



**Department of Engineering Management and  
Systems Engineering  
Graduate Student Handbook**

**Initial Publication Date: April 2013**

**Revision 2.1: November 2016**

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## **I. Message from the Department Chair**

On behalf of the faculty and staff of the Department of Engineering Management and Systems Engineering, I would like to welcome you to Missouri S&T and the EMSE department. As you pursue your graduate study within our department, you will find that our programs and faculty are both innovative and evolving, each continuing to offer new areas of study in both research and teaching. Therefore, I encourage you to contact the faculty to learn about the courses they teach and the research they conduct, as well as the opportunities they have available to graduate students.

To help guide you during your graduate studies, this handbook has been developed to provide graduate students the most recent policies and procedures in our department for graduate education at both the Masters and PhD levels, for study in either Engineering Management or Systems Engineering. I encourage you to read this handbook and refer to it often as you continue your studies with our department. Of course, while every attempt has been made to provide a comprehensive overview of EMSE graduate policies and procedures, some topics of interest to you may not be addressed in this document. If this is the case, I would encourage you to discuss these areas with our very capable Graduate Staff and/or Associate Chair for Graduate Studies.

Once again, welcome to Missouri S&T and the EMSE department. I know that you will find your studies within our department and degree programs both rewarding and valuable, regardless of whether you study Engineering Management or Systems Engineering.

Sincerely,

Suzanna Long, PhD  
Professor and Chair  
Engineering Management and Systems Engineering  
Missouri University of Science and Technology

## **II. General Information**

The engineering management and systems engineering (EMSE) department at Missouri S&T offers undergraduate and graduate education in engineering management and graduate education in systems engineering. General regulations and procedures for all graduate programs are governed by the University. The individual departments and degree programs may also impose additional requirements. Information contained in this document describes the requirements and procedures specifically applicable to students in the engineering management and systems engineering degree programs. Different sets of rules and regulations may apply to students in other degree programs.

### **II.A. Graduate Degrees**

#### **II.A.1. Graduate Certificate Program**

The Graduate Certificate Program is designed to appeal to working professionals. Graduate certificate programs consist of a four-course sequence of graduate courses that provide working professionals with the knowledge they need to understand and contribute to an emerging area. Once admitted to the individual graduate certificate program, the student must take four designated courses within three years. In order to receive a Graduate Certificate, a student must have a cumulative grade point average of 3.0 or better. Students admitted to the graduate certificate program will have a non-matriculated status; however, if they complete the four-course sequence with a grade of B or better in each of the courses taken, they can be admitted to the MS program if they apply (see Section III Admissions). The graduate certificate credits taken by students admitted to the MS program will count toward their master's degrees. There is a time limit of six years to complete an MS degree. This time limit is from the semester the student starts their first graduate certificate course until they finish their MS degree. Student who do not have all of the prerequisite courses necessary to take a course in the graduate certificate program will be allowed to take "bridge" courses at either the graduate or undergraduate level to prepare for the formal graduate certificate courses.

Once admitted to a graduate certificate program, a student will be given three years to complete the program so long as they maintain a 3.0 GPA in the courses taken. If at any time their GPA drops below 3.0 they may be deemed ineligible for completion of the graduate certificate.

The Department of Engineering Management and Systems Engineering prefers that a student wishing to enroll in a graduate certificate program have a minimum of one-year of professional employment experience before entering into the program.

#### **II.A.2. Master of Science Degrees**

The Department of Engineering Management and Systems Engineering offers a Master of Science in Engineering Management and a Master of Science in Systems Engineering. Emphasis areas for the MS Engineering Management degree are

Financial Engineering, Human Systems Integration, Leadership in Engineering Organizations, Lean Six Sigma, Project Management, and Safety. Emphasis areas for the MS Systems Engineering degree are Model Based Systems Engineering, Systems Architecting, Modeling and Simulations, Model Based Engineering, Network Centric Systems, Computational Intelligence, Human System Integration, and Infrastructure Systems.

Thesis and non-thesis degrees are available for both MS degree programs. The choice of program is made in consultation with the student's graduate advisor.

### **II.A.3. Doctoral Degrees**

The Department of Engineering Management and Systems Engineering offers a Doctor of Philosophy (PhD) in Engineering Management and a Doctor of Philosophy in Systems Engineering. Emphasis areas for the Engineering Management PhD degree are Financial Engineering, Human Systems Integration, Leadership in Engineering Organizations, Lean Six Sigma, Project Management, and Safety. Emphasis areas for the Systems Engineering PhD degree are Model Based Systems Engineering, Systems Architecting, Modeling and Simulations, Model Based Engineering, Network Centric Systems, Computational Intelligence, Human System Integration, and Infrastructure Systems.

The degree of Doctor of Philosophy is awarded to students who have pursued graduate study without serious interruption, who have submitted an acceptable dissertation, passed all prescribed examinations, and satisfactorily met all requirements set by the Department and University. Recipients of this degree are attested by the graduate faculty as having attained a high level of learning by extensive study in some emphasis area and as having developed an ability to carry on independent research.

### **II.A.4. Dual (Second) Master's Degree**

A student having completed an MS degree at Missouri S&T or elsewhere in one major shall be eligible to receive a second master's degree upon the satisfactory completion of at least an appropriate additional graduate academic work. An additional 24 credit hours of graduate academic work is necessary for a second master's degree in Engineering Management. An additional 24 (non-thesis) or 30 (thesis) credit hours of graduate academic work is necessary for a second master's in Systems Engineering.

The plan of study for a second masters must contain at least 6 credit hours of 400-level courses. In addition, a maximum of 6 credit hours can be transferred in for a second masters. All other requirements including the use of out-of-department representatives on the appropriate committees must be fulfilled. In planning a dual master's degree, please note the need for defining which degree program is to be completed first.

### **II.A.5. Dual Enrollment**

Admission for dual enrollment as an undergraduate and graduate student during the student's senior year is granted by the Director of Admissions with the approval of the Associate Chair for Graduate Studies and Vice Provost for Graduate Studies. Admission is normally given to those students who rank in the upper third of their undergraduate class. As an alternative to class rank, students who have a 3.00 cumulative GPA shall be permitted to enroll during their last semester. Students who have a 3.50 cumulative GPA shall be permitted to enroll during their second to last semester.

A student who desires to dually enroll must submit an application to the Director of Admissions. Forms for this purpose can be obtained from Admissions. Students must declare which courses are to be taken for graduate credit in the first two weeks of each semester. A student must take at least three hours of undergraduate credit from Missouri S&T each semester.

Dual enrollment is limited to 16 credit hours per semester. The Vice Provost for Graduate Studies considers petitions for excess hours. If a dually enrolled student fails to meet undergraduate requirements, the probationary status will be that of an undergraduate student and will be evaluated without reference to graduate grades.

If a student plans to continue in the MS program, they are required to apply for regular admission once they complete their B.S. degree.

## **II.B. Distance and Off Campus Programs**

### **II.B.1. MS Degree Distance**

The Engineering Management and Systems Engineering Department offers a Master of Science in Engineering Management and Master of Science in Systems Engineering through distance education. Typically, distance students enroll in the MS non-thesis degree, which requires 30 credit hours of graduate course work. More information is available at <http://dce.mst.edu>.

### **II.B.2. PhD Degree Distance**

The Engineering Management and Systems Engineering Department offers a Doctor of Philosophy in Engineering Management and Doctor of Philosophy in Systems Engineering through distance education. Distance students are expected to complete all requirements listed in the Missouri S&T Graduate Catalog under the section entitled *Doctor of Philosophy Degree* and follow all procedures listed under the *Procedures for PhD Candidates*. Distance PhD applicants must also submit the Non-Traditional Student Agreement with their application.

Students enrolled in a PhD program must complete the written and oral PhD qualifying exam before becoming a candidate for the PhD degree. The content of all PhD programs is individually structured in consultation with and approval by the student's advisory committee.

