

A meeting of Iowa industry personnel in the information technology field was held December 16, 2008, at the ISEAGE facility in the Iowa State University Research Park. The purpose of the meeting was to discuss a new Engineering Technology degree under development in the Department of Electrical and Computer Engineering at Iowa State University and to gather input from these industry leaders. . Seven companies were represented. In attendance were

Pioneer Hi-Bred, Marv Hardisty  
SHAZAM Network, David Collison and Jackie Rolow  
Principal Financial, Randy Nyberg  
Nationwide Insurance, Dan Greteman  
ITA Group, Ideas to Action, John R. Rose  
FBL Financial Group, Inc., Donna J. Emerson  
Iowa Department of Economic Development, Kim Bentley  
Iowa State University, Admissions Office, Laura Doering  
Iowa State University, Admissions Office, Marc Harding

After introductions of all in attendance, Doug Jacobson, University Professor in the Department of Electrical and Computer Engineering, presented a draft version of the Engineering Tech degree as envisioned by the staff at ISU. The significance of ABET accreditation and the process to achieve accreditation was also discussed. The proposed degree would be an ABET accredited Engineering Technology program which could have the name of Computer Engineering Technology, Electrical/Electronics Engineering Technology or Information Engineering Technology. The target market is students who are not destined for the Electrical and Computer Engineering program at ISU and for those who transfer with a degree from a community college in information technology. The Engineering Technology degree is a direct response to the desire presented by Iowa community college presidents and top academic officers at the ISU Community College Summit to find a path for these two year degrees to transfer. So, with that in mind, the program will work to matriculate these degrees. Additionally, to facilitate the transfer student there will be online learning pieces tailored to the specific community college to help students who have not have had certain types of training at their college be equipped for the coursework they will be presented with in this degree track.

Laura Doering of the ISU Admissions Office noted that 41% of all incoming freshman at ISU come with some college credit and that more and more students are starting at community colleges. In Iowa there is a movement to have a 2+2+2 program where students can start taking classes toward a degree in high school, continue with two years at the community college and complete at a four year institution with only two more years. The Engineering Tech degree fits well with these demographics and the current educational environment.

The meeting was also the beginning of a gap analysis to see what the industry needs and/or what is missing in the current graduates placed in their companies. Additionally, attendees were asked to forecast what type of skills an employee would be need to have in 15 years. The goal of the exercise was to determine if and how a new proposed degree could be mutually beneficial to students seeking a four-year degree and employers wishing to hire them.

After the presentation and the initial work on the gap analysis, a group brainstorming session followed which helped to sharpen the focus on the needed skill sets, as well as provide an rough outline of outcomes needed from courses in the new program.

The skills needed were categorized into three areas in which current graduates need to improve and are voids in the existing employee pool:

## **Personal Skills**

Soft skills  
Customer service  
Leadership  
Ethics  
Collaboration  
Team work  
Team building  
Importance of privacy and personal data  
Preparing to work in a business where technology is not central to the business, but a supporting system  
Technical writing  
Presentations  
Professional emails  
Interview skills  
Life-long learning  
Ability to adapt, especially for/with change

## **Technical Skills**

Infrastructure and networking  
Process design  
Supporting legacy systems/using the cool new tools to interface with legacy systems  
Interfacing old and new systems  
Implementation/integration of packaged software  
Service oriented architecture  
Data mining and information handling  
Data segmentation  
Data structures and normalization  
Table driven design

## **Conceptual Skills**

Organizational change management  
Problem solving  
Business processes and business process reengineering  
Systems Development Life Cycle/Methodology  
Business continuity (how to build systems with business continuity in mind)  
Disaster recovery  
Fault tolerance  
Total cost of ownership

Additionally, when the skill sets were being discussed, there was a need expressed for a way to give students the experience of a real world project. One option thrown out on the table was a capstone course which would allow students to have a real project and take it through the entire process of conceptualization to implementation. There were also additional ideas for courses bantered around the room. They are enumerated below. The attendees were also strong advocates of an internship program where students could gain some hands-on, real world experience which would help them understand business better upon graduation. They wanted classroom projects with ties to industry to give the real world experience again and they also wanted guest lectures from the industry to help with that reality check.

