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8-2008

Strategic Plan For Industrial and Management Systems Engineering

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Savory, Paul, "Strategic Plan For Industrial and Management Systems Engineering" (2008). *Industrial and Management Systems Engineering -- Reports*. 2.

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STRATEGIC PLAN

INDUSTRIAL and MANAGEMENT SYSTEMS ENGINEERING

ROLE OF THIS PLAN

The role of this strategic plan is to map out a range of department goals, offer objectives for achieving each goal, and list potential strategies for meeting an objective. It also lists performance metrics for measuring progress for each goal. Each year, a subset of goals and objectives will be identified by the IMSE department as a priority for the coming year. Detailed metrics for measuring improvement for the department's priorities areas will then be defined.

DEPARTMENT MISSION

The mission of the department is to advance the frontiers of industrial engineering, to educate qualified individuals in the discipline, and to disseminate knowledge both within and beyond the university for applying industrial engineering concepts and principles to technical and societal challenges.

DEPARTMENT VISION

Our vision is to become a department recognized by the College, University, state, other Industrial Engineering programs, regional industry, and federal agencies for its oncampus and distance educational opportunities, research capabilities, outreach programs, and renowned for the high quality of our graduates.

GOAL 1 **Develop Strong and Focused Research**

Objective 1.1 **Expand into new areas of research**

Potential Strategy:

- Support faculty pursuing research opportunities in emerging areas such as:
 - healthcare management
 - engineering education
 - the practice of engineering

Objective 1.2 **Increase research funding**

Potential Strategies:

- Submit more external proposals
- Submit larger research proposals – multiple university, multiple campus, multiple researchers
- Generate comparable annual research expenditures for faculty members

Objective 1.3 **Become Successful in Acquiring Strategic Grants**

Potential Strategies:

- Develop relationships and pursue federal and state earmark opportunities (e.g., FRA, Air Force, Nebraska Department of Roads)
- Submit proposals for NU-system money (Layman, NRI, POE)

Objective 1.4	Raise the External Visibility of the Department
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Potential Strategies:

- Disseminate research (e.g., publish journal articles, present at conferences, write books)
- Organize and host international, national, and regional workshops/conferences
- Provide travel assistance to faculty to attend national and international meetings
- Participate on national review panels (e.g., NSF, DoD, NIH)

Performance Metrics for Goal 1

- ✓ Number of publications
- ✓ Amount of competitive research funding sought and obtained
- ✓ Quality and frequency of invited talks for faculty
- ✓ Leadership in national and international organizations, conferences, and societies
- ✓ Number of research-funded graduate assistants and post-docs in each core and growth areas
- ✓ High citation/reference to faculty research by external audiences

GOAL 2	Increase the size of the undergraduate program
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Objective 2.1	Improve the quality of IMSE students
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Potential Strategies:

- Increase scholarship funds for top students.
- Implement program changes to accommodate increase in honors students, including development of department/college honors-only courses.

Objective 2.2	Improve retention and graduation rates
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Potential Strategies:

- Offer an orientation session for students – possibly one focused for freshman, sophomores, juniors, and seniors
- Identify a faculty member (associate chair?) as the point person or facilitator for students to ask questions
- Create a department committee responsible for undergraduate recruitment - committee develops a recruiting plan with time table and proposed budget
- Participate in Engineers Week and New Student Enrollment programs
- Support the efforts of IIE and Alpha Pi Mu for sponsoring student activities

Objective 2.3	Increase student recognition
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Potential Strategy:

- Create a Department Student Recognition Committee to promote the nomination of students for recognition. Develop a list, due date, requirements and time table for all Professional Society, University, College and Department awards that students would be potential candidates for. Encourage and assist students to apply for these awards.