### **II.B.2.a Engineering Management PhD Degree Distance**

A candidate for the Doctor of Philosophy (PhD) degree in Engineering Management must complete the equivalent of at least three years (six semesters, 72 hours minimum) of full-time work beyond the bachelor's degree. For those holding a master's degree from Missouri S&T or another institution, the requirement can be met by completing the equivalent of two years (four semesters) of full time work beyond the master's degree.

Students must normally spend at least two sequential semesters in full-time residence at Missouri S&T and conduct original research under the supervision of a doctoral advisor. For Distance PhD students, alternative methods for meeting this residency requirement are allowed and are up to the discretion of the student's doctoral advisor, but the qualifying examination, comprehensive examination and dissertation defense must be completed on campus. The student has the option of conducting research that is beneficial to the student's professional work.

### **II.B.2.b Systems Engineering PhD Degree Distance**

The total credit requirements for graduation are a minimum of 60 credit hours after the successful completion of MS degree in Systems Engineering or a minimum of 90 credit hours after a BS degree and a minimum of three years of post-graduate work. Actual courses taken will be determined by the candidate's committee and his/her plan of study.

Students must normally spend at least two sequential semesters in full-time residence at Missouri S&T and conduct original research under the supervision of a doctoral advisor. For Distance PhD students, alternative methods for meeting this residency requirement are allowed and are up to the discretion of the student's doctoral advisor, but the qualifying examination, comprehensive examination and dissertation defense must be completed on campus. The student has the option of conducting research that is beneficial to the student's professional work.

### **II.B.2.c Residency Requirements PhD Degree Distance**

All students are expected to follow the Missouri S&T Graduate Student Residency requirements. Distance students can meet the two-year residency requirement with the following requirements:

- the qualifying exam must be taken on campus during the first year of enrollment;
- a minimum two video conferences per month with their research advisor;
- the PhD committee will include one person from the student's professional work location, the appointment committee member must have a PhD and be familiar with the chosen research;
- meet with the PhD committee on a regular basis with at least two meetings per semester;



- the PhD Comprehensive Exam must be taken on campus; and
- the Defense of Dissertation must take place on campus.

### **II.B.3. Engineering Education Center (EEC) – St. Louis**

The Engineering Education Center serves the population of Greater St. Louis by providing evening graduate programs in various engineering disciplines. This service of the Missouri S&T is mostly intended for practicing engineers interested in enhancing their qualification and status via acquiring an advanced degree. For additional information, please see <http://eec.mst.edu/>.

### **III. Admissions**

#### ***III.A. Required Documentation***

All of the documentation requested below should be sent to the Director of Admissions. The mailing address is:

Director of Admissions  
Missouri University of Science and Technology  
G2 Parker Hall  
300 W. 13<sup>th</sup> Street  
Rolla, MO 65409-1060

When the Admissions office has received all of the required documentation it will be forwarded to the department. The department will make a recommendation. The recommendation will be forwarded to the Office of Graduate Studies for approval. Official notification of the outcome will be mailed to the applicant from the Admissions Office. The Engineering Management and Systems Engineering Department cannot provide admission status or decisions. Applicants must contact the Admissions Office if they have questions regarding their application.

#### **III.A.1. Application Form and Application Fee**

All graduate applicants must submit a completed application form and a one-time non-refundable application fee. Graduate application forms and instructions can be obtained at [http://futurestudents.mst.edu/admissions/application\\_select.html](http://futurestudents.mst.edu/admissions/application_select.html). Refer to Table 1 in Section III.A.11 for a full list of required application documents.

#### **III.A.2. Graduate Record Exam (GRE) Scores**

All MS and PhD graduate applicants must submit a complete set of GRE scores (GRE-V, GRE-Q, and GRE-WR). GRE scores are not required for graduate certificate applicants or students applying to the MS after completion of a graduate certificate with a B or better in all certificate classes. The GRE is not required for students with Missouri S&T BS degrees entering an MS program in the engineering management and systems engineering department who have a 3.2 or greater GPA in their undergraduate work. The GRE is required for all PhD applicants.

These score reports should be sent directly from ETS to the Director of Admissions. Information regarding the GRE can be found at <http://www.gre.org>. Refer to Table 1 in Section III.A.11 for a full list of required application documents.

#### **III.A.3. Test of English as a Foreign Language (TOEFL) Scores**

International applicants must submit TOEFL scores to the Director of Admissions. TOEFL scores are not required from domestic applicants. Information regarding the

TOEFL can be obtained at <http://www.toefl.org>. Recently the IELTS (International English Language Testing System) test has become widely available and is recognized by the department as an acceptable substitute for the TOEFL test. Refer to Table 1 in Section III.A.11 for a full list of required application documents.

#### **III.A.4. Letters of Recommendation**

All MS and PhD applicants are required to submit a minimum of three letters of recommendation. Letters of recommendation are not required for graduate certificate applicants. Letters of recommendation should be mailed to the Director of Admissions in sealed envelopes or emailed to Admissions ([mstgrad@mst.edu](mailto:mstgrad@mst.edu)). Refer to Table 1 in Section III.A.11 for a full list of required application documents.

#### **III.A.5. Transcripts**

All applicants must submit official transcripts from all colleges and universities previously attended. The transcripts should be sent directly from the colleges and universities to the Director of Admissions. Where the colleges and/or universities use a system differing significantly from the 4 point GPA system used at Missouri S&T, it is helpful to include a statement of the grading scheme, class rank, and any other information that can be provided by the college or university. Refer to Table 1 in Section III.A.11 for a full list of required application documents.

#### **III.A.6. Financial Statement**

All international students must submit a financial statement showing sufficient resources to cover living and educational expenses for one year. This requirement does not apply to domestic applicants. More information can be found at <http://futurestudents.mst.edu/admissions/international/applygrad.html>. Refer to Table 1 in Section III.A.11 for a full list of required application documents.

#### **III.A.7. Statement of Purpose**

All MS and PhD applicants are required to submit a statement of purpose indicating their specific area(s) of interest in engineering management or systems engineering, and outlining how the pursuit of an advanced degree will complement their overall career plan. The statement of purpose is encouraged for all graduate certificate applicants. Refer to Table 1 in Section III.A.11 for a full list of required application documents.

#### **III.A.8. Resume**

Resumes can be useful in documenting significant industrial experience, post-graduate training, publications, and other significant professional accomplishments. Applicants are encouraged to include resumes as part of their application package. Refer to Table 1 in Section III.A.11 for a full list of required application documents.

### III.A.9. Non-Traditional Student Agreement

All distance PhD applicants are required to submit a non-traditional student agreement. This requirement does not apply to on-campus PhD applicants. Refer to Table 1 in Section III.A.11 for a full list of required application documents.

### III.A.10. Additional Information as Requested

In a few cases the department may request additional information from an applicant. Failure to comply with such requests can prevent the timely processing of the applicant's request for admission.

### III.A.11. Summary

Table 1 provides a summary of the admission requirements. The summary indicates which applications are required (R), not required (NR), and encouraged (E) based on whether the applicant is international (Int.) or domestic (Dom.).

	Graduate Certificate		Masters Degrees		Doctoral Degrees <sup>b</sup>	
	Int.	Dom.	Int.	Dom.	Int.	Dom.
Application Fee <sup>a</sup>	R	R	R	R	R	R
Application Form	R	R	R	R	R	R
GRE Scores	NR	NR	R	R	R	R
TOEFL	R	NR	R	NR	R	NR
Letters of Recommendation	NR	NR	R	R	R	R
Transcripts	R	R	R	R	R	R
Financial Statement	R	NR	R	NR	R	NR
Statement of Purpose	E	E	R	R	R	R
Resume	E	E	E	E	E	E

*Table 1: A Summary of Customarily Required Application Documents*

<sup>a</sup>**Note:** Applicants are only required to pay the application fee one time. If, for example, a student applies for the MS program, completes the MS program, and then decides to continue for a PhD degree, they will not have to pay another application fee although they will be required to submit a new application form.

