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Minnesota State University, Mankato
Strategic Priority Funding
Step 2: Invited Full Proposal

Sub-Meet Use Only
16
Proposal Tracking Number

Academic Affairs, Minnesota State University, Mankato Please do not use this form until invited to do so by the Planning Sub-Meet. \*\*\*

Proposal Name: Development of a Minor/Certificate in International Engineering and Technology

This proposal is being submitted for a project that supports (please indicate priority by checking the appropriate circle):

- Global Solutions (checked)
Applied Doctoral Institution
Extended Learning
Quality and Excellence
Campus of the Future

Total Funds Requested for Expenditure in FY14 (2013-2014 academic year) \$ 42,730

Primary Contact Name Patrick Tebbe Campus Mailing Address TE205

Primary Email Address patrick.tebbe@mnsu.edu Phone Number x6834

Please note:

- Upon notification of funding, the primary contact recipient will work with the Assessment and Evaluation Sub-Meet to prepare an assessment plan. Funds will only be released upon successful completion and approval of the assessment plan.
A Mid-Year Report will be due January 13, 2014, and an Annual Report will be due June 30, 2014.

Primary Contact Signature Patrick Tebbe Date 1/11/13

Co-Applicant Name(s) and Signature(s):

Bruce Jones Date 1/14/13
Rebecca Bates Date 14 Jan 13
Curtis Allen Date 1/14/13
Caryn E. Lindsay Date 1/14/13
Aaron Budge Date 1/14/13

I have reviewed the following proposal:

Department Director/Chair Signature\* (see above) Date

Department Director/Chair Signature\* Date

Dean Signature\* Approval by Sward Date 1/14/13

Dean Signature\* Date

Dean Signature\* Date

Division/Vice President Signature\* LB/ Date

Division/Vice President Signature\* Date 1/14/13

Date Submitted to Institutional Research, Planning, and Assessment: Jan 11, 13 RA (Deadline is January 11, 2013)

\*Signatures needed for all affected units, departments and colleges. Attached additional cover/signature sheets as needed.

# Strategic Priority Funding Proposal

## Full Proposal: Step 2

*(Please limit the proposal narrative and attachments to 10 pages)*

Proposal Name: Development of a Minor/Certificate in International Engineering and Technology

(Increase space between questions or add pages as needed)

### 1. Provide a clear description of the project being proposed. (5 points)

Funding is requested to bring together faculty, staff, administration, and international partners for the purpose of designing an undergraduate minor and matching graduate certificate in “International Engineering and Technology”. The minor/certificate will be available to engineering and engineering technology majors at Minnesota State Mankato and will provide a global experience that will complement their more traditional studies. The graduate certificate will also be available to international students seeking a short term visit opportunity hosted by Minnesota State Mankato. This project will build on current university global initiatives, international partnerships, and engineering and technology efforts already underway, such as Engineers Without Borders, to create a new curriculum option that does not currently exist within MSU or MNSCU.

The resulting curriculum options will blend the real world projects used in engineering education with greater cultural exposure. Through international partnerships there will be greater opportunities for students to experience other cultures and to engage in international education and work experiences. Global competence will also be developed through local activities and course modifications that integrate international graduate students attracted by the certificate.

### 2. Identify the university strategic priority advanced by this project and explain the direct connection between the strategic priority and project. (20 points)

This project directly addresses the Strategic Planning Priority #1 (Global Solutions). The project will promote a campus discussion on international engineering. International partners will also be engaged in the conversation, thereby addressing Goal 1.1. Engineering is by definition a problem-solving field with global impact. Through the resulting minor/certificate, engineering and engineering technology students will be provided an opportunity to view problems from a wider, global perspective (Goal 1.2). The project will promote and develop international partnerships that will allow more MSU students to pursue international experiences while also attracting more international students to MSU (Goal 1.3).

The project will also have an impact on Strategic Planning Priority #2 (Applied Doctoral Institution). The graduate certificate will support the graduate education of our students and bring new vibrancy to the engineering and engineering technology graduate programs. By marketing the certificate to international graduate students seeking a short term study abroad option there will be additional students in the graduate level engineering courses (Goal 2.2 and Goal 2.3).

Engineering and engineering technology programs operate under an outcome based assessment process (ABET). The curriculums are continuously adjusted to better address the needs of key stakeholders. National conversations on innovation in engineering education and state workforce needs both stress the importance of improving global competence education. Therefore, development of the international minor/certificate addresses Strategic Planning Priority #5 (Quality and Excellence) allowing us to better serve our students and employers (Goal 5.1).