## **Course topics and goals**

Capstone

- Business process

- Integration to legacy systems
- Build business case
- Support TCO (total cost of ownership)
- Customer Service
- Mock interviews, (present-quality of applicants is very low)
- Well rounded degree, to include a degree for a noncore technology business with a technology component

Internships and partnering with industries

- Opportunity to continue their education
- Work field exposure and experience throughout the course of the degree

Curriculum partnership with industries

- Industrial guest lectures, mentoring

Design through the curriculum

Blend of MIS, CprE, and ComS knowledge

There also was expressed a need for specializations; potentially the Tech Degree could be developed with tracks within it. The attendees seemed to express interest in students in three areas of expertise which are listed below.

### **Tracks**

Infrastructure

Business/application

Integration

The following issues were noted as important to make sure the degree succeeds in offering industry well-prepared students.

### **Issues to develop the degree successfully**

Recruitment of High School students

IT Jobs for non IT companies

Define marketing target

Strong industry ties –“real world” examples

Guest Lectures

Transfer learning communities

Real World Labs

Future expectations

- Bridge application technical and business analysis, 15 years
- Business process will be huge in next 10 years
- Large government agencies huge retirement issue and replacement
- Split careers in technical and management

### **Next Steps/ Action Items**

In January, a short and precise survey will be emailed to to small and large companies in the state of Iowa. The list that will be used for this email survey has yet to be determined. The survey itself will focus on the following two types of questions:

- **The job types they currently employ**
  - Infrastructure
  - Application
  - Management
  - Staffing mix, on/off shore opportunities
  - Retirement replacements

- Percent of Legacy, current, 5 years, 10 years, and beyond
- Per cent of new technologies
- Is security an issue
- **Demographics of their companies**
  - Who do they seek to employ
  - Will there be a net gain of IT workers in their company in the next X years
  - Core business size
    - IT employment opportunities
  - Business type
    - Technology
    - Software
  - Budget for IT support within the company
  - IT, cost verses value to the company
  - Rank skills for employment
    - Ask respondents to rank a list of priority skills from highest value to lowest value to their company.
  - To whom does the CIO report?

The attendees want a chart of the existing majors and how they overlap or what classes they take. They had a hard time understanding the difference between software engineering, computer science and computer engineering.

In addition to the email survey, industries in Iowa will need to provide support for the Engineering Tech Degree. Some of the ways industries can support the program will be

- Development of labs
- Adjunct staffing of courses
- Monetary support for the program
- Reaching out to high schools students or being ambassadors program for IT
- Service to current high school instructors to further their IT knowledge
- Letters of support for the creation of the new degree

Communication about the Engineering Tech degree will be ongoing through the use of email and website link. All attendees of this event, as well as other companies in Iowa, will be kept up-to-date on the progress of the degree, results of the survey taken will be posted. Additionally, after the degree is approved by the Board of Regents in approximately two years, an advisory board will be formed as required by the ABET accreditation.

After discussion of the degree, Doug mentioned how the Community College Cyber Defense Competition (CCCDC) and the IT-Adventures go along with the new Engineering Technology degree. He also suggested that community colleges and industry may like to mentor high school teams in the IT-Adventures program because it provides direct contact with prospective employees. Southwestern Community College has seen the rewards from being a mentor. SWCC instructor, Loyal Winborn, has documentation of increase of enrollment from his personal involvement with working with the students in high school and attracting them into his program at Southwestern. Doug also mentioned that the IT-Adventures program would be ramping up to sponsor regional competitions in the near future and that the program would be looking for community colleges that might be willing to partner with it to run the regional event.

The Engineering Technology presentation, as well as information about the ABET accreditation, is available at [www.it-adventures.org/tech-degree](http://www.it-adventures.org/tech-degree). Information about the IT-Adventures program may be found at [www.it-adventures.org](http://www.it-adventures.org).

We would especially like to thank Kim Bentley for her attendance at the event, as well as the Iowa Department of Economic Development who financially supported today's meeting and continued enthusiasm for activities that support the future of Iowa secondary and post-secondary students.