<sup>b</sup>**Note:** The non-traditional student agreement is required for all distance PhD students (Section III.A.9)

### III.B. Admission Guidelines

The admission guidelines listed below provide a guide of the department's expectations for incoming graduate students. They are not necessarily intended to preclude the acceptance of students who may have specialized skills, training, or other accomplishments providing solid evidence of outstanding potential to contribute to the research mission of the department.

### **III.B.1. Undergraduate Background**

The engineering management and systems engineering department offers graduate certificates and degree programs in engineering. As such, a strong background in engineering fundamentals is necessary for entry into these programs. The department will not offer graduate admissions to students who do not have the equivalent of a four-year BS degree in engineering or physical science.

### **III.B.2. Grades**

The nominal GPA requirement for admission to the graduate certificate, MS degree program, and PhD program in this department is a GPA of 2.75, 3.0 and 3.5, respectively, on a 4.0 GPA system. In evaluating academic performance from universities that may use other grading systems, the department may rely upon statistical data gathered in analyzing academic outcomes for recent graduate students and/or academic qualifications of recently accepted students from comparable institutions to the extent that such statistical data is available.

### **III.B.3. GRE Scores**

The minimum GRE score must be  $V \geq 155$ ,  $Q \geq 148$  on new scoring system (the sum of GRE-V and GRE-Q scores be at least 1100 on the old scoring system) and the GRE-A score must be a minimum of 4.0.

### **III.B.4. TOEFL or IELTS Scores**

International students are required to provide TOEFL scores. The department has no particular preference for either the computer based TOEFL or the paper based TOEFL. However, at some test sites it is possible that the TOEFL is only offered in one of these two forms. The minimum recommended scores set by the department are 237 on the computer based TOEFL, 580 on the paper based TOEFL, and 92 on the IBT (internet based testing) version of the TOEFL. The recommended IELTS score is a minimum of 6.5.

### **III.B.5. Graduate School Grades**

Students seeking admission to the PhD program should meet or exceed all of the guidelines for those seeking admission to the MS program and should have a graduate GPA in their proposed field of study (or closely related field) of 3.5 or better.

### **III.B.6. Essential Background Courses**

Students applying for graduate studies with degrees in closely related fields may have additional conditions placed on their admission. These conditions are generally imposed to make sure that students who do not have a traditional engineering management or systems engineering degree will have sufficient background to have a reasonable chance for academic success in the department's two graduate programs. Specifically, students who wish to pursue a graduate degree in engineering management or systems engineering based on one or previous

degrees in related subjects (e.g. mechanical engineering, computer engineering, etc.) may be required to take courses as listed in Table 2.

<b>All Subjects Below Are Required</b>
Calculus I, II, III
Differential Equations
Statistics
Physics or Chemistry
Engineering Economy

*Table 2. Essential Background Courses*

When students are required to take some combination of these background courses as a condition for their admission, they should realize that many, if not all, of the required background courses are undergraduate courses. As such they will not count towards fulfilling the requirements for the MS or PhD degrees.

### **III.B.7. Other Considerations and Probationary Admission**

When applicants meet all of the guidelines listed above and provide all of the information requested, the department will usually recommend admission. When applicants do not meet these guidelines the department may consider other factors such as:

1. Specific skills, training, and/or experience relevant to departmental research projects.
2. Publications and/or presentations at conferences.
3. Recommendations from Missouri S&T engineering management and systems engineering faculty, particularly when accompanied by offers of a research assistantship or other forms of financial support as appropriate.

In very rare cases the department may grant probationary admission to MS applicants. In order to be considered for conditional admission a student who does not meet the normal admissions standards must provide verifiable and convincing evidence of their potential to succeed in our graduate program. The decision to accept a student for conditional status is made by the Associate Chair for Graduate Studies and subject to approval by the Vice Provost of Graduate Studies. If a student is accepted into the graduate program under conditional status, they are not allowed to hold an assistantship until they have qualified for regular status. To qualify for regular graduate status in this department, a conditional status graduate student must:

- a. Enroll only in courses approved by the Associate Chair for Graduate Studies each semester.
- b. Have a graduate GPA of at least 3.0 at the end of the semester in which the student earned his 12<sup>th</sup> graduate credit hour, with no grades below a B, even including any undergraduate courses the student is taking as remedial coursework.

- c. Apply for regular status graduate admission by filing a Form 1 sometime between the end of the semester when the student earned their 12<sup>th</sup> graduate credit hour and the sixth week of the following semester.

Assuming the student has met all of the conditions listed above, they should be accepted as regular status graduate students. Upon being granted regular status they will have the same rights and privileges as those who are initially admitted in regular status.

In all cases, the responsibility for providing supporting documentation for additional considerations rests with the applicant.

## **IV. Advising**

A student is assigned a faculty advisor by the engineering management and systems engineering department once enrolled in the graduate program. This assignment is made on the basis of the student's intention of following a non-thesis or thesis track. MS thesis students are assigned an advisor based on the mutual agreement between the student and the proposed faculty member. In the case of PhD students, the Associate Chair for Graduate Studies and Graduate Affairs Committee will assist the student during the first two terms of registration and acquaint the student with the various rules, regulations, and procedures of the Department. The PhD student must establish an advisory committee after passing the qualifying examination to review their program of study, including establishing a PhD advisor for the remainder of their graduate work. This advisor must be both a member of the graduate faculty and under appointment to the engineering management and systems engineering department.

### ***IV.A. Role of the Student***

A graduate student is to follow all the instructions outlined in this handbook. The student should seek advice from their advisor with ample time before any critical deadline dates. The selection of the MS thesis and PhD advisor is probably the most important decision in the graduate process and, thus, needs to be carefully considered.

### ***IV.B. Role of the Advisor***

The advisor has the responsibility to meet with the student on a regular basis and to guide the student in his/her graduate studies. The advisor provides comments on the academic and future career of the student and their possible options in future appointments in industry, government, and/or academia. If the student is also involved in research with the advisor, the majority of the time will be devoted to the research topic.

### ***IV.C. Change of Advisor***

A graduate student on a sponsored graduate research assistant (GRA) appointment may not change advisors without the express written consent of the student's current advisor. If the student's advisor will not agree to a change, and if an information review by the Associate Chair for Graduate Studies does not resolve the issue, then the Graduate Affairs Committee will formally hear the views of both the student and the advisor, and will make a recommendation to the Engineering Management and Systems Engineering faculty for a final decision.

Non-thesis master degree students are assigned an initial advisor by the department. Master degree students, both thesis and non-thesis, and PhD students may change advisors at any time with the consent of their old advisor, their new advisor, and, in the case of MS thesis and PhD students, the consent of their advisory committee.



The change is recorded on the Form 1 and is signed by both the former and new advisor.

A change in a committee member is also recorded on the Form 1. This change on the Form 1 also requires signatures from the former and new committee member, the advisor, and the remaining committee members.

#### ***IV.D. Advisor from a Different Department***

If an Engineering Management and Systems Engineering graduate student has an out-of-department advisor, then the student must also have a co-advisor within the department. Similarly, if an out-of-department graduate student is being advised by a faculty member in the engineering management and systems engineering department, then the faculty member should follow the protocols established by the graduate student's department.

## **V. Financial Assistance and Appointment**

There are four major types of financial assistance awarded by the department on a competitive basis that are available to graduate students at Missouri S&T:

1. graduate teaching assistantships (GTA),
2. graduate research assistantships (GRA),
3. fellowships, and
4. hourly research positions.

Students holding GTA or GRA assistantships must register for at least three (3) credit hours during the summer semester and for at least nine (9) credit hours for the fall and spring semesters. The Graduate Affairs Committee continuously reviews the record and progress of every graduate student. All appointments are conditional on satisfactory performance.

Campus policy II-12 states that GTA and GRA appointments are contingent upon students “maintaining satisfactory progress towards an advanced degree at Missouri S&T.” By definition, a probationary status student is not a candidate for a degree at Missouri S&T and may not be appointed to GTA or GRA positions.

### **V.A. Assistantships**

#### **V.A.1. Graduate Research Assistantship (GRA)**

GRAs are supervised by individual professors for research-related duties. Typically, the appointments are 0.25-0.50 full-time equivalency (FTE). This means working up to 10-20 hours per week on research duties. In addition, if the appointment is at least 0.25 FTE, there is a waiver of the out-of-state fee. In addition, PhD students on 0.375 FTE or greater will have their tuition and supplemental fees remitted.

