CORPORATE-SPONSORED INTERDISCIPLINARY SENIOR DESIGN

Kat Wakabayashi, Maurice F. Aburdene, Steven B. Shooter, Peter M. Jansson, Brian R. King, Charles J. Kim, Joseph V. Tranquillo, Erin Eberle, Shane W. Cohen, College of Engineering, Bucknell University, Lewisburg PA 17837, U.S.A.

Bucknell Engineering

- Private liberal arts college in Central Pennsylvania (Proximity to New York, Washington DC, Philadelphia, and Pittsburgh)
- A predominantly undergraduate institution with 3,600 undergraduate and 50 graduate students
- Expansion to three Colleges: Arts and Sciences, Management, and Engineering
- Top Rankings in U.S. News and World Report Best Colleges (for non-Ph.D. granting institutions)
- Eight engineering disciplines (Six participating: Biomedical (BMEG), Chemical (CHEG), Computer Eng. (CPEG), Computer Sci. (CSCI), Electrical (ELEC), Mechanical (MECH))

The Course (ENGR 452-453)

- Initial development / implementation supported by the Kern Family Foundation, 2015
  - Kern Entrepreneurial Engineering Network (KEEN)
- Two-semester, capstone course
- Taught and advised by professors in multiple engineering departments
  - Two co-instructors of class and co-advisers to the teams (CHEG, ELEC, MECH)
  - Five additional faculty members in the review panel (BMEG, CHEG, CPEG, CSCI, MECH)
- Resource-committed
  - Corporate funding, specially-designated laboratory, out-of-class hours, technical personnel

Educational Principles and Outcomes

- Students solve a real-world company challenge in an interdisciplinary context
- Students bring disciplinary knowledge, skills, and competencies
- Students design engineering products or solutions in teams

Client and Student Feedback

Steven Mackey, Senior Manager, Product Design and Engineering, Keurig Green Mountain, Inc.

“I’ve been delighted to see the quality of Senior Design students that Bucknell has created. I’ve always been a strong believer in IDSD programs. It really helps the students get ready for the ‘real world’ and in my opinion, puts the students above their peers that have not had this experience.”

Ezra Yarnell, Senior Engineering Manager, Corning Inc.

“To maximize your impact as an engineer in industry one must realize the power of surrounding yourself with those who think differently and have knowledge in other disciplines. This experience is the very core of what the IDSD program offers Bucknell engineering students.”

Erin Körp, Chemical Engineering, ’17

“IDSD challenged me to learn new skills and work on unfamiliar tasks. These unique opportunities allowed me to showcase my versatility and adaptability in a real-world setting—It helped me get a New Product Engineering and Development position at Avon.”

Sam Roy, Electrical and Computer Engineering, ’16

“Currently, as an Analyst at Ernst & Young, I work with clients, teams and project leaders around the world with different expertise and technical backgrounds. Reflecting on the IDSD class, I can confirm that my experience from the project with my client has immensely helped me in my current role.”

For Further Information:
Shane Cohen, Industrial Liaison
Phone: 570-577-3707
Email: scohen@bucknell.edu

Interdisciplinary Senior Design Panorama

Students Apply to Participate

Selected students profile
- Entrepreneurial approach
- Work/design experience
- Communication skills
- Critical thinking skills
- Teamwork

Solution for clinical inertia of Type II Diabetes patients (Medtronic)

Continuous Improvement

- Expanding course & majors
  - 2017 had participation from Management
  - Diverse group of corporate sponsors
- Funding to cover materials & supplies, travel, and program administration
- Exposure on campus for recruitment
- Access to student and faculty intellectual capital
- Access to Bucknell facilities and resources

Mentoring Relationship

- Weekly conference calls/emails
- Arrangement of visits in both directions
- Liaison between Bucknell and company
- Logistics, legal, financial matters
- Educational impact for future engineers

Educational Impact of IDSD

- Exposure on campus for recruitment
- Development position at Avon.
- Funding to cover materials & supplies, travel, and program administration
- Exposure on campus for recruitment
- Access to student and faculty intellectual capital
- Access to Bucknell facilities and resources

Corporate Sponsor

Key Deliverables

- Quarterly design panel reviews
- Semi-annual technical reports
- Progress reports and presentations
- Campus-wide Design Exposition

Sponsor Day at Bucknell

- Working sessions with project team
- Class lecture in an interdisciplinary context
- Company info session and marketing
- Career Center and Corporate Relations connection

Visit to Sponsor Site

- Project kick-off
- Manufacturing floor visit
- Corporate culture

Major Sponsoring Partners

Avery Dennison
CORNING
Geisinger
Keurig Green Mountain
Medtronic
Primus Technologies
PG&E

Client

Professional Development
Communication
Confidentiality & IP
Disciplinary Approach

Teamwork

Educational Principles and Outcomes

- Problem Definition
- Background Research
- Concept Generation
- Decision Making
- Prototyping
- Reflection
- Validation

Educational Impact for Future Engineers

- Foundational learning skills
- Critical thinking skills
- Communication skills
- Entrepreneurial approach
- Teamwork

Visit to Sponsor Site

- Project kick-off
- Manufacturing floor visit
- Corporate culture

For Further Information:
Shane Cohen, Industrial Liaison
Phone: 570-577-3707
Email: scohen@bucknell.edu