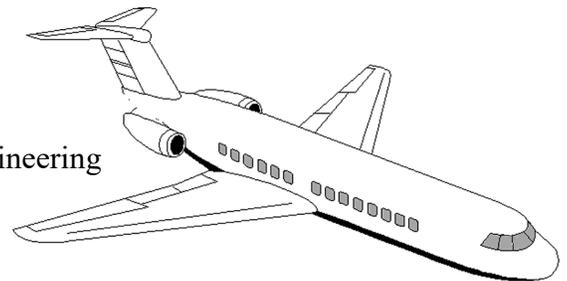
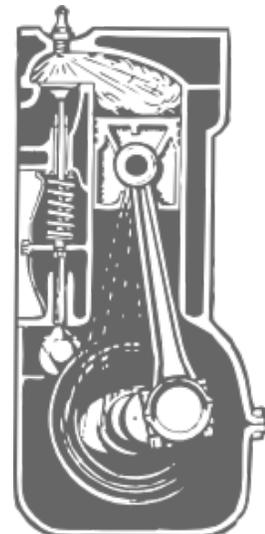
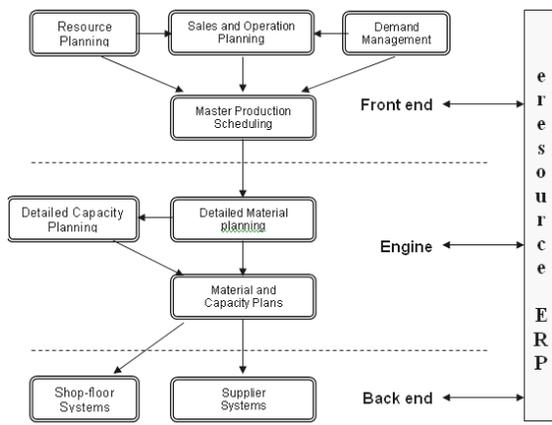


Department of Applied Engineering



and Technology Management



Welcome to New and Prospective Students

Thank you for your interest in the Master of Science in Technology Management (MSTM) program. If you are making your first inquiry about the program please contact the Department Chair. Whether you are inquiring about the program, newly admitted, or well underway, this document contains helpful information. Some information about the BS in Engineering Technology Management (ETM) and PhD in Technology Management and similar programs is provided to put the MS in Technology Management in context. Please let the Department Chair know about any broken links, typos, or other ambiguities within this document.

The MSTM program is meant to further the academic preparation and professional advancement of the baccalaureate graduate with a degree in, and professional orientation toward, technology management or similar engineering-industrial-technical field. The program provides theoretical and practical learning experiences to prepare graduates for leadership positions in industry, and/or prepare them for doctoral level programs such as the PhD in Technology Management.

The degree is coordinated by the Department of Applied Engineering and Technology Management (AETM) within the College of Technology (COT).

For information about the program, consult the program Department Chair (Dr. Randy Peters randy.peters@instate.edu, 812 237 4962).

What is Technology Management?

Alternatively, Is the MS (or PhD) in Technology Management Right for Me?

Technology management is a common term to describe supervision and management functions in engineering-industrial-technical environments. *Technology management* can be thought of as an umbrella term for a range of engineering-industrial-technical management programs. Regardless of the name, technology management programs are meant to prepare management-oriented technical professionals.

Industrial implies industries such as automotive, construction, and manufacturing. The industrial functions would include such things as product and equipment design, production planning, process control, customer relations, training, quality control, materials processing and testing, packaging, and the management of such functions. The technologies covered would be things like electronics, computer control and networking, machining, welding, and others. Technology Management is differentiated from mere engineering or business management due to its technical hands-on focus. At the undergraduate level, a large proportion of the courses will be laboratory-based.

Many technology management programs exist with varying titles and with varying levels of specificity. All will integrate (a) technology and (b) the management of that technology; and (c) will focus on experiential and tactile learning as the preferred instructional method. The

following table summarizes such programs at ISU (not including minors and certificates, e.g., the Lean Six Sigma minor).

