

**SEQUENTIAL UNDERGRADUATE/GRADUATE STUDY (SUGS) PROGRAM  
LEADING TO THE B.S.E. DEGREE IN PARTICIPATING ENGINEERING  
DEPARTMENTS AND THE M.S.E. DEGREE IN INDUSTRIAL AND  
OPERATIONS ENGINEERING (IOE)**

APPROVED by the IOE Faculty, March 8, 1995  
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REVISED October 2010 (transfer credit for Accounting 471)  
REVISED July 2016 (changes in IOE Probability/Statistics sequence)  
REVISED Summer 2017 (to 1) change program name from SGUS to SUGS, 2) add  
CHEPS as a specialization, and 3) clarify double-counting and IOE deficiencies)  
REVISED Summer 2018 (wording changes)

### **Introduction and Summary**

Description: The Department of Industrial and Operations Engineering (IOE) has established a five-year Sequential Undergraduate/Graduate Study (SUGS) 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. Courses that are double-counted for SUGS may not be double-counted for any other purpose (e.g., dual undergraduate or dual graduate degrees).

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 [SUGS form](#) as part of the SUGS application.

Tuition Requirements: SUGS students must enroll in Rackham for at least two full (9 credit) terms, paying full Rackham tuition with no other U of M registration. 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 general 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
- Health Systems Engineering and Patient Safety
- Operations Research
- Production/Distribution/Logistics & Transportation (PDL) Systems
- Statistical Decision Making/Quality Engineering

The BSE/MS-IOE SUGS 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

SUGS 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. To avoid being admitted with deficiencies, students considering the IOE Masters degree must also have adequate preparation in probability, statistics, and linear algebra. Information on preparation in these areas and removal of deficiencies can be found at:

<https://ioe.engin.umich.edu/wp-content/uploads/sites/4/2017/09/ioe-master-progreqforbidcourse.pdf>

To satisfy preparation requirements in probability and statistics, students must complete a nine-credit sequence: IOE 265 “Probability and Statistics for Engineers” (3 credit hours), IOE 316 “Introduction to Markov Processes” (3 credit hours), and IOE 366 “Linear Statistical Models” (3 credit hours). To satisfy preparation requirements in linear algebra, students must complete one of the following courses: Math 214, Math 217, Math 417, or Math 419. Because none of these courses are allowed for IOE graduate credit, they are NOT eligible for double counting. However, they may be used as electives toward the BSE degree. (Note: Courses equivalent to IOE 265, 316, 366 and Math 214, 217, 417, or 419 are acceptable to fulfill probability, statistics, and linear algebra preparation requirements.)

Up to six credit-hours of undergraduate courses may be “double-counted” *provided that these courses are eligible for credit in the IOE Masters degree curriculum. Additional information on eligible courses can be found at:*

<https://ioe.engin.umich.edu/wp-content/uploads/sites/4/2017/09/ioe-master-progreqforbidcourse.pdf>

Normally, double-counted courses are selected from the “General Elective” category of the BSE degree requirements.

Students considering the SUGS program should work closely with the Undergraduate Program Advisor from their BSE department as well as the IOE SUGS Advisor when choosing elective courses.

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

SUGS students must complete 30 credit-hours of approved graduate-level courses in order to receive the MSE (IOE) degree. Specific requirements are established in The University of Michigan College of Engineering BULLETIN. 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 (see URL cited above). 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, SUGS 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 SUGS program that can be completed with the minimum 152 credit hours is careful management of undergraduate elective courses. Students considering the SUGS program must “reserve” at least 12 credit hours for undergraduate courses in probability, statistics and linear algebra, and 6 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 SUGS program no later than first semester of their senior year. The student must submit the [IOE SUGS form](#) indicating that he/she is applying for provisional admission as an SUGS student. In addition, the student must submit a nomination letter from the Undergraduate Program Advisor for his/her BSE degree. They must maintain the 3.5 GPA or higher at the time they complete the undergraduate degree.

They must also submit the standard Rackham application form corresponding with the term they intended to start Graduate School.

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 SUGS status.

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