LAKE SUPERIOR STATE UNIVERSITY

School of Engineering and Technology

Industrial-Based Senior Projects

BACKGROUND:

Thank you for your interest in sponsoring a senior project with the Lake Superior State University (LSSU) School of Engineering and Technology. We plan to select the senior projects for the 2014-2015 academic year by the mid part of August 2014. LSSU has conducted numerous senior projects for over two decades, mostly partnering with industry. These projects have resulted in excellent outcomes thereby providing an excellent experience for all the stake holders, namely, the industrial partners, the LSSU engineering and technology graduates, and the LSSU School of Engineering and Technology.

As you may know, all LSSU engineering and engineering technology students are required to work on a senior project during their final year. The project can be research based, co-op based or industrially based. Most of our projects are industrially based. That is where you come into the picture, and that is the subject of this document.

During the spring and summer, we recruit projects from industrial partners. Projects are submitted from a variety of companies within Michigan, the surrounding states, and Canada. Around second week of August, the Senior Projects Faculty Board (SPFB) reviews and then selects the projects for the following academic year and assigns students to the projects. The students begin work on the projects in early September and are scheduled to complete the projects in late March of the following year. The SPFB assigns a Faculty Advisor to each project. Together, the Faculty Advisor, the industrial partner, and the SPFB oversee the project for its entire duration. The SPFB works closely with the industrial partner to define the scope of the project early in the Fall semester. The SPFB also monitors project progress and may adjust the project scope during the academic year after discussions with the industrial partner.

The fee to sponsor an engineering senior project at LSSU is set at $4,000. This is in addition to actual material expenses necessary to complete project. Neither the students nor the faculty are paid for their engineering work. The customer owns all designs, prototypes, or systems that result from the project, but must agree not to hold LSSU or the students liable for repercussions of any design or build flaw. The customer must provide an engineer who will act as the Industrial Contact for the project. The Industrial Contact is requested to attend a kick-off meeting in late August (if needed), provide input through periodic informal telephone meetings, attend at least one formal design review, and to attend the final presentation in April/May of 2015. The design reviews may be conducted via videoconference or by using other networking tools.

LSSU senior projects have won many awards and national design competitions (8 since the year 2000) in addition to several paper presentations in professional conferences. We are proud of both the quality of our projects and the awards that the projects have received. Your support of an LSSU senior project is an excellent way to receive an engineered project at a low cost and to support the LSSU engineering and engineering technology programs.

If you have any questions about LSSU industrial-based senior projects, contact the SPFB chairman, Jim Devaprasad, at 906-635-2131 or at JDEVAPRASAD@LSSU.EDU. We look forward to receiving a project proposal from your organization.

Project Selection Criteria

There are numerous factors that are considered by the Senior Projects Faculty Board while selecting the senior projects for an academic year. Here are some of the main considerations:

1) Is there a good match between the senior students and the projects being considered? (For example: in a particular year there may be far more electrical engineering students than in the other fields, which means, more EE based projects will be selected).
2) Is there a good match between the resources at LSSU (faculty, staff, lab facilities, etc.) and the projects?
3) Does the scope of the project fit the LSSU academic time frame? That is, the project scope should be appropriate so that it can be completed over two semesters (30 weeks) with a student team which typically consists of 5 members who are expected to put in about 15 hours per week per team member towards the project.
4) Is the project clearly defined and with achievable outcomes?
5) Is there clear evidence of engineering and financial support that will be provided by the sponsoring organization?

Project Proposal

INSTRUCTIONS:

Thank you for your interest in sponsoring a senior project with the LSSU School of Engineering and Technology. We plan to select the projects for the 2014-2015 academic year by mid August 2014.

Fill in the attached form as best as you can. The areas under the headings are intended for you to insert your own words. The ***italicized text*** **is a hypothetical proposal** and is intended to give you an idea of what to write. Just delete the italicized examples and insert your own words.

We don't need to know all the details about your project at this point. We are mainly looking for a broad description of your project and your contact information. It should take you about an hour or less to fill out the form.