#### **V.A.2. Graduate Teaching Assistantship (GTA)**

Course section instructors will supervise GTAs and their teaching-related duties. At the beginning of each semester, each faculty member assigned a GTA will provide them a clearly written statement outlining expectations and duties pursuant to the GTA assignment. Graduate students serving as GTAs (i.e., those who have passed the GTA workshop) may, on occasion, substitute for the faculty member as a guest lecturer. As per the January 31, 2002 memo from the Provost, GTA's are not allowed to be in charge of instruction and will not have final grade authority in any and all first and second year courses.

##### **V.A.2.a GTA Workshop**

All students must take and pass the GTA workshop with a grade of B or higher before they can be put on a GTA assignment.

### **V.A.2.b Duties of Faculty Members Working with GTAs**

Faculty members are expected to supervise laboratory exercises, resolve disputes, and ensure that the laboratory equipment is maintained and in working condition. The faculty will ensure that their GTAs are proficient in all the equipment and procedures required to perform each lab exercise, will provide the GTAs with solutions or grading keys to all assigned work (including homework problems, laboratory reports, etc.) or review and approve solutions or grading keys developed by the GTA. Faculty will review all laboratory component grade recommendations made by the GTA, and will ensure that the GTA's time on task does not, on average, exceed the allocated time limit.

### **V.A.3. Fellowships**

Fellowships are offered from many venues including Distinguished Chancellor's Fellowships, National Science Foundation Fellowships, State and Federal Fellowships such as the Graduate Assistance in Areas of National Need (GAANN) fellowship offered by the U.S. Department of Education, and Industrial Fellowships.

Sources include Distinguished Chancellor's Fellowships, administered by the Vice Provost for Graduate Studies, and external fellowships funded and administered by outside entities.

The Distinguished Chancellor's Fellowship is not open to MS students. The fellowship consists of a waiver of resident and applicable non-resident fees and an additional stipend of \$10,000/yr. Students are limited to six semesters and intervening summer sessions with a possible extension of two semesters. The student must maintain a 3.50 cumulative GPA. Students may apply for this fellowship through the department chair.

External fellowships come from both industry and government, and range from a few hundred dollars to rather large levels. These usually are limited in number and are competitive at a national level.

### **V.A.4. Hourly Research Positions**

Hourly research positions involve assisting individual professors or research teams on specific projects and are paid at an hourly wage established by the University.

## ***V.B. Funding Requirements/Expectations***

Funded graduate students are required to attend all department-sponsored graduate seminars for each semester they are funded. Non-funded graduate students are highly encouraged to attend graduate seminars. Attendance at department graduate seminars may be used in evaluating the student's grades for research credit hours, or impact new or existing funding decisions.

PhD students and funded MS thesis students are required to participate in the Research Open House in the spring semester. Students are required to submit a poster on their research. Funded first semester MS students and PhD students prior to the qualifying exam are highly encouraged to submit a poster; however, exceptions can be made if approved by the advisor. All non-funded engineering management and systems engineering research students are encouraged to participate in the contest as well.

## **VI. Academic Honesty and Ethics**

Personal and corporate integrity is an essential element of any organization. Accordingly, every student is expected to avoid even the appearance of cheating, and to claim credit only for his or her own work.

### ***VI.A. Academic Honesty and Ethics***

Page 30 of the Student Academic Regulations handbook (<http://registrar.mst.edu/academicregs/index.html>) describes the student standard of conduct relative to the System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty, including cheating, plagiarism, or sabotage. Additional guidance, including a description of the process for dealing with issues related to academic dishonesty, is available on-line at <http://ugs.mst.edu>.

### ***VI.B. Required Responsible Conduct of Research Training***

Effective February 2014, all new graduate research students in the Engineering Management and Systems Engineering department are required to take and pass the Collaborative Institutional Training Initiative (CITI) course on Responsible Conduct of Research (RCR). This requirement applies to all graduate MS Thesis and PhD students, whether on-campus or distance.

All new graduate certificate and MS Non-Thesis students are required to view the EMSE Mandatory Academic Honesty Seminar and complete an affidavit of responsibility to abide by the ethical standards.

A department hold will be placed on each student's account during their first semester. Research students are required to submit a pdf of their certificate showing successful completion of the RCR training, and non-research students are required to submit their signed affidavit to [emgt@mst.edu](mailto:emgt@mst.edu). The Associate Chair of Graduate Studies will then remove the department hold. Students will not be able to register for their second semester until this hold is removed.

### ***VI.C. Training Registration***

Go to [www.citiprogram.org](http://www.citiprogram.org). If you are a new user, you must register in CITI. Click on “**New Users Register Here**” link - you will then be prompted to:

1. Choose your institution - Under “**Participating Institutions**,” scroll through the drop-down box for “**Missouri University of Science and Technology**”;
2. Select your Username and Password;
3. Enter your name; and
4. Enter your email address.

You will then be taken to a page asking you to submit contact information; you must enter “[rcrtrn@mst.edu](mailto:rcrtrn@mst.edu)” as the *Institutional email address*.

To proceed, you’ll be directed to a page entitled “**Main Menu**” which shows the courses you are enrolled in for Missouri University of Science and Technology. Click on the “**Status**” column to **Enter or Re-enter** the course. Upon entering the course, the “**Grade Book**” will be displayed which will track progress of module completion. Click and complete each module to complete the course.

After completion of the RCR training, it is the student’s responsibility to submit a pdf of the training certificate to [emgt@mst.edu](mailto:emgt@mst.edu).

## **VII. Graduate Degrees**

The engineering management and systems engineering department offers master and doctoral degrees in engineering management as well as master and doctoral degrees in systems engineering. In addition, the department offers several graduate certificate programs. The non-thesis master's degree is based entirely on coursework while the thesis master's degree is based on a combination of coursework and research. The thesis master's degree requires the student to find a faculty member willing to serve as both research supervisor and academic advisor. This should be done as soon as possible so that the student and advisor will be able to formulate both a plan of study (coursework) and a research project. Non-thesis master degree students must also have an advisor. In this case the advisor's role is to assist the students in selecting courses consistent with their interests and abilities. The advisor is also responsible for ensuring the student's program of study meets the department's degree requirements and allows the student the opportunity to complete all degree requirements within a reasonable and customary time limit.

## **VIII. Graduate Degree Requirements**

Requirements for graduate degrees may originate at different levels. Requirements applying to all graduate degrees granted by Missouri S&T are set by the graduate faculty. Additional requirements applying to all graduate degrees granted in the department of engineering management and systems engineering are determined and approved by the department faculty. It is important to realize that a candidate for a graduate degree from this department must meet the requirements set at the campus (Missouri S&T) level AND the department (EMSE) level.

### **VIII.A. Programs of Study**

Unlike undergraduate degrees, which are highly structured and include many required courses, graduate degrees are often highly individualized to accommodate each student's research and academic interests. Therefore, graduate degree seekers are required to submit a formal written program of study showing which courses they plan to take and when they plan to take the courses. For MS students (thesis and non-thesis) this requirement is met by completing a Form 1, which is available at: <http://grad.mst.edu/currentstudents/formsdeadlines/masters/>. For doctoral students the requirement consists of completing a Form 5, which is available at: <http://grad.mst.edu/currentstudents/formsdeadlines/phd/>. Once the forms are completed they need to be approved by the student's advisor. In the case of MS thesis and doctoral students, the forms also need the approval of all members of the student's advisory committee. Students should save an electronic copy of this form to use for future updates. Students must obtain the signatures of their advisor(s) as well as the members of their advisory committee. The form should then be submitted to the graduate staff who will obtain the remaining required signatures. If additional information or justification is required you and/or your advisor will be contacted.

The following sections will describe the requirements as they specifically apply to graduate certificates, master's degrees, and doctoral degrees.