Table 1. COT Technical Programs

Technology Management Type Programs in the College of Technology		
BS	MS	PhD
Architectural Engineering Technology	Electronics & Computer Technology	Technology Management: with concentrations in
Automation and Control Engineering Technology	Occupational Safety Management	<ul style="list-style-type: none"> • Digital Communications • Construction Management • Human Resource Development and Industrial Training • Manufacturing Systems • Quality Systems
Automotive Engineering Technology	Technology Management	
Aviation Management		
Civil Engineering Technology		
Computer Engineering Technology		
Construction Management		
Electronics Engineering Technology		
Engineering: with concentrations Civil, Industrial, and Mechanical		
Engineering Technology		
Engineering Technology Management		
Information Technology		
Interior Architecture Design		
Manufacturing Engineering Technology		
Mechanical Engineering Technology		
Packaging Engineering Technology		
Safety Management		
Unmanned Systems		

Entrance Requirements

Unconditional admission to the program requires fulfillment of all University and program requirements as summarized below. See the College of Graduate and Professional Studies (CGPS) web site and the Graduate Catalog for more information.

- Minimum 2.7 GPA from the baccalaureate degree.
- ABET accredited BS major (from ISU or elsewhere) or approved ISU BS with 4+1 accelerated option.
 - Case-by-case consideration of programs with another accreditation closely aligned with ABET, e.g., ATMAE or ACCE.
 - Case-by-case consideration of non-accredited programs whose curriculum is closely aligned with ABET.
- GRE
 - For unconditional admission: 40th or greater percentile in Verbal (149), Quantitative (151), and Analytical (3.5).
 - For conditional admission: minimum scores of Verbal (143), Quantitative (145), and Analytical (3.0). The general “condition” is to maintain a 3.5 GPA in the MS courses for the first 9 credits.
 - 4+1 accelerated students must take the GRE but have no minimum score requirements.

Timeline and Routing for a New Student

Following are the typical steps in getting started in the program. For other steps and actual dates, see the CGPS website.

1. You are aware of the MSTM program, e.g., from an alum, employer, and ISU web site, etc.
2. You talk to the Department Chair or other faculty member about the program. You also look at the CGPS web site, the graduate catalog, and this document to learn more about the program.
3. You decide to enroll in the program, given your prior course work, work experience, and future education and professional goals.
4. You apply via the ISU online application system.
5. When admitted, you contact the Department Chair or assigned Advisor as soon as possible to get initial advice and register for courses.
6. As soon as possible (before the next advising period), you finalize the Contract of Study.

Advising & Advisors

The Department Chair may provide initial advice to prospective and recently admitted students. With the development of the formalized COS, advising duties are transferred to the Advisor. The

Department Chair may also be an Advisor. The student’s Advisor guides the student through the student’s Culminating Experience and otherwise mentors the student.

The following table lists the primary faculty members involved with the program and their primary expertise. These faculty members may serve as Advisors or Committee Members. Note that all faculty members have diverse qualifications and interests and are competent to be the Advisor or Committee Member for any student.

Table 2. MSTM Graduate Faculty Members

Faculty Member	Primary Expertise
Troy Allen	Aviation
Nesli Alp	Engineering Management
Affan Badar	Industrial, Mechanical
Phillip Cochrane	Automotive, Mechanical
Sheikh Ferdous	Mechanical
Kara Harris	Tech & Engineering Education
Michael Hayden	Quality, Research and Statistics
Kristina, Lawyer	Automotive, Mechanical
James McKirahan	Manufacturing, Quality
Alistar McLeod	Manufacturing
Ahmed Mohamed	Civil
Riem Rostom	Environmental
Randy Peters	Automotive
Mehran Shahhosseini	Mechanical
James Smallwood	Manufacturing
Michael Williamson	Civil
Several others	With expertise in Construction, Electronics, Safety, and others (see the list of COT Technical Programs.

Committee Members

In addition to the Advisor, two other faculty members make up the student’s Culminating Experience Committee (usually termed the student’s *Committee*). Committee Members evaluate the Culminating Experience (which includes the thesis/project and the Comprehensive Exam) and otherwise assist the Advisor and the student. Usually, Committee Members are other faculty members in Table 2. However, other faculty members in and out of the AETM Department can serve on a Committee. Off-campus personnel with the appropriate credentials can be approved to be an ad hoc Committee member.

Coordinator

The Coordinator is the faculty member who provides leadership for the program. The Coordinator provides initial advice until the permanent Advisor and COS are finalized. The Coordinator can also be an Advisor and Committee Member. Currently, the Department Chair is the Coordinator.

