Engineering Management Joint Program: COE and COB

Engineering Management at UAH

The University of Alabama in Huntsville Engineering Management program is being offered as a joint program between the College of Engineering and the College of Business. The Engineering Management Option in the College of Engineering has been developed to meet the needs of practicing engineers and other technical (STEM) professionals who are performing or have ambitions to perform engineering management functions such as project management or supervision and who are without the benefit of a formal education in these areas. In addition, individuals with an interest in this area who do not have a STEM background now have the option within the MBA program to obtain a minor in Engineering Management. This joint program is a collaboration between the two colleges and uses coursework from both programs.

The MSE in Engineering Management consists of ten courses and is offered to engineering and qualified STEM professionals. The program is designed with the working professional in mind and courses are almost exclusively offered as either hybrid or online courses. The hybrid courses provide the flexibility to attend classes or to access classroom lectures offline as often as necessary to accommodate schedule and travel commitments. Online courses provide computer mediated access for self-paced instruction and provide even greater flexibility in scheduling.

The emphasis will be on a coursework only degree program at the Masters level of 30 semester hours, at least until full time research faculty can be hired and a doctoral program becomes feasible. The ten courses would be divided into:

- a core of five EM courses,
- two mathematics (statistics/optimization) courses, and
- a set of three elective courses can be used to provide depth in a secondary area or the flexibility to explore areas of interest. Examples shown below include aerospace, cybersecurity or business analytics which have been identified as being particularly useful for local professionals interested in Engineering Management. Other electives can be arranged with a program advisor from either COE or COB course offerings.

Engineering Management Core

EM 660 Engineering Management Theory
EM 760 Engineering Management Structures and Systems
EM 666 Project Management
EM 661 Strategic Engineering Management
ISE 623 Engineering Economics

The courses bolded are also included under the Engineering Management minor for the MBA program. The regular scheduling of these courses would serve programs in both colleges and facilitate the steady progression of students within the EM program. The substitution of MKT 604 New Product Development for EM 661 would reduce the number of EM courses necessary to get the program off the ground, while maintaining the minimum number of courses that must be taught within the COE to satisfy MSE requirements.

Statistics and Optimization Courses (COE Mathematics Requirement)

The COE has a mathematics requirement that can be fulfilled with courses in statistics and optimization. The proposed program would be satisfied with two courses drawn from either COE or COB:

Alternative A

ISE 690 Statistical Methods for Engineers

Choose one of:

ISE 526 Design and Analysis of Experiments
ISE 790 Advanced Statistical Applications

Alternative B:

MSC 600 Quantitative Methods

Choose one of:
MSC 615 Decision Modeling

MSC 641 Advanced Analytics

**Elective Courses**

The Thomas committee report on Engineering Management suggested that a program that included options for aerospace engineering or cyber security would be popular among potential students. Additionally, an option in Business Analytics is suggested. Thus, a student may choose from among the three elective options in the following list. There may be prerequisite courses needed for some of the course options. A list of recommended prerequisite classes is under development by the committee.

**Aerospace EM**

ISE 627 Introduction to Systems Engineering

MAE 589 Computer Aided Engineering

ISE 739 Optimization in Aerospace Systems Engineering

**Cybersecurity EM**

CS 570 Introduction to Computer Networks

CPE 549 Introduction to Cyber Security Engineering

CPE 649 Advanced Cybersecurity Engineering

**Business Analytics EM**

IS 571 Business Intelligence and Analytics

IS 640 Data MGT and Data Mining

MSC 641 Advanced Analytics

As noted, students may also choose to select from other graduate engineering or business electives as interests dictates and background permits. Elective courses can be approved by a program advisor. Engineering courses are typically hybrid courses, providing flexibility to students to attend class or view remotely as their schedules require. Many of the courses listed here from the COB are offered annually as online courses. (At present time only MSC 641 is not offered as either hybrid or online course.)

**Admission to MSE**

Admission to the program would be similar to other programs in the ISEEM department. A bachelor degree in engineering from an accredited institution with a minimum cumulative GPA of 3.0 (on a 4.0 scale), a GPA of 3.0 in all prior graduate work, a minimum GRE cumulative score of 300 (with minimum of 145 Verbal and 155 Quantitative scores).

Promising applicants (GPA over 3.25) with a STEM background may gain admittance to the MSE by meeting the remaining requirements above and by completing a basic selection of courses in fundamentals of math, science, and core engineering topics. Some prerequisites may be necessary to fulfill these requirements.

In the area of mathematics, a course in differential equations (course similar to UAH MA 238) is required while a course in linear algebra (e.g., similar to MA 244) is desirable. Note that some programs offer a combined course in both linear algebra and differential equations that would be an ideal way to meet this requirement.

In the area of basic science, a course in Physics with calculus (courses similar to PH 111 or PH 112) and a course (with lab) in Chemistry (courses similar to CH 121 and CH 125) are required.

Finally, a course in electrical circuits (courses similar to EE 213), statics (MAE 271), and either of thermodynamics (MAE 341) or fluid mechanics (MAE 310) cover the fundamentals of engineering requirements.

One to two years job experience in a technical position would be treated preferentially in admission but would not be required.

The GRE can be waived for students who have practiced engineering for five years past the BS degree, whose resume shows significant career progression, and who meet the other requirements. The GRE also be waived if the student has passed the NCEES Fundamentals of Engineering (FE) exam taken as part of the requirements to be a licensed professional engineer.