**3. Describe how the project will have a significant impact on students and deliver a significant return on investment to the university. (15 points)**

Access to a program such as an international minor/certificate has been found to promote student's self-directed and life-long learning skills (American Society of Engineering Education, 2009). In addition, recent research indicates that "educational experiences such as international programs" are important to attracting and retaining a more diverse pool of students (Smith, Sheppard, Johnson & Johnson, 2005). Subsequently, this project has the potential to impact the recruitment, retention, and skill development of students at Minnesota State University, Mankato. A suggested innovation that would impact engineering education and students was to "(o)ffer a minor in international engineering." (American Society of Engineering Education, 2012)

Recently the Minnesota Department of Employment and Economic Development (DEED) partnered with MnSCU to conduct workforce assessments in several industrial areas. In the area of Engineering, the assessment determined that "(m)any engineering firms are experiencing growth in their work with international companies; this increases their need for employees with cultural and language skills". In addition, "(w)ith more firms doing international work, candidates with international experiences are an asset. This includes travel experiences, fluency in other languages and cultural sensitivity." (MnSCU, 2012).

The American Society of Engineering Education report "Creating a Culture for Scholarly and Systematic Innovation in Engineering Education" provides some specific suggestions on how a program designed to educate a "global engineer" might be structured.

*Offer a minor in international engineering. A minor might consist of 15 credits, with courses and a practicum abroad focusing on the language, culture, history, geography, society, or institutions of a particular country or region of the world. These programs can be developed from scratch within engineering or sometimes coupled to international programs in the humanities that exist at major universities. A student might take courses overseas, hold a summer internship in industry, conduct research overseas, engage in a service project, or any combination of these (e.g., Global Studies program at Worcester Polytechnic Institute, Humanitarian Engineering program at Colorado School of Mines). (ASEE, 2009)*

The specific composition of such a program at Minnesota State University will be determined by the project team.

International experiences are difficult to fit into a traditional engineering program because of credit expectations and sequential course offerings. The development of an undergraduate minor in the context of engineering experiences and with a focus on cultural learning will create a pathway for students to develop cultural and language skills desired by our regional employers. The engineering context will show our students that faculty and administration support the development of these skills and will provide credentials to students. This will encourage students who had been hoping for international experiences to take part in the proposed program.

Through the resulting minor/certificate, graduates will be produced with an expanded set of skills. These graduates will be better prepared to address the needs of regional industry and local communities, which increasingly involves global and international connections. Subsequently, students will be impacted through better employment opportunities. A program in international engineering will be a valuable public relations and marketing tool for the university. MSU will also gain greater international visibility through the relationships that will develop once the program is established.

## References

American Society of Engineering Education, "Creating a Culture for Scholarly and Systematic Innovation in Engineering Education", [http://www.asee.org/about-us/the-organization/advisory-committees/CCSSIE/CCSSIE\\_PhaseIReport\\_June2009.pdf](http://www.asee.org/about-us/the-organization/advisory-committees/CCSSIE/CCSSIE_PhaseIReport_June2009.pdf), 2009.

American Society of Engineering Education, "Innovation with Impact", <http://www.asee.org/about-us/the-organization/advisory-committees/Innovation-With-Impact/Innovation-With-Impact-Report.pdf>, 2012.

Minnesota State Colleges & Universities (MnSCU) and the Minnesota Department of Employment and Economic Development (DEED) "Meeting Minnesota's Workforce Needs Industry Summary: Engineering", <http://www.mnscu.edu/business/workforceassessment/doc/Engineering%20Workforce%20Summary-09%202012.pdf>, 2012.

Smith, K., Sheppard, S., Johnson, D., and Johnson, R., "Pedagogies of Engagement: Classroom-Based Practices", *Journal of Engineering Education*, [http://www.engr.wisc.edu/services/elc/Pedagogies\\_of\\_student\\_engagement\\_Smith.pdf](http://www.engr.wisc.edu/services/elc/Pedagogies_of_student_engagement_Smith.pdf), Jan. 2005.

#### **4. Identify the specific measurable outcomes that will be used to measure the impact of the project. (10 points)**

The first major outcomes and deliverables of this project will be curriculum proposals for an undergraduate minor and a graduate certificate, submitted through the CDS system by the Fall 2013 deadline. Specific tasks to achieve this will include, but are not limited to: a review of existing relevant courses and programs, a review of similar best practice programs and a visit by an expert from one of these, and development of a curriculum plan for the undergraduate and graduate level. The second major outcome will be establishing formal relationships with international partners both to receive students from MSU and to send students to MSU as part of the program. Lastly, establishing a marketing plan and a process to recruit students into the program will be established.

To summarize, the key outcomes for this development phase are:

- A curriculum proposal for an undergraduate minor in International Engineering and Technology submitted through CDS for approval.
- A curriculum proposal for a graduate certificate in International Engineering and Technology submitted through CDS for approval.
- Confirmation of at least two international partners who will "host" students from MSU as part of the program.
- Confirmation of at least one international partner who will send students to MSU as part of the program.
- A marketing plan with unique focuses on the region, the nation, and internationally.
- An application process for students to apply and be accepted into the programs.
- An administrative structure to manage the interdisciplinary offering.

For longer term consideration, the number of students applying to the program, combined with feedback from students and international partners, can be used for assessment purposes. This will likely be integrated with the existing and ongoing assessment procedures for accreditation which are used in all of the associated programs.