Objective 2.4	Increase the size of the undergraduate program
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Potential Strategies:

- Offer smaller scholarships (e.g., book scholarships)
- Offer engineering fee scholarships
- Target Chinese students looking to come to UNL through our university's partnership program: Xi'an Jiaotong University City College (XJTUCC) and Zhejiang University City College (ZUCC)

- Explore developing formal transfer programs (2 year/3 year) with international schools
- Define and formalize relationships for a 1-semester or 1-year study-abroad opportunity for international students to attend our program
- Continue to support a transfer program with area community colleges or schools (e.g., Nebraska Wesleyan, Doane)
- Continue and strengthen the Industrial Engineering Research Fair to attract more engineering students to the department

Objective 2.5	Increase the diversity of the student body
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Potential Strategies:

- Develop an outreach culture to recruit diverse students (e.g., women, Hispanics, other under-represented minorities).
- Explore options for recruiting non-traditional and out-of-state students (e.g., scholarships, promotional material, recruiting trips to other schools looking for transfer students)

Performance Metrics for Goal 2

- ✓ Average ACT score of entering freshman students
- ✓ Average GPA of graduating students
- ✓ Number of department scholarships offered and amounts
- ✓ Number of incoming freshman students
- ✓ Number of students in the undergraduate program
- ✓ Retention rate for the undergraduate program
- ✓ Track the diversity of the student body in relation to that of other programs in the college and peer institutions
- ✓ Track graduation and retention rates
- ✓ Number of awards won by students

GOAL 3	Increase the Size of the Graduate Program
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Objective 3.1	Develop Additional Degree Options/Programs in Select Areas of Research
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Potential Strategies:

- Update the MS of Industrial Engineering degree option
- Evaluate the need for the MS of Manufacturing Systems – if still needed, update and modernize the curricula options and examination requirements
- Explore developing more department-based certificate programs
- Explore developing a department minor in general IE or in a specific subtopic (ergonomics, logistics, quality)
- Continue to develop and expand the Master of Engineering program – expand beyond just the Engineering Management emphasis
- Update the admission criteria and rules for the PhD degree

Objective 3.2	Increase the Number of Graduate Assistantships
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Potential Strategies:

- Leverage existing college funding programs for international students
- Maximize available university and college-based scholarships/fellowships
- Request additional state-funded graduate assistants
- Increase the number of research assistants supported by grants
- Ask industry partners to fund graduate fellowships

Objective 3.3	Encourage students in MS program to continue for the PhD
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Potential Strategy:

- Offer priority funding for PhD and planned PhD students

Objective 3.4	Develop an undergraduate student culture that results in a pipeline of our top students into the MSIE program
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Potential Strategies:

- Develop a 150 hours BSMS program (5 year program)
- Sponsor activities to impart value of a graduate education

Objective 3.5	Increase the Number of Well Qualified Graduate Students
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Potential Strategies:

- Have a department “Graduate Information Day” (Saturday?) which is widely advertised and helps students understand their options and programs
- Aggressively recruit well qualified students by speeding up the admission process for top applicants and offering assistantships as early as possible
- Have the graduate committee develop/implement a recruiting plan (time table, needed budget)
- Continue to foster graduate student “pipelines” with other Nebraska colleges (Doane, Nebraska Wesleyan)

Objective 3.6	Improve the Graduate Experience in our Program
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Potential Strategies:

- Have a department graduate student orientation meeting each semester
- Identify a graduate facilitator who is the main point-of-contact person for questions regarding the graduate program (potentially this is also the graduate chair)
- Develop a graduate student seminar-series in which all doctoral students and some selected MS students present their research and receive peer-feedback from other graduate students at least one or two times per year. Also, recognize the top presenter by the peer review result. Combine or use these presentations (plus posters) as the program for an the Industrial Engineering Research Fair.

