Office of the Registrar
FORM 40G REV 4/13

APPROVED COPY

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF A GRADUATE COURSE
(50000-60000 LEVEL)

ENGR 50000
Graduate Council Doc. No. 13-21a

0

DEPARTMENT: School of Engineering Education / College of Engineering
EFFECTIVE SESSION: Spring 2014 201430

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

- [X] 1. New course with supporting documents (complete proposal form)
- [ ] 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
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered
- [ ] 12. Transfer from one department to another

PROPOSED:		EXISTING:	
Subject Abbreviation	ENGR	Subject Abbreviation	
Course Number	50000	Course Number	
Long Title	Global Design Team V		
Short Title	Global Design Team V (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:
2. Variable Credit Range: Minimum Cr. Hrs: 0 (Check One) To [X] Or [ ] Maximum Cr. Hrs: 3
3. Equivalent Credit: Yes [ ] No [ ]
4. Thesis Credit: Yes [ ] No [ ]

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only [ ]
2. Satisfactory/Unsatisfactory Only [ ]
3. Repeatable [X] Maximum Repeatable Credit: 3
4. Credit by Examination [ ]
5. Fees [ ] Coop [ ] Lab [ ] Rate Request — Include comment to explain fee
6. Registration Approval Type: Department [X] Instructor [ ]
7. Variable Title [ ]
8. Honors [ ]
9. Full Time Privilege [ ]
10. Off Campus Experience [ ]

Schedule Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	⅓ of Credit Allocated
Lecture				
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study	variable	variable	16	
Pract/Observ				

Cross-Listed Courses

RECEIVED
JAN 27 2014
OFFICE OF THE REGISTRAR

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Global Design Team (GDT) brings together undergraduate and graduate 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~~ 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. 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.

*COURSE LEARNING OUTCOMES: Professor Mohtar.

See attached supporting documentation describing twelve learning outcomes in three categories: Technical (I.1-4), Professional (II.1-4), and Social-Cultural (III.1-4).

	Date		Date		Date
Calumet Department Head		Calumet School Dean		Calumet Director of Graduate Studies	
Fort Wayne Department Head		Fort Wayne School Dean		Fort Wayne Director of Graduate Studies	
Indianapolis Department Head		Indianapolis School Dean		IUPUI Associate Dean for Graduate Education	
North Central Department Head		North Central School Dean		North Central Director of Graduate Studies	
West Lafayette Department Head	9/23/13	West Lafayette College/School Dean	9/24/13	Date Approved by Graduate Council	APPROVED 1/16/14
Graduate Area Committee Convener	1/16/14	Graduate Dean		Graduate Council Secretary	1/21/14
				West Lafayette Registrar	2/5/14

OFFICE OF THE REGISTRAR

(Grad Form 40G [Excel format] - Does not include the Graduate Council's required supporting document. See pdf version of Form 40G)

Shafer, Marsha L

From: Fellure, Debra S.
Sent: Wednesday, July 16, 2014 1:03 PM
To: Shafer, Marsha L
Cc: Minix, L Adele
Subject: RE: GEP 50000 Form 40G - EFD 34-11

Hi Marsha,

I apologize that I have not had a chance to reply to your message.

Since GEP was not a degree granting graduate program, Phil Pope, Senior Associate Dean met with Audeen Fentiman and Brent Jesiek regarding options to create this course. The course was approved as ENGR 50000. Please see the attached copy.

I hope this helps...please don't hesitate to contact me if you have further questions.

Debbie

Debra S. Fellure
The Purdue University Graduate School
Graduate Programs Office
YONG 160
765-494-6963
dfellure@purdue.edu

> **From:** Minix, L Adele
> **Sent:** Friday, June 27, 2014 11:05 AM
> **To:** Shafer, Marsha L
> **Subject:** RE: GEP 50000 Form 40G
>
> Hi Marsha,
>
> I do not show having ever received this Form 40G, the course is not set up in the catalog. It may have gotten hung up in the Grad School; Debbie Fellure may be able to help you. Sorry that I could not be of more assistance.
>
> Adele
>
> **From:** Shafer, Marsha L
> **Sent:** Friday, June 27, 2014 10:43 AM
> **To:** Minix, L Adele
> **Subject:** GEP 50000 Form 40G
>
> Adele;
> Attached is a Form 40G I have from 2011 that I did not get a signed copy approved by the Registrar's office. Hopefully, you did get something from the Grad office and can track down a signed copy approved by the Registrar.
>
> If you have a signed copy of this Form 40G, please send me one for GEP 50000.
>
> Thanks,
> Marsha

Office of the Registrar
FORM 40G REV. 4/10

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A GRADUATE COURSE
(50000-60000 LEVEL)

