

# **BSE Chemical Engineering / MSE in Industrial and Operations Engineering SGUS Program**

## **Introduction and Summary**

Description: The Department of Industrial and Operations Engineering (IOE) has established a five-year Sequential Graduate/Undergraduate Study (SGUS) program that allows outstanding students in the College of Engineering (COE) to receive their BSE degree from a participating COE department followed by the MSE degree in IOE after completing a minimum of 152 credit hours. This is accomplished by allowing students to “double-count” six credit hours of prior approved graduate-level courses in order to satisfy all requirements for both the BSE and MSE degrees. Double-counted courses appear as transfer credit on the student’s Rackham transcript.

Eligibility: Students who have reached the second term of their junior year with a minimum cumulative GPA of 3.5 may apply for provisional admission to the program. This allows sufficient time for the student to be advised appropriately regarding undergraduate and graduate course selections. Students who do not meet the GPA requirement may petition the IOE Graduate Admissions and Financial Aid Committee for provisional admission by providing other credentials such as letters of recommendation from faculty and/or other evidence of special accomplishments. Finally, the student must include a nomination letter from his/her Undergraduate Program Advisor as part of the SGUS application.

Tuition Requirements: SGUS students must enroll in Rackham for two at least two full terms, paying Rackham tuition. Normally, this will be the final two terms of enrollment in the five-year program.

## **Background**

College of Engineering undergraduate programs require students to complete 128 credit hours consisting of core engineering courses, departmental core courses, and a combination of technical and unrestricted electives. While these programs provide students with an excellent, focused technical education in their chosen engineering discipline, the 128 credit hours provide only a limited opportunity for students to pursue topics in systems design and integration that are covered in IOE courses at the 400-600 level. By pursuing a coordinated graduate/undergraduate study program, students are offered the opportunity to take graduate IOE courses and obtain the IOE Masters degree as part of an uninterrupted, five-year program.

There are several reasons why non-IOE engineering students pursue the IOE Masters degree. Some students use it as the first step toward the IOE Ph.D. degree. Other students pursue the degree to expand their knowledge base in order to enhance their qualifications for professional engineering careers. Among this group, most students select their IOE courses in order to specialize in one or two of the following areas:

- Engineering Management
- Ergonomics/Safety

Financial Engineering  
Operations Research  
Production/Manufacturing Systems  
Statistical Decision Making/Quality Engineering

The BSE/MS-IOE SGUS program encourages some of our very best undergraduates to stay at Michigan for an extra year. It also serves the engineering community by providing better-trained engineers at the entry level of the profession.

### **Program Description and Degree Requirements**

#### Requirements for the BSE. Degree

SGUS students must complete all requirements for their BSE degree as established by their department and published in The University of Michigan College of Engineering BULLETIN. Due to preparation requirements in probability and statistics for the IOE graduate program, students must complete IOE 265 “Engineering Probability and Statistics” (4 credit hours), IOE 316 “Introduction to Markov Processes” (2 credit hours), and IOE 366 “Linear Statistical Models” (2 credit hours). Because these courses are at the undergraduate level, they are NOT eligible for double counting, but may be used as electives toward the BSE degree. (Note: Courses equivalent to IOE 265, 316, and 366 are acceptable to fulfill probability and statistics preparation requirements.) Up to six credit-hours of undergraduate courses may be “double-counted” and transferred to the student’s Rackham transcript, *provided that these courses are eligible for credit in the IOE Masters degree curriculum*. Normally, double-counted courses are selected from the “Unrestricted Elective” category of the BSE degree requirements.

Students considering the SGUS program should work closely with the Undergraduate Program Advisor from their BSE department as well as the IOE SGUS Advisor when choosing elective courses. Any student wishing to enter the SGUS program must include a nomination letter from his/her Undergraduate Program Advisor as part of the Rackham application.

#### Requirements for the MSE (IOE) Degree

SGUS students must complete 30 credit-hours of approved graduate-level courses in order to receive the MSE (IOE) degree. These include;

- At least 18 hours of approved IOE graduate courses
- At least 14 credits at 500-level or above (minimum of 8 credits from IOE)
- Independent study courses (IOE 590, 593, 690, 790) and 1-credit and 2-credit seminars may not be counted as 500 level or above courses
- No more than six credits of independent study
- At least two cognate courses (not less than 4.5 credits) must be taken from outside the IOE department
- Math 513 required if student hasn’t taken linear algebra, such as math 417 or 419.  
Note that neither Math 417 or Math 419 count for graduate credit.

Information regarding which 400-level and 500-level courses are eligible for IOE graduate credit is summarized on the “Masters Counseling Information” flyer available

from the IOE Graduate Program Office. Other questions regarding the eligibility of courses will be answered by the IOE Graduate Program Advisor.

Because six credit-hours of BSE courses are double-counted, SGUS students must complete 24 credit-hours beyond the BSE degree requirements for a total of 152 credit hours in the combined program.

**The key to designing a SGUS program that can be completed with the minimum 152 credit hours is careful management of undergraduate elective courses. Students considering the SGUS program must “reserve” at least 8 credit hours for undergraduate probability and statistics coursework and 6 elective credit hours for courses that are eligible for credit in the IOE Masters degree program.**

### **Admission Procedures**

Undergraduate students from participating departments who have maintained a GPA of at least 3.5 are eligible to apply for provisional admission to the SGUS program during their senior year. The student must submit the standard Rackham application form and a cover letter stating that he/she is applying for provisional admission as an SGUS student. In addition, the student must submit a nomination letter from the Undergraduate Program Advisor for his/her BSE degree.

Formal admission to Rackham will not occur until the student is within 6 credits of completing the B.S.E. degree. Normally, students will enroll in Rackham for the final two terms of the combined program.

### **Administrative Policies and Practices**

The student's BSE department will maintain the undergraduate record. Following formal acceptance into Rackham, the IOE Graduate Program Office will maintain a separate folder for all graduate records. Both folders will be tagged to indicate SGUS status.

Audits for both degrees will be performed in the normal manner by the appropriate Undergraduate and Graduate Program Advisors.

### **CONTACTS**

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