#### **VIII.A.1. Graduate Certificates**

Graduate certificate programs are designed to appeal to working professionals. Once admitted to an individual certificate program, the student must take four designated courses. In order to receive a graduate certificate, a student must have a cumulative grade point average of a 3.0 or better. If they complete the four-course sequence with a grade of a B or better in each of the courses taken, they can be admitted to the MS program if they apply (see Section II Admissions). The certificate credits taken by the students admitted into the MS program will count toward their master's degree. If the student chooses to continue for an MS, the time limit for completing the MS will start when the student took their first certificate course until they finish their MS degree.



Once admitted to a certificate program, a student will be given three years to complete the program so long as they maintain a B average on the courses taken.

A maximum of one course outside of the certificate is allowed within the first five courses for students enrolled only in a graduate certificate or with the probationary MS acceptance of a B or better in the graduate certificate.

### **VIII.A.2. First Master's Degree in Engineering Management**

The Form 1 must have a set of courses that satisfies all of the following requirements simultaneously:

1. The total number of credit hours must be greater than or equal to 30.
2. Only 300-level and 400-level courses will be counted towards the program of study.
3. For the MS thesis, there must be at least 6 credit hours of 400 level lecture courses and, for the MS non-thesis, there at least 9 credit hours of 400 level lecture courses.
4. For the MS non-thesis, the maximum number of Eng Mgt 490 (thesis research) credit hours is 0; however, there may be a maximum of 4 credit hours of special problems and/or seminar courses.
5. For the MS thesis, the minimum number of Eng Mgt 490 (thesis research) is 6 credit hours.
6. All 400 level courses must be technical courses in engineering, math, or science. Courses outside of the engineering management and systems engineering department require advisor approval.
7. MS thesis students must have a thesis advisory committee chaired by their advisor and the committee must contain at least two other graduate faculty members. MS thesis students in the engineering management and systems engineering department must also fill out a defense notice announcing the date, location, time, committee members, title, abstract, etc. for their thesis defense at least two weeks in advance of their defense. This form, available from the graduate staff, will then be distributed electronically to all department faculty and graduate students.

### **VIII.A.3. First Master's Degree in Systems Engineering**

The Form 1 must have a set of courses that satisfies all of the following requirements simultaneously:

1. The total number of credit hours must be greater than or equal to 30 for the MS non-thesis and 36 for the MS thesis.
2. Only 300-level and 400-level courses will be counted towards the program of study.
3. For an MS thesis, there must be at least 6 credit hours of 400 level lecture courses and, for an MS non-thesis, at least 9 credit hours of 400 level lecture courses.

4. Credit hours from Sys Eng 490 (thesis research) may not be taken by MS non-thesis students. A maximum of 4 credit hours of special problems and/or seminar courses may be applied to the non-thesis MS degree.
5. For MS thesis students, the minimum number of Sys Eng 490 (thesis research) credit hours is 6 credit hours.
6. All 400 level courses must be technical courses in engineering, math, or science. Courses outside of the engineering management and systems engineering department require advisor approval.
7. MS thesis students must have a thesis advisory committee chaired by their advisor and the committee must contain at least two other graduate faculty members. MS thesis students in the engineering management and systems engineering department must also fill out a defense notice announcing the date, location, time, committee members, title, abstract, etc. for their thesis defense at least two weeks in advance of their defense. This form, available from the graduate staff, will then be distributed electronically to all department faculty and graduate students.

#### **VIII.A.4. Second Master's Degree in Engineering Management**

The second MS degree in engineering management is intended for students who already have an MS degree in a field closely related to engineering management and/or systems engineering. The minimum number of credit hours required for a second MS degree is 24. As in the case of a first MS degree, the second MS degree can include research and coursework (thesis) or coursework only (non-thesis). Students who wish to obtain a second MS degree must apply specifically for admission as a second MS degree student. The following requirements would apply once the student has been accepted as a second MS degree student.

On the Form 1 there must be at least one single subset of courses that satisfies all of the following requirements simultaneously:

1. The total number of credit hours in the subset must be greater than or equal to 24.
2. The plan of study for a second MS must contain at least 6 credit hours of 400-level courses.
3. A maximum of 6 credit hours can be transferred in for a second MS.
4. Requirements 2, 4, 5, 6, and 7 as listed above for the first MS degree in Engineering Management must be met (see Section VII.A.2).
5. Dual, or simultaneous, MS degrees students must clearly define on their Form 1 which degree is to be completed first.

#### **VIII.A.5. Second Master's Degree in Systems Engineering**

The second MS degree in systems engineering is intended for students who already have an MS degree in a field closely related to engineering management and/or systems engineering. The minimum number of credit hours required for a second MS degree is 24. Additional courses can be taken with the approval of the graduate advisor. As in the case of a first MS degree,

the second MS degree can include research and coursework (thesis) or coursework only (non-thesis). Students who wish to obtain a second MS degree must apply specifically for admission as a second MS degree student. The following requirements would apply once the student has been accepted as a second MS degree student:

On the Form 1 there must be at least one single subset of courses that satisfies all of the following requirements simultaneously:

1. The total number of credit hours in the subset must be greater than or equal to 24 for an MS non-thesis and 30 for an MS thesis.
2. The plan of study for a second MS must contain at least 6 credit hours of 400-level courses.
3. A maximum of 6 credit hours can be transferred in for a second masters.
4. Requirements 2, 4, 5, 6, and 7 as listed above for the first MS degree in Systems Engineering must be met (see Section VII.A.3).
5. Dual, or simultaneous, MS degrees students must clearly define on their Form 1 which degree is to be completed first.

#### **VIII.A.6. Doctoral Programs**

All doctoral programs in this department require the completion of a dissertation. Oversight for the dissertation is the responsibility of the student's advisor together with an advisory committee. On campus PhD students' advisory committee must consist of at least five graduate faculty members, one of which is outside the department. Distance PhD students' advisory committee must consist of at least five graduate faculty members from Missouri S&T, one of which is outside the department, and a distance committee member with a PhD or equivalent. The advisor will act as chair of the advisory committee.

Subject to approval by a doctoral candidate's advisory committee, the student can receive credit from an MS degree in a relevant field.

#### **VIII.A.6.a Doctoral Degree in Engineering Management**

On the Form 5 there must be at least one single subset of courses taken for graduate credit that satisfies all of the following requirements simultaneously:

1. The total number of credit hours in the subset must be greater than or equal to 60. All 400 level courses must be technical courses in engineering, math, or hard science. Courses outside of these fields require advisor approval.
2. Excluding all MS credit hours, the number of remaining credit hours of graduate coursework must equal or exceed 30 and at least half of these credit hours should be attributable to courses taken in the degree program.
3. The total number of credit hours taken as PhD dissertation research (490) must equal or exceed 24.

4. Students are required to take at least 15 credit hours of 400 level coursework.
5. Students are encouraged, but not required, to take at least 12 hours of courses outside their major area.
6. All courses taken from the MS degree should be indicated on the Form 5.

#### **VIII.A.6.b Doctoral Degree in Systems Engineering**

On the Form 5 there must be at least one single subset of courses taken for graduate credit that satisfies all of the following requirements simultaneously:

1. The total number of credit hours in the subset must be greater than or equal to 60. All 400 level courses must be technical courses in engineering, math, or hard science. Courses outside of these fields require advisor approval.
2. Excluding all MS credit hours, the number of remaining credit hours of graduate coursework must equal or exceed 30 and at least half of these credit hours should be attributable to courses taken in the degree program.
3. The total number of credit hours taken as PhD dissertation research (490) must equal or exceed 30.
4. Students are required to take at least 15 credit hours of 400 level coursework.
5. Students are encouraged, but not required, to take at least 12 hours of courses outside their major area.
7. All courses taken from the MS degree should be indicated on the Form 5.

## **IX. Graduate Degree Procedures**

A description of the common specific steps required to complete the requirements for a graduate degree in all departments can be found in the Graduate Catalog. The following describes how these procedures are followed in the engineering management and systems engineering department.