Performance Metrics for Goal 3

- ✓ Number of graduate applicants
- ✓ Number of graduate students in program
- ✓ Amount of money available for graduate student support
- ✓ Number of graduate assistant supported
- ✓ Number of Ph.D. graduates
- ✓ GRE scores of admitted doctoral students
- ✓ Percentage of UNL students continuing on to graduate school.
- ✓ Attendance at Graduate Information Day event
- ✓ Number of students in five-year 150-hour program.
- ✓ Number of graduate enrollments from regional 4-year colleges.
- ✓ Number of students completing certificate/specialization programs

GOAL 4 Improve Existing and Create New Educational Programs

Objective 4.1 External Evaluations and Assessments

Potential Strategies:

- Maintain our ABET accreditation
- Develop materials for UNL Academic Program Review

Objective 4.2 Broaden and modernize the undergraduate program to ensure future competitiveness

Potential Strategies:

- Develop one or more new undergraduate “specialty areas” or course tracks. For example, healthcare, logistics
- Compare course in our curriculum to see if they are preparing undergraduate students to be successful in their jobs
- Annually review curriculum each spring and make changes to accommodate needs/concerns

Objective 4.3 Integrate Teaching with Research

Potential Strategies:

- Encourage faculty to direct more UCare students
- Fund undergraduate students on research grants
- Explore external grants linking research with curriculum topics

Objective 4.4 Formalize Internships and Co-Coop with Local Industry

Potential Strategies:

- Solicit companies for opportunities
- Move from ad-hoc placements to systematic placements that are coordinated by the department
- Formalize agreements with companies, the placement process, and money to department serving as facilitator
- Develop a means of sharing current opportunities with students

Objective 4.5 Continue Alternative Course Delivery Systems

Potential Strategies:

- Continue to develop internet-based courses at the graduate level – focus on those needed for graduate degrees or department-based certifications
- Explore converting more undergraduate course for a distance-based delivery
- Consider converting our entire undergraduate curriculum to an online format

Objective 4.6 Maintain quality computing infrastructure for students

Potential Strategies:

- Ensure that students have access to specialty software so they can install on their own resources.
- Maintain our department computer laboratory
- Maintain a departmental student email database (maintain it?, access?)

Performance Metrics for Goal 4

- ✓ Number of annual curriculum changes
- ✓ Number of undergraduate students working on research project
- ✓ Number of companies sponsoring internship opportunities
- ✓ Number of students pursuing internships/co-coops at local companies
- ✓ Number of students pursuing internships/co-coops that lead to full-time positions
- ✓ Number of students taught via alternative methods
- ✓ Results from periodic survey of alumni

GOAL 5 Strengthen Department Infrastructure and Community

Objective 5.1 Hire a New Department Chair

Potential Strategies:

- Advertise nationally
- Selectively invite faculty to apply

Objective 5.2 Define Faculty Roles in Department Governance

Potential Strategies:

- Create a department undergraduate recruitment and retention committee
- Identify a department facilitator or point person for undergraduates (associate chair?) Clarify role of graduate committee, graduate chair, and chair/associate chair in regards to graduate items.
- Potentially have the graduate committee only focus on MS students (admissions, recruitment) and identify a department facilitator or point person for graduate students (graduate chair)
- Define a department committee to focus on PhD students (admissions, recruitment)
- Define a department point-person for alumni relations
- Create a committee responsible for student and faculty awards and recognition

Objective 5.3 Increase Department Staff Support

Potential Strategies:

- Seek full financial funding for department secretary
- Delineate roles of department staff (who is responsible for what, assistance with grants, undergraduate recruitment, graduate recruitment)

Objective 5.4 Develop Infrastructure Grants

Potential Strategy:

- Submit funding proposals to maintain and develop research and teaching equipment and facilities infrastructure (Nontraditional Manufacturing Research Center, Ergonomics Center, Packaging Laboratory and RFID and Supply Chain Logistics Laboratory)

Objective 5.5 Optimize work force and resource utilization

Potential Strategies:

- Reallocate teaching and service loads for new and for research productive faculty
- Optimize utilization of existing space resources
- Support professional development opportunities for all employees

Objective 5.6 Improve the culture for faculty

Potential Strategy:

- Establish a “Distinguished Visitors Program” to sponsor seminars and longer term visits by distinguished academic researchers
- Create a Department Faculty Recognition Committee to promote the nomination of faculty members for recognition. Develop a list, due date, requirements and time table for all University, College and Department awards that members would be potential candidates for. Encourage and assist faculty and students to apply for these awards.
- Encourage the IIE student organization to bestow a recognition (certificate?) on one department faculty member that had the largest impact on their success
- Encourage faculty to continue to develop as teachers, mentors, and researchers by participating in professional development activities

