ]

Schedule Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture				
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Global Design Team (GDT) brings together undergraduate and graduates students from different disciplines, inside and outside of the College of Engineering, to design solutions to solve real-world problems over the course of one academic semester. Depending on the size and scope of the project, teams may range from one to twenty students under the advisement of a faculty member. GDTs partner student teams with non-governmental organizations, businesses, and/or other research institutions in international development projects. No prerequisites are required for this course, however, department approval is required for enrollment. This course is repeatable for credit. Approval for registration is granted based on an application process that takes into consideration previous design experience, level of interest in the topic, and GPA. A flat fee (variable) shall be assessed to each student enrolling in this course and credited to the Global Engineering Program to cover student travel expenses.

*COURSE LEARNING OUTCOMES

(Condensed from full course learning outcomes.)
1. Real-world, full-cycle design experience in the context of a different culture and geographical region, 2. Increased global awareness and competence, 3. Global humanitarian impact

	Date		Date
Calumet Department Head		Calumet School Dean	
Fort Wayne Department Head		Fort Wayne School Dean	
Indianapolis Department Head		Indianapolis School Dean	
North Central Faculty Senate Chair		Vice Chancellor for Academic Affairs	
West Lafayette Department Head	4/1/11	West Lafayette College/School Dean	7/6/11

West Lafayette Registrar — Date

OFFICE OF THE REGISTRAR