### ***IX.A. Master's Degree (Non-thesis)***

An acceptable Form 1 must be submitted and approved within the first six weeks of the semester in which the student completes their fifteenth credit hour. Failure to comply with this requirement will cause the Office of Graduate Studies to issue a hold on the student's registration. Once a hold has been issued, the student will not be allowed to register for courses.

The Form 1 must be approved by the student's advisor. The form should then be forwarded to the graduate staff to obtain department approval from the Department Chair. After receiving department approval it will be forwarded to the Office of Graduate Studies for final approval. This requirement will be fulfilled after it is approved by the Office of Graduate Studies.

Subsequent changes in an approved program of study will be noted on Form 1-A, approved by the advisor, and forwarded to the graduate staff to receive approval from the Department Chair and the Office of Graduate Studies.

Within the first four weeks of the final semester, the student should ensure that all degree requirements will be fulfilled by the end of the semester. At this time the student is required to fill out an application for graduation. Complying with this requirement will allow adequate time for the faculty to approve the granting of the degree and will also enable the student to participate in the next graduation ceremony. Failure to comply with this requirement will delay granting the degree and final transcripts. Commencement is held at the end of the Fall and Spring semesters. Students who complete their degrees during the summer session and meet these requirements are eligible to participate in the graduation ceremony held at the end of the next Fall semester.

Occasionally students fill out their application for graduation and, due to unforeseen circumstances, are unable to complete their degree requirements by the end of the semester. In these cases the student will need to fill out a new application for graduation for the subsequent semester. International students who determine that they will not be able to fulfill their degree requirements after applying for graduation should contact the International Affairs Office as soon as possible to avoid any adverse consequences regarding their immigration status.

## ***IX.B. Master's Degree (Thesis)***

An acceptable Form 1 must be submitted and approved within the first six weeks of the semester in which the student completes their fifteenth credit hour. Failure to comply with this requirement will cause the Office of Graduate Studies to issue a hold on the student's registration. Once a hold has been issued, the student will not be allowed to register for courses.

The Form 1 must be approved by the student's advisor and their advisory committee. The advisory committee is chaired by the student's advisor. The advisory committee must consist of at least three graduate faculty members. A list of members of the graduate faculty can be found at:

<http://gradfac.mst.edu/graduatefaculty/membership/gradfaclist/>.

Subsequent changes in an approved program of study will be noted on Form 1-A, approved by the advisory committee, and forwarded to the graduate staff to receive approval from the Department Chair and the Office of Graduate Studies.

Within the first four weeks of the final semester, the student should ensure that all degree requirements will be fulfilled by the end of the semester. At this time the student is required to fill out an application for graduation. Complying with this requirement will allow adequate time for the faculty to approve the granting of the degree and will also enable the student to participate in the next graduation ceremony. Failure to comply with this requirement will delay granting the degree and final transcripts. Commencement is held at the end of the Fall and Spring semesters. Students who complete their degrees during the summer session and meet these requirements are eligible to participate in the graduation ceremony held at the end of the next Fall semester.

Occasionally students fill out their application for graduation and, due to unforeseen circumstances, are unable to complete their degree requirements by the end of the semester. This situation occurs most often when students are unable to complete and defend their thesis prior to the deadlines set by the department. In these cases the student will need to complete a new application for graduation for the subsequent semester. International students who determine that they will not be able to fulfill their degree requirements after applying for graduation should contact the International Affairs Office as soon as possible to avoid any adverse consequences regarding their immigration status.

## ***IX.C. Doctoral Degree***

An acceptable Form 5 must be submitted by the end of the semester in which the student passes their qualifying exam. Failure to comply with this requirement will cause the Office of Graduate Studies to issue a hold on the student's registration. Once a hold has been issued, the student will not be allowed to register for courses.

The Form 5 must be approved by the student's advisor and their advisory committee. The advisory committee is chaired by the student's advisor. The advisory committee

must consist of at least five graduate faculty members, one of which is outside the department. A list of members of the graduate faculty can be found at: <http://gradfac.mst.edu/graduatefaculty/membership/gradfaclist/>.

Subsequent changes in an approved program of study will be noted on Form 5-A, approved by the advisory committee, and forwarded to the graduate staff to receive approval from the Department Chair and the Office of Graduate Studies.

Within the first four weeks of the final semester, the student should ensure that all degree requirements will be fulfilled by the end of the semester. At this time the student is required to fill out an application for graduation. Complying with this requirement will allow adequate time for the faculty to approve the granting of the degree and will also enable the student to participate in the next graduation ceremony. Failure to comply with this requirement will delay granting the degree and final transcripts. Commencement is held at the end of the Fall and Spring semesters. Students who complete their degrees during the summer session and meet these requirements are eligible to participate in the graduation ceremony held at the end of the next Fall semester.

Occasionally students fill out their application for graduation and, due to unforeseen circumstances, are unable to complete their degree requirements by the end of the semester. This situation occurs most often when students are unable to complete and defend their dissertation prior to the deadlines set by the department. In these cases the student will need to complete a new application for graduation for the subsequent semester. International students who determine that they will not be able to fulfill their degree requirements after applying for graduation should contact the International Affairs Office as soon as possible to avoid any adverse consequences regarding their immigration status.

## ***IX.D. Modifications to a Previously Approved Program of Study***

### **IX.D.1. Master's Degrees**

Once the Form 1 has been approved, students can modify the program by submitting a Form 1-A. This form, showing all courses, is needed to add courses, delete courses, change advisors, or change committee members and is subject to approval of their advisor and (in the case of MS thesis students) thesis committee. All courses should be listed on the student's Form 1-A when adding or deleting courses. A Form 1-A is not necessary when taking a course in a different semester than listed on the current Form 1 (i.e., taking Eng Mgt 314 in spring semester rather than in the fall as indicated on the Form 1).

Students should use the Form 1-A to change their advisor and/or to replace members of the advisory committee (MS thesis students). Changing advisors requires the approval of both the old and new advisors. Similarly, the replacement of advisory committee members requires the approval of both former and proposed committee members. Students who change advisors

and/or committee members should realize that their new advisors and committee members have the right to request the addition or deletion of specific courses from the previously approved Form 1. The responsibility for assuring that the program of study, as modified, still meets all of the requirements enumerated above rests with the student, the advisor, and (for MS thesis students) the advisory committee.

#### **IX.D.2. Master's Degree – Changing from Thesis/Non-Thesis**

An acceptable Form 1A must be submitted and approved when a student changes from an MS non-thesis to an MS thesis or from an MS thesis to an MS non-thesis. Students are responsible for discussing this with their advisor before this change occurs. The student is then responsible for submitting a Form 1A, which meets the requirements, listed in Section VII.A.2 through VII.A.5 depending on the degree program and change. For MS thesis students, funding will be terminated immediately when changing from the MS thesis to MS non-thesis.

#### **IX.D.3. Doctoral Degrees**

Once the Form 5 has been approved, students can modify the program by submitting a Form 5-A, which must be reapproved by the committee. This form, showing all courses, is needed to add courses, delete courses, change advisors, or change committee members and is subject to approval of their advisor and thesis committees. All courses should be listed on the student's Form 5-A when adding or deleting courses. A Form 5-A is not necessary when taking a course in a different semester than listed on the current Form 5 (i.e., taking Eng Mgt 314 in spring semester rather than in the fall as indicated on the Form 5).

Doctoral students can use a Form 5-A to change members of the advisory committee and/or change their advisor. Changing advisors requires the approval of both the old and new advisors. Similarly, the replacement of advisory committee members requires the approval of both former and proposed committee members. Students who change advisors and/or committee members should realize that their new advisors and committee members have the right to request the addition or deletion of specific courses from the previously approved Form 5. The responsibility for assuring that the program of study, as modified, still meets all of the requirements enumerated above rests with the student, the advisor, and the advisory committee.



## **X. Major Exams**

In addition to the exams given as part of the formal coursework required for graduate degrees, there are several major exams required for students pursuing advanced degrees in this department. The required exams depend on the degree being sought, and in the case of MS degree students, whether the degree is the thesis or non-thesis.