EFD 34-11

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 (complete proposal form)
- [ ] 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
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites/restrictions
- [ ] 11. Change in semesters offered
- [ ] 12. Transfer from one department to another

PROPOSED:		EXISTING:	
Subject Abbreviation	GEP	Subject Abbreviation	
Course Number	50000	Course Number	
Long Title	Global Design Team V		
Short Title	Global Design Team V		

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

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

COURSE ATTRIBUTES: Check All That Apply
1. Pass/Not Pass Only [ ]
2. Satisfactory/Unsatisfactory Only [ ]
3. Repeatable [x]
Maximum Repeatable Credit: 3
4. Credit by Examination [ ]
5. Special Fees [ ]
6. Registration Approval Type
Department [x] Instructor [ ]
7. Variable Title [ ]
8. Honors [ ]
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	variable	variable	16	
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.

Calumet Department Head	Date	Calumet School Dean	Date	Calumet Undergrad Curriculm Committee	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date	Fort Wayne Chancellor	Date
Indianapolis Department Head	Date	Indianapolis School Dean	Date	Undergrad Curriculm Committee	Date
North Central Department Head	Date	North Central School Dean	Date	Date Approved by Graduate Council	
West Lafayette Department Head	4/11/11 Date	West Lafayette College/School Dean	Date	Graduate Council Secretary	Date
Graduate Area Committee Convener	Date	Graduate Dean	Date	West Lafayette Registrar	Date

OFFICE OF THE REGISTRAR

(Grad Form 40G [Excel format] - Does not include the Graduate Council's required supporting document. See pdf version of Form 40G)

TO: The Faculty of the College of Engineering

FROM: Global Engineering Program

RE: New Graduate Course, ~~GEP~~ ENGR 50000, Global Design Team V

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~~ ENGR 50000 Global Design Team V
Semesters 1& 2, Lecture 1, Cr. 0-3 (variable credit)
Prerequisite: Department approval required for enrollment

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. Travel for project implementation is an optional component of this course and is not covered under this EFD.
Students must have **department (GEP) approval for enrollment** and this course is **repeatable for credit**. Approval for registration is granted based on an application that takes into consideration previous design experience, level of interest in the topic, and GPA.

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.

Graduate students contribute a unique perspective to these projects in that typically, undergraduate students do not have an opportunity to learn from the diverse experiences and backgrounds of graduate students. Graduate students also provide leadership to the projects.

Having run the Global Design Team projects as pilots for the past two years, these courses have been listed by individual schools within the College of Engineering. It is now time to formalize this increasingly popular program into regular courses and move them into a centralized location under the GEP designator. Doing so will offer a better controlled enrollment and provide greater flexibility for students to obtain credit.

William Anderson, 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

Supporting Document for a New Graduate Course

To: Purdue University Graduate Council

From:
Faculty Member: Rabi H. Mohtar
Department: Global Engineering Program
Campus: West Lafayette

Date: November 19, 2010

Subject: Proposal for New Graduate Course-Documentation Required by the Graduate Council to Accompany Registrar's Form 40G

For Reviewer's comments only (Select One)

Reviewer:

Comments:

Contact for information if questions arise:
Name: Anne Dare
Phone Number: 6-1810
E-mail: adare@purdue.edu
Campus Address: CIVL 1259

Course Subject Abbreviation and Number: ~~GEP~~ ENGR 50000

Course Title: Global Design Team V

A. Justification for the Course:

- Provide a complete and detailed explanation of the need for the course (e. g., in the preparation of students, in providing new knowledge/training in one or more topics, in meeting degree requirements, etc.), how the course contributes to existing majors and/or concentrations, and how the course relates to other graduate courses offered by the department, other departments, or interdisciplinary programs.

- Justify the level of the proposed graduate course (500- or 600-level) including statements on, but not limited to: (1) the target audience, including the anticipated number of undergraduate and graduate students who will enroll in the course; and (2) the rigor of the course.

B. Learning Outcomes and Method of Evaluation or Assessment:

- Describe the course objectives and student learning outcomes that address the objectives (i.e., knowledge, communication, critical thinking, ethical research, etc.).

- Describe the methods of evaluation or assessment of student learning outcomes. (Include evidence for both direct and indirect methods.)

- Grading criteria (select from dropdown box); include a statement describing the criteria that will be used to assess students and how the final grade will be determined.

Criteria: Papers and Projects

- Identify the method(s) of instruction (select from dropdown box) and describe how the methods promote the likely success of the desired student learning outcomes.