Contract of Study

Your Advisor will help you formulate a COS that details the courses you are required to complete to earn the MSTM degree. In addition to course work passed, there are other graduation requirements, e.g., minimum GPA. The COS must be completed no later than the end of the course registration period for the student’s second semester. It is wise to draft a COS during the application process to gauge your suitability for the MS program. Concomitant with the finalized COS, two additional Committee Members will be selected. The COS is at the end of this document.

Program at a Glance

Courses¹

Core (18 credits)	MET 504 – Engineering Design and Management
	ET 505 – Economic Analysis for Engineering & Technology
	ET 601 – Technology and the Supervisor
	ET 607 – Statistics for Experimental Research in Technology
	ET 608 – Application of Simulation Modeling and Analysis
	ET 698 – Research Methods
Advisor-Approved Elective (9 credits min)	
Culminating Experience (6 credits)	ET 697 – Major Project 6 credits OR
	ET 699 – Master’s Thesis 6 credits

¹A 500-level course cannot be repeated if it was taken at the 400 level as an undergraduate, e.g., if ET 405 was taken as an undergraduate, ET 505 cannot be part of the MSTM Contract of Study. When a course cannot be taken, an additional advisor-approved elective is used. The program has no “free” electives, i.e., included on the COS at the student’s discretion. All courses are required, or advisor approved. The advisor-approved electives must have an engineering,

industrial, or technical focus, and be compatible with ABET accreditation. Courses within the AETM department are preferred; other COT courses are allowed. Make sure that all prerequisite courses are included in the Contract of Study. Prerequisite or deficiency courses can increase the hours beyond the 33 credit hour minimum.

Transfer Credit

Up to 9 hours of prior graduate course work from other institutions or other programs at ISU may be used on the COS. Substitute courses must be equivalent in content and level to the MSTM required or advisor-approved elective course.

Credit for Prior Learning

For some courses it may be possible to receive credit for prior learning, e.g., professional certification or licensure. Contact the Department Chair for details. A maximum of 9 hours of credit for prior learning and transfer credit, total, may be used for the COS.

Substitutions

Normally, every Core course must be taken (see the preceding section). However, a 500-level course cannot be repeated if it was taken at the 400 level as an undergraduate, e.g., if MET 405 was taken as an undergraduate, MET 505 cannot be part of the MSTM Contract of Study. Also, but rarely, a required course may not be scheduled as planned. When a course was complete as an undergraduate or is not scheduled as planned, another suitable course is approved by the advisor.

Selecting a Topic and Committee Members

Many factors go into the selection of a topic and Committee Members. As early as possible in your program, discuss possible topics with your Advisor (who will also direct your thesis or project Committee).

Topics

The topic must be appropriate (see the pre-proposal elements below). Though the topic is most important and drives the method (not visa versa), the student must have the resources to apply the method. Assume the problem is that my faucet leaks. To work on that problem, I need to know how to use plumbing tools. The leak is more important and drives the tools. However, if I do not have plumbing tools I may have to abandon that project in favor of one for which I have the tools (or have the time, money, data, lab, personnel, etc.).

From your prior learning and professional experiences, you should be aware of numerous problems, questions, and requirements that would be great topics. The primary reason you want to earn the MSTM should be to address those problems, questions, and requirements.

Appropriate topics are real world (not a home or hobby topic). The research methods course requires you to have an approved topic, but the sooner a topic is approved, the better.

It is common for students to address a problem, question, or requirement (the topic of their Culminating Experience) to one or more of the following, which might also be funded, at least in part, by a funding agency, an employer, or other organization.

- The student's employer or another organization.
- An ISU faculty member's or other researcher's project.
- An ISU lab or other ISU function.

Note that while collaboration is common and encouraged, the student's project for their Culminating Experience must be completed solely by the student. For example, a student's project can be part of a bigger project but the part that is the students must be a complete subpart that the student performed by themselves. There are no joint Culminating Experience projects or reports.

Committee Members

Committee Members volunteer to serve on a student's Committee. Some potential members are too busy working on other Committees or decline for other reasons. In deciding, most Committee Members will want to see a 1-2 page pre-proposal (see the pre-proposal elements below). The student should first communicate with the Advisor and receive approval before forwarding documents to other Committee Members.

Some Committee Members have general criteria for serving on Committees. Common criteria include things such as the student has demonstrated proficiency with writing (using APA style) and the methods to be used in the study. Committee Members are more likely to want to work with a student when the student's project is of high quality and aligns with the Committee Member's own research agenda.