### ***X.A. Master's Degree Thesis Defense***

All MS thesis degree candidates must defend their thesis in an oral examination conducted by their advisory committee. The student will be responsible for distributing copies of their thesis to the advisory committee at least two weeks in advance of the exam and will arrange a time and place for the oral thesis defense. Students need to contact the graduate staff to arrange for an official department announcement to be made at least two weeks in advance of the exam. A copy of the thesis will also be provided to the graduate staff to make available to the engineering management and systems engineering faculty at least one week prior to the defense. After the thesis defense, the chair of the advisory committee will submit the Graduate Form 2 and rubric to the graduate staff for department approval and submission to the Office of Graduate Studies.

All thesis students must submit a final bound copy of their thesis to the department for the engineering management and systems engineering library. The student must also provide a bound copy to their advisor. In addition, the student must provide a bound copy to their committee members upon request.

### ***X.B. Master's Degree Comprehensive Exam***

The engineering management and systems engineering department do not require MS degree students to pass a comprehensive exam although this exam may still be required in other departments.

### ***X.C. PhD Qualifying Exam***

The purpose of the qualifying examination is to determine the student's understanding of the fundamentals of engineering management or systems engineering and to guide the student in selecting appropriate courses.

The qualifying exam will be conducted each Fall and Spring semester. The qualifying exam is coordinated by the Associate Chair for Graduate Studies. The engineering management and systems engineering faculty will form the qualifying exam committee and serve to prepare, write, and evaluate the written portion of the exam. The qualifying exam consists of a written and an oral portion.

All doctoral students are required to pass a qualifying exam. Students seeking a doctoral degree in engineering management must pass the engineering management qualifying exam. Similarly, students seeking a doctoral degree in systems engineering

must pass the systems engineering qualifying exam. These exams are offered only once in the fall semester and once in the spring semester. The Office of Graduate Studies requires that the qualifying exam be passed by the end of the fifth semester after completing the MS degree. A more detailed explanation of the exam contents and requirements may be obtained from the graduate staff. After the qualifying exam, the Associate Chair for Graduate Studies will submit the Graduate Form 4 and rubric to the graduate staff for department approval and submission to the Office of Graduate Studies.

### **X.C.1. Engineering Management Qualifying Exam**

The written engineering management qualifying exam is an open-book, open-notes written examination given in one day. Calculators are permitted. Laptop computers are not permitted for the written portion of the engineering management qualifying exam.

The written portion tests the student's understanding of fundamental concepts in engineering management. The problems are at the level of basic undergraduate and MS level courses. For the written portion, the examination consists of five questions. The first four questions are based on the four core courses (Eng Mgt 314, Eng Mgt 361, Eng Mgt 365, and Eng Mgt 452). The student must select three of these questions. The fifth question is written by the student's doctoral advisor based on their selected research area. This question is required. For the four questions required, the student has four hours to provide a response.

The second part of the engineering management qualifying exam is the oral exam. For the oral exam, the student is expected to present their research proposal. A PowerPoint template will be provided by the graduate staff at least one month prior to the qualifying exam. During the oral exam, faculty may also ask questions based on the student's responses to the written portion of the exam.

### **X.C.2. Systems Engineering Qualifying Exam**

The written systems engineering qualifying exam is open-book, open-notes written examination given in one day. Calculators are permitted. Laptop computers are permitted for the written portion of the systems engineering qualifying exam.

The written portion tests the student's understanding of fundamental concepts in systems engineering and their ability to pursue original research that will lead to new contributions in systems engineering literature. For the written portion, the examination consists of three questions. The first two questions are to assess the knowledge of statistics and optimization. The third question is written by the systems engineering faculty to assess the student's ability to pursue original research in systems engineering. One hour and forty-five minutes is allowed for the statistics and optimization questions each, and three

hours are allowed for the systems engineering question. The student's responses to the systems engineering question will be in writing and also as a presentation for the second portion of the qualifying exam.

The second part of the systems engineering qualifying exam is the oral exam, conducted the morning following the written exam. For the oral exam, the student is expected to present both their solution to the systems engineering question and their research proposal. A PowerPoint template will be provided by the graduate staff at least one month prior to the qualifying exam for the research proposal. During the oral exam, faculty may also ask questions based on the student's responses to the written portion of the exam.

### **X.C.3. Qualifying Exam Results**

The qualifying exam will be graded by appropriate faculty. The qualifying exam committee shall make the final decision on the qualifying exam outcome. The Associate Chair for Graduate Studies shall serve as a non-voting convener of the committee. A grade of 70% constitutes passing of the examination. Upon successful completion of the qualifying exam, the student is admitted to PhD candidacy. A student who fails the examination may take the entire examination again at the regularly scheduled time next semester. A student may take the qualifying exam a maximum of two times.

A student who fails the qualifying exam twice is no longer eligible for admission to PhD candidacy.

After the qualifying exam the Associate Chair for Graduate Studies will submit the Graduate Form 4 and rubric to the graduate staff for department approval.

### **X.D. PhD Comprehensive Exam**

The purpose of the comprehensive examination is to evaluate the preparedness of the candidate to perform quality research as proposed. The comprehensive examination consists of an oral presentation of the student's intended doctoral research work and an examination of subject matter related to the dissertation area.

All doctoral students are required to pass a comprehensive exam planned and administered by the student's advisory committee during their candidacy.

The Vice Provost for Graduate Studies will authorize the student's advisory committee to administer the comprehensive examination after the student has completed 75% of all formal coursework (exclusive of thesis research) listed on their Graduate Form 5. In addition to the course requirements, a current Form 5 must be in place prior to the Department Chair approving the request. Students need to prepare and submit a "Request for Comprehensive Exam" form at least two weeks prior to the proposed date of the exam. The request form must be approved by the student's advisory committee, the engineering management and systems engineering, department and the Office of Graduate Studies. A period of at least 12 weeks must

elapse between the completion of the comprehensive exam and the dissertation defense. Students in the systems engineering doctoral program are required to have submitted a journal paper or refereed conference paper prior to scheduling their comprehensive exam.

The comprehensive exam is determined by the student's advisory committee. It will be both oral and written. It is recommended that these examination be completed within a 30-day period.

The oral examination should begin with a presentation of the dissertation proposal. While this examination centers on the dissertation topic, it also assesses the depth and breadth of the student's knowledge and ability to solve fundamental research problems. The response of the student to the written questions can also be probed during this examination.

The committee determines if the candidate 1) has sufficient ability and comprehensive knowledge to conduct the research, 2) has sufficiently reviewed the literature, and 3) has proposed research which has a reasonable scope and which could produce an original and acceptable research contribution.

After the comprehensive examination the student's advisor will submit the Graduate Form 6 and rubric to the graduate staff for department approval and submission to the Office of Graduate Studies. A candidate will be considered to have passed if all, or all but one, of the advisory committee vote for passing.

If failure is reported, the advisory committee will recommend suggested coursework or other remedial measures to the candidate. A second comprehensive examination may be scheduled 12 weeks after the completion of the first exam. Failure of the second examination will automatically terminate the candidacy.

### ***X.E. PhD Dissertation Defense***

At the defense, the candidate formally presents his or her doctoral research in a forum open to all members of the university community and the public at large and defends the research and conclusions against any challenges. All doctoral degree candidates must defend their dissertation in an oral defense examination conducted by their advisory committee.

Notice of the defense must be publicly announced at least two weeks prior to the examination. Information regarding the announcement must be given to the Graduate Studies Office prior to the two-week announcement.

The student will be responsible for distributing copies of their dissertation to the advisory committee at least two weeks prior to their defense. A copy of the dissertation will also be provided to the graduate secretary so that it may be made available to the Engineering Management and Systems Engineering faculty at least one week prior to the defense. The student will also arrange a time and place for the

oral dissertation defense. Students should contact the graduate staff and the Office of Graduate Studies to arrange for an official department announcement to be made at least two weeks in advance of the exam.

The defense will be conducted in a formal and professional manner. The chair of the student's advisory committee shall introduce the candidate and outline the defense procedure. The candidate shall then present the doctoral research findings to the committee and public. After the presentation, questions will be invited from all present.