**5. Describe how the activities generated by this project will be sustained after strategic priority funding has ended, or if applicable, explain why the project does not need to be sustained. (5 points)**

The resulting minor and certificate are intended to be self-sustaining based on enrollments. It is believed the programs can be developed largely using existing courses. Once established, administrative expenses are expected to be minimal. Revenue generated through the programs is intended to be sufficient to pay for costs associated with offering the program.

**6. Provide a budget justification that explains why the funding being requested is required to support the project and outline the funding requested within the budget table below. (5 points)**

A Project Coordinator will oversee development of the minor and graduate certificate. The Coordinator will be the primary contact, facilitate interactions between the programs and international partners, arrange all meetings, and be responsible for the final documentation of each measurable outcome. Dr. Aaron Budge (former Chairperson for Mechanical & Civil Engineering) will serve as the Project Coordinator. He will be provided with 3 credits of release time in each semester. Funds are requested for an adjunct to cover these credits ( $2 \times 3 \times \$1200 = \$7200$  salary and  $0.0765 \times \$7200 = \$551$  fringe).

The Project Team will include representatives from each of the associated engineering or engineering technology departments (Mechanical & Civil Engineering, Electrical & Computer Engineering & Technology, Integrated Engineering, and Automotive and Manufacturing Engineering Technology). In addition, a member from outside engineering will be sought from a relevant program such as International Relations or International Business. Members will be expected to attend two initial half day project meetings in the summer and three shorter meetings during each semester. To coordinate the summer meetings the Project Coordinator will also receive two summer duty days. Funds are requested to compensate the members 1 additional duty day in the summer and 2 additional duty days during the academic year ( $2 \times \$500 + 5 \times 3 \times \$500 = \$8500$  salary and  $0.3 \times \$8000 = \$2550$  fringe).

To assist with the administrative tasks, communication with potential partners, and researching best practices a ½ time Graduate Assistant will be used. Funds are requested for the Graduate Assistant stipend and tuition waiver ( $\$4500$  and  $\frac{1}{2} \$5858 = \$2929$ ).

There are currently a few programs in the United States identified as best practice sites for international engineering (e.g. Global Studies at Worcester Polytechnic Institute and the Humanitarian Engineering program at Colorado School of Mines). It is expected that an appropriate contact (i.e. expert) from one of these sites will be invited to campus to explain how their program works and to offer insights to the Project Team and the larger campus. Funds are requested to cover travel expenses and other compensations for this visit ( $\$2000$ ).

Over the last several years, several potential international partners have visited MSU and have been visited by MSU engineering faculty. These exchanges have served to start general conversations on interactions between programs. To build on this, additional visits will be necessary to develop partnerships specifically for the international engineering minor/certificate. To support these visits additional travel funds are requested ( $\$15,000$ ).

Materials and supplies necessary for basic meetings and coordination (e.g. office supplies, copies, and other materials) is also requested ( $\$500$ ).

Budget table:

	FY14	FY14 Matching Funds
<b>Personnel</b>		
Unclassified Salary (adjunct and duty days)	14,700	
Classified Salary		
Fringe <sup>a</sup> (Classified and Unclassified)	3101	
Graduate Assistant Salary	4,500	
Graduate Assistant Tuition Reduction/Waiver <sup>b</sup>	2,929	
<b>Non-Salary</b>		
Student Help		
Purchased Services/Travel Expenses	17,000	
Supplies and Materials	500	
Building Improvement/Construction Costs		
Equipment		
Other (please specify)		
<b>Total Budget/Funding Requested</b>	<b>42,730</b>	

<sup>a</sup> Note: All current employees must be paid fringe benefits. Fringe should be estimated based on salary and position classification: Unclassified 30%, Classified 37%, Adjunct 7.65%.

<sup>b</sup> Estimated Tuition Reduction/Waiver for full-year enrollment: Masters \$5,858, Doctoral \$10,000.

**7. Identify any special considerations or needs required for this project (e.g. physical space, contractual obligations, IT support, or collaborations with/implications for other units). (5 points)**

The Project Team will need to work collaboratively with the Kearney International Center. No additional space or IT support will be required beyond what is already provided. Caryn Lindsay has already agreed to support the development of this project. As a 12-month employee, this project falls within the scope of her work.

**8. Provide a project timeline outlining key tasks and dates for completion. (5 points)**

Completion Date	Task
May 2013	Project Team finalized
June 2013	1 <sup>st</sup> summer project meeting Review best practices from other programs. Draft mission and objectives of the new minor/certificate.
July 2013	2 <sup>nd</sup> summer project meeting Identify expert to invite to campus. Finalize mission and objectives.
September 2013	Draft structure and curriculum for minor/certificate. Initial list of possible international partners completed.
October 2013	Visit by expert from best practices site.
December 2013	Submit minor and certificate proposals through CDS. Visit with at least one possible international partners completed.
March 2014	Visit to additional international partners completed.
June 2014	Application process and administrative structure approved and in place. Confirmed status with three international partners. Marketing plan completed.