Method of Instruction | Ind. Study

C. **Prerequisite(s):**

- List prerequisite courses by subject abbreviation, number, and title.
- List other prerequisites and/or experiences/background required. If no prerequisites are indicated, provide an explanation for their absence.

D. **Course Instructor(s):**

- Provide the name, rank, and department/program affiliation of the instructor(s).
- Is the instructor currently a member of the Graduate Faculty? X Yes ___ No
  (If the answer is no, indicate when it is expected that a request will be submitted.)

E. **Course Outline:**

- Provide an outline of topics to be covered and indicate the relative amount of time or emphasis devoted to each topic. If laboratory of field experiences are used to supplement a lecture course, explain the value of the experience(s) to enhance the quality of the course and student learning. For special topics courses, include a sample outline of a course that would be offered under the proposed course.

F. **Reading List (including course text):**

- A primary reading list or bibliography should be limited to material the students will be required to read in order to successfully complete the course. It should not be a compilation of general reference material.
- A secondary reading list or bibliography should include material students may use as background information.

G. **Library Resources**

- Describe the library resources that are currently available or the resources needed to support this proposed course.

H. **Example of a Course Syllabus** (While not a necessary component of this supporting document, an example of a course syllabus is available, for information, by clicking on the link below, which goes to the *Graduate School's Policies and Procedures Manual for Administering Graduate Student Programs*. See Appendix K.)

http://www.gradschool.purdue.edu/downloads/Graduate_School_Policies_and_Procedures_Manual.pdf

A. Justification for the Course:

This course is part of a continuum of courses sponsored by the Global Engineering Program, and represents graduate student involvement in Global Design Teams. 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. Travel for project implementation is an optional component of this course and is not covered under this EFD or Form 40G. Students must have **department approval for enrollment** and this course is **repeatable for credit**. Approval for registration is granted based on an application that takes into consideration previous design experience, level of interest in the topic, and GPA.

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.

Graduate students contribute a unique perspective to these projects in that typically, undergraduate students do not have an opportunity to learn from the diverse experiences and backgrounds of graduate students. Graduate students also provide leadership to the projects.

Having run the Global Design Team projects as pilots for the past two years, these courses have been listed by individual schools within the College of Engineering. It is now time to formalize this increasingly popular program into regular courses and move them into a centralized location under the GEP designator. Doing so will offer a better controlled enrollment and provide greater flexibility for students to obtain credit.

Enrollment:

Student interest and involvement in Global Design Teams is steadily growing both within and outside the College of Engineering as we seek out diverse opportunities and challenges for student teams to address. Current enrollment for Spring 2011 projects is at 63 students, 17 of which are graduate students. These students are distributed across seven teams.

B. Learning Outcomes and Method of Evaluation or Assessment:

General Global Design Team 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)

Methods of Evaluation or Assessment
Students will self-assess how well they believe they address these attributes at the beginning and the end of the course. The course instructor will also complete an assessment for each project

group for the purpose of comparison between the students' and instructor's perception of student learning.

Grading Criteria
The primary artifacts used to grade student performance in this course are papers and projects. The final deliverable for this course is a presentation and comprehensive document outlining the proposed design and/or recommendations from the group. The quality of the work submitted for this final presentation and document will determine the course grade, as well as student participation and engagement throughout the semester.

Instruction Method
Students will meet weekly with their project team and faculty advisor, as well as via video conference with their project partners on the ground in the project location. Outside of these meetings, students will be responsible for coordinating with team members or performing tasks independently. This weekly reporting keeps the project on track and allows students to exchange and critique ideas, but also allows ample independent work time. Communicating with international partners also provides an opportunity for the exchange and critique of ideas, but also tests and improves students' cross-cultural communication skills.

C. Prerequisite(s):
No specific prerequisites exist, however, approval for registration is granted based on an application that takes into consideration previous design experience, level of interest in the topic, and GPA.

D. Course Instructor(s):
Rabi H. Mohtar, Director, Global Engineering Program and Professor, Agricultural and Biological Engineering

E. Course Outline:
As this offering is similar to a special topics course, in that individual groups work on distinct projects that may require a different course outline to address the challenge, the outline provided below is only an example.

Week 1: Human-centered design; Designing with/for communities; Region/Community background
Week 2: Principles of water resource management; Delivery methods
Week 3: Water rights & tariffs
Week 4: Progress Presentations – project proposals, objectives, timeline, data needs
Week 5: Community educational needs; Health concerns; Impact assessments
Week 6: Generating design alternatives
Week 7: Progress Presentations
Week 8: Outline final document
...
Week 15: Final Presentations
Week 16: Compile final document

F. Reading List:
Varies depending on project topic.

G. Library Resources:
Varies depending on project topic. No additional resources needed.

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)