Culminating Experience Proposal

The Culminating Experience proposal is written in the research methods course.

Proposal and Pre-proposal Elements

Most Committee Members require a proposal to have completed chapters 1, 2 (2 should at least be substantially complete), and 3. Following are the elements that many faculty members want to see in a 1-2 page pre-proposal (with all answers being *yes*).

PhD in Technology Management

- Does the question/problem/task focus on a specific field or specialization?

- Does the question/problem/task focus on management?
- Does the question/problem/task focus on technology? The first three bullets taken together could be stated: Is the problem about the management of technology in the specialization context?
- Is the activity research?
 - A systematic inquiry?
 - Meant to produce generalizable knowledge?
 - In a discipline or field (the first three bullets)?
- Is the problem important; should it be worked on given all the other needs of the world?
- Will the answer/solution/results significantly add to the body of knowledge?
- Will the project require approximately 18 credit hours (1 academic full-time year) of effort?

MS Thesis or Project

The MS Culminating Experience is similar in structure to the PhD dissertation but has less of an expectation for generalizability, the importance to the field, and the significance of the problem than does the PhD. MS Culminating Experiences tends to be more practical in nature, e.g., fixing a specific real problem, creating something, or other R&D. All the PhD bullets above apply but the effort is equivalent to 6 credit hours.

Formatting

The APA style manual is the official style for technology. ISU thesis formatting standards add other requirements. See the CGPS website for the steps in completing a thesis, the thesis handbook, and other useful information.

Culminating Experience

The Culminating Experience for this program includes (a) either a thesis or graduate project and (b) a comprehensive evaluation. Both theses and projects have the following common elements.

- The Culminating Experience must be completed during the last semester of course work or after completing at least 24 semester hours of the approved COS.
- The student's Advisor is the instructor of record.
- Normally, the traditional five-chapter thesis model will be used.
- The written report will adhere to the APA Publication Manual. For a thesis, ISU's Thesis style will be layered on top of APA style.
- The ISU thesis routing and approval process will be used. See the CGPS website and the thesis dissertation handbook for more details. For example, for a project or thesis:
 - There will be 3-faculty member Committee (there is a CGPS form for this).
 - The Committee will approve the proposal (there is a CGPS form for this).

- The student will present and defend the results of the Culminating Experience to the Committee (there are CGPS forms for scheduling and approving the defense and report).
- The student will make any corrections and submit the final report of the Culminating Experience.

The intent is that a thesis and a project will be procedurally and structurally similar. The significant differences between a thesis and project follow.

- Some paperwork for a project is routed only up to the AETM Department level.
- The timeline for project completion can be less restrictive than for a thesis. However, the presentation/defense of the project should take place no later than 2 weeks before the end of the semester. A thesis should be defended at least 6 weeks before the end of the semester. See the CGPS website for procedures and timeline.

Thesis vs Project

Many students assume a project is easier than a thesis. This is not the case. There are more quality checks with a thesis than a project because a thesis is also approved by the COT and CGPS Deans. In addition, a copy of the thesis is placed in the library. Consequently, a thesis usually takes more than one semester. A project is the same level of quality but does not have as many steps in the timeline. The best preparation for a doctoral dissertation is to have done a thesis. If a person is not going to do a doctorate, a thesis is a better terminal experience than a project. A thesis also looks better on a resume. Thesis or project, you should decide on one of them when you complete your contract of study (which is to be completed the student's first semester).

Course Content

Project or thesis, the Culminating Experience is a course. Like any other course, there is a course site, syllabus, and due dates. Interaction with other students is required. The course is not an independent study course. There are several point-bearing assignments in the course. Not all the grade is based on merely doing the project or writing the report. Some graded components of the Culminating Experience course follow. Though the research report is about 50% of the points in the course, you must complete all assignments.

- Research proposal.
- Progress reports.
- Research report.
- Project presentation/defense.
- Comprehensive examination.
- Taking and passing the ATMAE Certified Technology Manager exam.
- Dissemination plan.
- Career plan.

- Completing the MSTM graduating exit survey.

Comprehensive Examination. The Comprehensive Examination is part of the Culminating Experience course. The student's Committee, led by the Advisor, administers, and evaluates the written and oral components. The performance on the evaluation is a component of the grade for the Culminating Experience.