You can either send the form by postal mail or by electronic mail.

By postal mail
Jim Devaprasad
Lake Superior State University
Department of Engineering and Technology
650 West Easterday Ave.
Sault Sainte Marie, MI 49783

By electronic mail
JDEVAPRASAD@LSSU.EDU

If you need any assistance, contact the SPFB chairman, Jim Devaprasad, at 906-635-2131 or at JDEVAPRASAD@LSSU.EDU.

Thanks again for your interest!

LAKE SUPERIOR STATE UNIVERSITY

PROJECT SUBMITTAL FORM

Company Background

Briefly describe your company and your division.

Vivicom is a division of Vivitel International, Inc. Vivitel International has 8,500 employees at 13 sites throughout the United States. The company designs and manufactures specialized electronic components for electrical equipment manufacturers in the United States and Europe. Vivicom has 1,250 employees and is located in Ann Arbor, Michigan. Vivicom designs and manufactures ultra fast electronic switches to telecom companies and satellite manufacturers.

Project Description

Briefly describe the nature of the project. What is your need? What is the expected outcome?

We have a $22.6M contract to design a digital router that may be packaged into a subsystem for a satellite. The router must run at 30 GBytes per second and must run off of 12 V and consume less than 25 mW of power. The router is currently being designed and we plan to manufacture prototypes by July 2013.

We want LSSU to design and build a test stand to verify the operation of prototypes of this router unit. The test stand should allow our engineers to insert router prototypes and test their operation. The test stand should simultaneously send 300 10MHz test signals to the router and then check the output signal to see if any error has occurred.

The expected outcome will be a fully functional test stand that our engineers can use to test router prototypes and documentation that would allow us to construct additional test stands.

Budget

Give a ball park estimate of the cost of materials and supplies for this project. Do not include your engineering cost or the $4,000 project fee.

I have forecast that this project will cost approximately $50K. The cost for building materials of the physical test stand structure will be about $10K. The cost for the high-speed electronics in the test stand will be about $40K.

Technical Content and Required Expertise

Specify the type of engineering work that will be needed to complete this project. Also estimate the number and discipline of the engineering students that you estimate will be needed.

This project will entail the following technical tasks:

- *20% identification and purchase of high-tech communication modules*
- *35% hardware design to mount and interface the communication modules*
- *35% assembly level programming*
- *10% design of prototype package*

The project will likely need the following student workers

- *3-4 electrical engineers (ability to design digital circuits, ability to design analog communications and understand the mathematics of modulation)*
- *1-2 computer engineers (ability to program in assembly and thorough understanding of communication mathematics)*
- *1 manufacturing technologist (ability to design small-scale, lightweight packaging of electronics)*

Industrial Support

List the types of support, other than money and the time of the industrial contact, that your company will provide for the project. Also list the types of support that your company will not provide for the project.

The industrial contact will provide expertise in the area of high-speed electronic communication theory and high-speed electronic communication software algorithms. Several engineers within the company will provide expertise regarding high-speed electronic hardware. The company will also provide a C programming developmental environment and an extensive C communications library.

We cannot provide any mechanical expertise in designing or building the physical structure of the test stand. The physical construction of the test stand must be done at LSSU.

Contact Information

Provide your information and the information of the likely industrial contact for the project. If you will be the industrial contact for the project or if this person has yet to be identified, just leave the latter part blank. The longer the Industrial Contact has been at your company, the more likely your project will be successful and be selected.

Person Submitting Proposal
Name .....*Rufus Leaking*
Title.....Senior Design Engineer
Company.....Vivicom, Inc.
Phone.....734-123-4567
Email.....rleaking@vivicom.com
Tenure .....17 years

Likely Industrial Contact
Name ..... *Sharon Sharalike*
Title ..... Design Engineer
Company..... Vivicom, Inc.
Phone..... 734-123-4568
Email..... ssharalike@vivicom.com
Tenure..... 8 years