Performance Metrics for Goal 5

- ✓ Hiring of a new department chair
- ✓ Level of funding support for department staff positions
- ✓ Number of infrastructure grants submitted and funded
- ✓ Average teaching load per faculty member
- ✓ Faculty productivity
- ✓ Number of rewards/recognitions received by the faculty
- ✓ Number of distinguished visitors

GOAL 6 Build community and industry connections

Objective 6.1 Encourage Faculty Entrepreneurship

Potential Strategy:

- Develop an Engineering Entrepreneurships class linked to outside partnerships (e.g., CBA Entrepreneurial Center)
- Encourage faculty to explore opportunities and partnerships pursuing SBIR and STTR grants from the NSF, DoD (AFOSR, BMDO, DARPA, ONR, SOCOM), and NIST

Objective 6.2 Foster outreach culture

Potential Strategies:

- Participate in tours and programs for area K-12 students and others (e.g., Bright Lights program)
- Encourage courses to have a service-learning component to them

Objective 6.3 Expand Industry Interaction

Potential Strategies:

- Develop a strong working relationship with IMSE industrial advisory board for providing input on teaching, curriculum, recruiting, and research
- Increase student design project involvement with local industry.
- Increased numbers of (faculty and student) projects supported by industry
- Encourage faculty to provide consulting and continuing education activities

Performance Metrics for Goal 6

- ✓ Number of patent and provisional patent applications
- ✓ Number of SBIR/STTR proposals submitted and funded
- ✓ Number of engineering design projects involved with industry.
- ✓ Number of student supported on industry-funded projects
- ✓ Number of industry-funded projects supporting faculty
- ✓ Number of internships, co-ops obtained by current students
- ✓ Placement of graduates to local companies

GOAL 7 | **Improve Physical Facilities**

Objective 7.1 | **Improved Office space**

Potential Strategies:

- Obtain new office space for department functions (administration, office, meeting) – stay first on list for space occupied by Transportation Center
- Obtain office space for new faculty
- Obtain storage space for office equipment
- Obtain office space for visiting post-docs and visiting faculty

Objective 7.2 | **Provide up-to-date equipment**

Potential Strategies:

- Ensure faculty have up-to-date computers
- Ensure teaching labs have needed equipment

Objective 7.3 | **Provide Space for Research Laboratories**

Potential Strategies:

- Provide excellent research space for faculty, their students, and funded research projects
- Seek additional research space for new research programs and areas
- Consolidate all department office and research space into one location

Objective 7.4 | **Provide Space for Teaching Laboratories**

Potential Strategy:

- Develop several hand-on teaching laboratories that do not interfere with on-going research projects

Objective 7.5 | **Keep the Existing Space Allocated to the Department**

Potential Strategy:

- Maintain all space currently allocated to the department

Performance Metrics for Goal 7

- ✓ Amount of overall department space (square footage)
- ✓ Amount of space for research labs in each core and growth area.
- ✓ Amount of space for teaching laboratories.
- ✓ Amount of space for post-docs and graduate students.

GOAL 8	Raise the External Visibility of the Department
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Objective 8.1	Develop and nurture alumni relationships
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Potential Strategies:

- Maintain a contact list (e-mail, physical address and phone) of alumni – more frequently contact alumni (e.g., each semester) with an update of the department
- Explore having reunion events (e.g., tailgate party at a football game) to foster an alumni atmosphere and attitude

Objective 8.2	Build departmental visibility and recognition in the region
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Potential Strategies:

- Design and implement strategic marketing/advertising/promotion campaign that highlight the Department, its people, and our accomplishments.
- Continually update department website and promotional materials
- Develop a list of accomplishment for faculty (e.g., rank of fellow in professional societies, invited lectures, countries visited, editorships, books published)

Performance Metrics for Goal 8

- Donations by alumni
- External contact by alumni
- Frequency of external references to the department