The written component has the following elements.

- Three questions. One question each pertaining to the Core, the focus of the advisor-approved electives, and a third question focusing on the Culminating Experience.
- Three hour time limit, proctored, no sources (book, internet, notes, etc.), word-processed.
- To be conducted no later than four weeks before the end of the term.

The oral component is used to discuss the results of the written component and clarify student's written responses as needed. It is to be conducted within two weeks after the written portion and no later than two weeks before the end of the term. It is usually conducted in conjunction with the student's defense of the Culminating Experience.

Important Meetings and Events

There are many important events in the complete timeline in earning a MS degree; see the CGPS website. In addition to the many informal meetings a student will have with various professors and Committee Members, several key activities require a meeting. Typically, these meetings are accomplished by an on-campus meeting or video conference.

Contract of Study

Though technically all Committee Members sign off on the Contract of Study, a live meeting of the student and all Committee Members is usually not necessary. Usually, the student works with the Advisor to formulate a Contract of Study (with other Committee Members interacting with the Advisor as necessary).

Proposal Defense for Project or Thesis

Usually this requires a meeting of the student and all Committee Members. Face-to-face meetings, when possible, are the best. Distance students usually set up a telephone conference call. There is a lot that must happen before a student sets up this meeting. Generally, no other Committee Members should be given a proposal or finished document until the Advisor says that it is OK to do so. The student should work closely with the Advisor in selecting a project or thesis topic and outlining the project or thesis. An individual Advisor may want one or more unofficial pre-proposals; other Committee Members may or may not be involved with pre-proposals.

The 698 Research Methods course, the student should have substantively written the proposal. The proposal is typically a future-tense version of chapters 1, 2, and 3 of the completed project report or thesis.

After Advisor approval, the student should schedule a meeting and forward the proposal to all Committee Members 2 weeks before the meeting. Usually, the student uses slides or handouts to summarize the main parts of the proposal, e.g., what the question or problem is, why the problem is important (the rationale), related research (review of literature), the proposed methodology and all the other main content of chapters 1-3. This is usually a one-hour meeting. Note that the proposal meeting is a type of defense. The student is not merely presenting what he or she wants to do but is *defending* what he or she wants to do. The student's presentation should only be 10-15 minutes. The rest of the time is used by the Committee to ask questions and direct the student. It is most common for the Committee to approve the proposal *with corrections and/or clarifications*. It is also common not to approve the proposal at that time but to require another meeting after corrections are made.

Project or Thesis Defense

This is scheduled and conducted the same as the proposal defense.

Comprehensive Exam

The Comprehensive Exam has two parts: written and oral; these are described elsewhere in this document. The written part does not require a meeting per se but special arraignments must be made. The written part is proctored; this means that a trustworthy authority must verify that the student follows the conditions of the exam, e.g., that the exam is closed book and has a time limit. It is up to the student to find this proctor. On-campus students usually arrange an exam time and location with the Advisor, department administrative assistant, or other University personnel. Distance students must find a proctor. The proctor must be qualified to do so. Common proctor sources are testing center personnel, instructors, or certain other personnel at educational institutions. A professional testing center such as *Sylvan* can be used. An employer's HR department may be able to do it.

The oral part does require a meeting. Usually, this meeting coincides with the Culminating Experience defense meeting.

Note that it takes some planning and forethought to set up the meetings. Note that there are deadlines and required paperwork, and that it can take a couple of weeks to set up a meeting. It is the student's responsibility to communicate with each Committee Member and find a suitable meeting time and date. The student should not try to set up a meeting until the Advisor says that it is OK to set up the meeting.

Presentations in Meetings

Most Committee Members prefer that PowerPoint slides be used as an aid in presenting a project or thesis proposal or final report. Therefore, use slides as an outline of what to present and only show key figures and tables. Do not present your entire proposal or report via slides. A proposal usually requires 10 or fewer slides and a completed project or thesis defense 20 or fewer slides. Include a slide or two about your BS, work experience, and qualifications, e.g., certifications. Include a few slides each about the most important points of each of the 5 chapters. Remember that the Committee has already read the report; only cover key elements. Following is the typical sequence of events and/or slides for a Culminating Experience defense (a proposal defense would be the same but only include the information for chapters 1-3).