After the open question-and-answer period, the student's advisory committee reconvenes in a closed session. The committee may recommend further examination, acceptance of the research, rejection of the research, or any other course of action. In the event of failure, a second examination may be permitted. A second failure results in dismissal.

After the dissertation the chair of the advisory committee will submit the Graduate Form 7 and rubric to the graduate staff for department approval and submission to the Office of Graduate Studies. A candidate will be considered to have passed if all, or all but one, of the advisory committee vote for passing. If failure is reported, the advisory committee will recommend suggested work to be completed or other remedial measures to be taken before another examination is scheduled.

All doctoral students must submit a final bound copy of their dissertation to the department for the engineering management and systems engineering library. The student must also provide a bound copy to their advisor. In addition, the student must provide a bound copy to their committee members upon request.

## **XI. Frequently Asked Questions**

### ***How do I get a graduate teaching assistantship?***

Most graduate teaching assistantships in the engineering management and systems engineering department involve teaching undergraduate or entry-level graduate courses. Students who wish to receive these appointments should contact the engineering management and systems engineering Department Chair, or speak with their advisor. In accordance with Missouri state statutes, international students are generally not eligible to be considered for a graduate teaching assistantship during their first semester. The relevant Missouri state statute can be found at:

<http://www.moga.state.mo.us/statutes/c100-199/1700000012.htm>

### ***How do I get a graduate research assistantship/funding?***

Funding is available on a competitive basis for MS thesis and PhD students. Students should contact faculty in their area of interest to see if those faculty have research projects to work on with them and funds available for research assistantships. If a faculty member decides to fund a student, they will notify the department. US students are eligible for loans and aid as qualified (<http://sfa.mst.edu/index.html>).

### ***As part of my MS degree I took several additional courses beyond the minimum requirements for my degree. Can I count these courses to fulfill the requirements for my PhD degree at Missouri S&T?***

The basic premise for counting courses is that one course can only count towards one degree. For a master's degree, all of the courses shown on your Form 1 (and subsequent Form 1-A's) are considered to be course requirements for your MS degree and, therefore, can not be used to fulfill course requirements for any other degree. However, if you have not finished your master's degree you may want to consider submitting a Form 1-A to remove extra courses from your Form 1 so that these courses will no longer be considered to be part of your MS degree requirements.

In this case it may be possible to count the extra courses towards fulfilling your PhD coursework requirements if you decide to continue your studies for a PhD at Missouri S&T. However, it is important to understand that the removal of courses from a program of study requires the approval of your advisor and advisory committee (for MS thesis students). It also requires the approval of the Associate Chair for Graduate Studies and the Office of Graduate Studies. Accepting these extra courses towards the fulfillment of your PhD degree requirements also depends on approval by the advisor and advisory committee, the Associate Chair for Graduate Studies, and the Office of Graduate Studies.

International students who wish to remove courses from one degree to apply towards another degree should discuss the implications of this change with the International Affairs Office. This change could conceivably affect the I-20 status of an international student. Therefore, the International Affairs Office has requested an additional requirement for international students who wish to remove courses from their program of study. The policy of the International Affairs Office is that courses being removed from

the program of study must be courses taken during the current semester. Courses cannot be removed retroactively.

***Is there any time limit on completing a PhD degree?***

The university requires that all of the graduate credit for a PhD degree must be obtained within a continuous 8 year period preceding the degree's conferral. Otherwise, it is necessary for the advisor to submit a formal written request for an extension and the request must be approved by the Associate Chair for Graduate Studies and the Office of Graduate Studies. In the case of PhD candidates who already have a master's degree or who have passed the qualifying exam, the time limit is reduced from eight to six years.

***Can I use correspondence or extension courses to fulfill some or all of my PhD coursework requirements?***

While correspondence and extension courses may, to a limited degree, be used to satisfy MS degree requirements, this type of coursework cannot form part of the PhD degree.

***I am currently enrolled as a graduate student in another department at Missouri S&T. What do I need to do to transfer into the engineering management and systems engineering department as a graduate student in either engineering management or systems engineering?***

Each department has different admissions requirements. Therefore, in order to transfer into the engineering management and systems engineering department at Missouri S&T, a student must submit a new graduate application with all of the supporting documentation. Usually the admissions office retains copies of the supporting documentation (e.g. GRE scores, transcripts from previous universities, letters of recommendation, etc.) and will forward these to the engineering management and systems engineering department. Students who wish to transfer into the engineering management and systems engineering department at Missouri S&T from another department at Missouri S&T must meet all of the normal admission requirements including GPA, test scores, adequacy of background courses, etc. In addition, for students who have completed one or more semesters at Missouri S&T, an official Missouri S&T transcript must be included with the application. Finally, students who are transferring from another department must provide an additional letter from their previous department indicating: i). The student requesting the transfer is currently in good standing in their current department; and ii). The current department approves their request to transfer. This letter should be provided by the graduate coordinator of their previous department. It should be addressed to the engineering management and systems engineering Associate Chair for Graduate Studies and should be included in a sealed envelope with the application.

***Are international graduate students eligible to participate in co-op assignments with companies or laboratories (federal or state)?***

An international student who wishes to take a co-op (CPT) assignment may do so if they provide:

1. A letter signed by the advisor indicating that they approve the CPT request.
2. A copy of the offer letter from the sponsoring organization.

3. An additional letter (if necessary\*) including the following four items:
  - a. A statement that the CPT assignment will be directly related to the student's area of study (specifically engineering management for EMgt students or systems engineering for SE students). For example, a telemarketing job would NOT be considered acceptable.
  - b. A statement of the job title.
  - c. A statement of the work location. This must be a physical address as opposed to a correspondence address. A post office box, for example, would be unacceptable.
  - d. A statement of the start and stop dates.

\*If the offer letter includes all items listed above (a through d), an additional letter is not required.

International students should also register with the COER (Career Opportunities and Employer Relations) Office before leaving for their co-op assignment so that they can officially be shown on the university records as being enrolled in a course.

***Do engineering management faculty members count as out of department members on a systems engineering graduate student's PhD advisory committee (conversely, do systems engineering faculty members count as out of department members on an engineering management graduate student's PhD advisory committee)?***

No. At least one faculty member from another department (outside engineering management and systems engineering) is required.

***Can I list a course on my Form 1, Form 1-A, Form 5, or Form 5-A for which I have received a grade of F?***

No. If you know that you have received an F in a course and you put it on your program of study (Forms 1, 1-A, 5, and/or 5-A), then you will have to retake the course before you can be considered to have completed your degree requirements. Some graduate courses are offered infrequently and some may even be offered only once. This can then significantly delay your degree completion date. Also, you should avoid including any course on your program of study if you are currently taking it and are in jeopardy of failing it by the end of the semester.

***I am an international student and have completed my BS degree at Missouri S&T (or another American undergraduate university). Do I still have to submit TOEFL scores?***

Yes. The TOEFL test is required for non-native English speakers.

***I was on a 25% appointment during the spring semester and would like to know if this entitles me to an out-of-state differential fee waiver during the following summer semester.***

If a student was on appointment for at least 25% for the previous spring semester and is likely to be on appointment in the upcoming fall semester, the student is allowed an out-of-state fee waiver for the summer. If the student is completing in the summer and not returning in the fall, the student is still entitled to an out-of-state waiver for the summer if the student had an appointment in the previous spring.



***Professor X, in another department, has offered me an assistantship to work on a project in their department and to complete a thesis under their supervision. Can I accept this offer and still graduate with an MS degree in engineering management or systems engineering?***

Yes, this is possible. First, you would have to find a faculty member in the department who is willing to be your co-advisor. The number of credit hours of 490 taken in this department should be equal to or greater than the number of credit hours taken in Professor X's department. However, at least half of all lecture courses, at least half of the 400 level lecture courses, at least half of the thesis research, and at least half of the special problems/seminars courses will be in your degree program. This requirement will be based on the number of credit hours rather than on the number of courses.

Rev. 04/19/13