Event	Approx. Duration
Introductions	2 minutes
Student background, e.g., previous degrees and work experience; why you are in the program	2 minutes
Career plans of student	2 minutes
Presentation of the research	15 minutes
Q&A about the research (based on presentation and the research report	15 minutes
Oral Comps	15 minutes
Wrap up, including additional directives to be met for graduation, e.g., editing the report.	10 minutes

General Scheduling Advice

Get to know your Advisor as soon as possible. Develop a COS as soon as possible. Schedule your next semester's courses as soon as possible. Also rely upon the actual schedule of classes found at ISU's website. Following is the best general advice that can be given (with #1 the highest priority). Only take courses on your COS. See your advisor for more help. Note that most courses are only offered once per year and some elective courses are only offered once every two years.

1. Take any course that is a prerequisite for another course.
2. Take the 607 statistics course as soon as possible.
3. The 607 statistics and the 698 research methods courses must be completed before a student enrolls in the project or thesis course.
4. Take other core courses.
5. Take advisor-approved electives.

Funding

You can use ISU's search function to find information, using keywords such as *funding*, *grants*, *awards*, *scholarships*, *assistantships*, *employment*, and similar terms. Use the ISU A-Z pulldown menu for help in finding web pages, contact information, and physical office locations. Some funding opportunities are only available after you are enrolled or only at certain points, e.g., research funding for your major project or funding to present the results of your major project.

Graduate Assistantships

The AETM Department Chair makes decisions about Departmentally-funded graduate assistantships (GA) and student workers. Most of our GAs and student worker needs are very specific, e.g., for lab or grading help with fluid power, diesel engines, foundry, Pro E CADD, etc. Most often, GAs and student workers are selected after they have been in one or our programs for a year (allowing the Department to best assess how to match a student to our specific needs). You should talk to the Department Chair about your background and work experience.

It is possible to be a GA for various entities on campus (not just your specific academic department). See the CGPS website.

Student Employment

It is also possible to get a non-GA related job as a student employee. The Human Resources website lists GA, student, and non-student jobs. There is also the possibility of local Terre Haute employment.

Scholarships

You can apply for various scholarships. See the COT, CGPS, Office of Student Financial Aid, and University Scholarship Office websites.

Contact Information

Again, thank you for your interest in the MSTM program. Please contact the Department Chair for further clarification or discussion.

Dr. Randy Peters: Applied Engineering and Technology Management Dept. Chair (and MSTM Coordinator)

Email: randy.peters@instate.edu

Office ph.: 812 237 4962

John Gallagher: AETM Department Administrative Assistant

Email: john.gallagher@indstate.edu

Office ph.: 812 237 3377

Contract of Study
Master of Science in Technology Management

Student Name:	
Student ID:	
Advisor Name:	

Contract of Study (33 Semester Credits Minimum)

	Courses ⁱ	Semester	Grade	Graduate Checkout ⁱⁱ
Core (18 credits)	MET 504 – Engineering Design and Management			
	ET 505 – Economic Analysis for Engineering & Technology			
	ET 601 – Technology and the Supervisor			
	ET 607 – Statistics for Experimental Research in Technology			
	ET 608 – Application of Simulation Modeling and Analysis			
	ET 698 – Research Methods			
Advisor-Approved Electivesⁱⁱⁱ (9 credits min)				
Culminating Experience (6 credits)	ET 697 – Major Project 6 credits OR			
	ET 699 – Master’s Thesis 6 credits			

Graduate Checkout			
All program-level requirements (courses and other paperwork ^{iv}) have been met.			
	Printed name	Signature	Date
Coordinator or Dept. Chair			

Contract of Study Approval (Advisor or Dept. Chair) _____ Date: _____

ⁱ A 500-level course cannot be repeated if it was taken at the 400 level as an undergraduate, e.g., if MET/ET 405 was taken as an undergraduate, ET 505 cannot be part of the MSTM Contract of Study. When a course cannot be taken, another suitable course is substituted.

ⁱⁱ This column is used by the MSTM Coordinator or Department Chair to verify that the Contract of Study adheres to the program requirements.

ⁱⁱⁱ These courses must have an engineering, industrial, technical focus, and compatible with ABET accreditation. Courses within the AETM department are preferred; other COT courses are allowed. Make sure that all prerequisite courses are included in the Contract of Study.

^{iv} Various other forms are required, e.g., committee membership, project proposal approval, and project defense. See the CGPS web site.