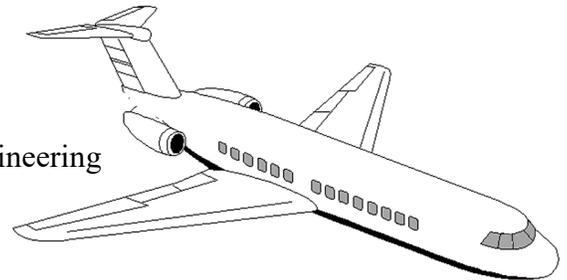


Department of Applied Engineering



and Technology Management

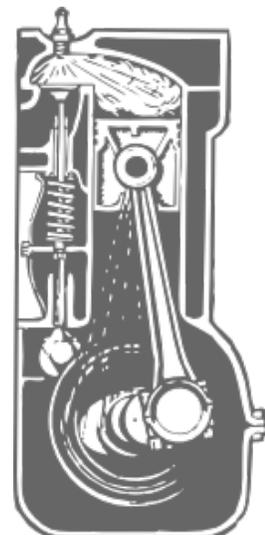
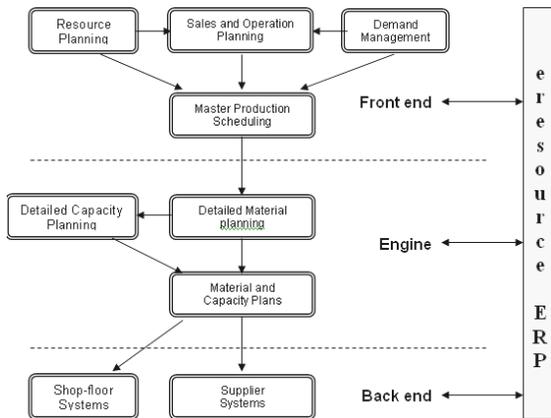


Table of Contents

WELCOME TO NEW AND PROSPECTIVE STUDENTS	3
WHAT IS TECHNOLOGY MANAGEMENT?	3
ENTRANCE REQUIREMENTS	5
TIME LINE AND ROUTING FOR A NEW STUDENT	5
ADVISING & ADVISORS	5
COMMITTEE MEMBERS	6
COORDINATOR	6
CONTRACT OF STUDY	6
TECHNOLOGY CONCENTRATIONS	7
TRANSFER CREDIT	8
CREDIT FOR PRIOR LEARNING	8
SUBSTITUTIONS	8
CULMINATING EXPERIENCE	8
THESIS VS PROJECT	9
SELECTING A TOPIC AND COMMITTEE MEMBERS	9
CULMINATING EXPERIENCE PROPOSAL	10
COMPREHENSIVE EVALUATION	11
IMPORTANT MEETINGS AND EVENTS	11
GENERAL SCHEDULING ADVICE	13
FUNDING	13
CONTACT INFORMATION	14

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 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). The program Contract of Study (COS) depicts the curricular requirements at a glance. The technical concentration is meant to allow an individualized COS that best fits the student's prior course work, experiences, and goals.

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

What is Technology Management?

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

Technology management is a current term to describe supervision and management functions in industrial-technical environments. *Technology management* can be thought of as an umbrella term for a range of industrial-technical 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 industrial-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 Automation and Control Engineering Technology Automotive Engineering Technology Aviation Management Civil Engineering Technology Computer Engineering Technology Construction Management Electronics Engineering Technology Engineering: with concentrations in <ul style="list-style-type: none"> • Civil • Industrial • Mechanical Engineering Technology: with concentrations in <ul style="list-style-type: none"> • Automotive engineering technology • Computer engineering technology • Electronics engineering technology • Mechanical engineering technology • Packaging engineering technology Information Technology Interior Architecture Design Manufacturing Engineering Technology Mechanical Engineering Technology Packaging Engineering Technology Professional Aviation Flight Technology Safety Management Unmanned Systems	Electronics & Computer Technology Occupational Safety Management Technology Management: with concentrations in <ul style="list-style-type: none"> • Automotive • Aviation • Manufacturing • Mechanical Engineering Technology • Packaging • Quality 	Technology Management: with concentrations in <ul style="list-style-type: none"> • Digital Communications • Construction Management • Human Resource Development and Industrial Training • Manufacturing Systems • Quality Systems

Entrance Requirements

Unconditional entrance to the program requires an accredited baccalaureate degree with a minimum 2.7 GPA, GRE quantitative and verbal scores each at or above the 40th percentile, and other criteria set by the University, see the College of Graduate and Professional Studies (CGPS) website. No specific baccalaureate degree is required for admission; however, students with academic and career experience related to the selected MSTM Concentration will be best prepared for the content and rigor of the program.

Time Line 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. The student decides the MSTM and a specific Concentration is appropriate (e.g., given their prior course work, work experience, and future education and professional goals).
2. The student applies via the ISU online application system.
3. If admitted, the student should contact the Department Chair or assigned Advisor as soon as possible to get initial advice and register for courses.
4. As soon as possible (before the next advising period) the student should finalize the COS.

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 faculty members involved with the program and their MSTM primary Concentration affiliation. These faculty members may serve as Advisors or Committee Members. Note that the faculty members are not restricted to the Concentration listed in the table. All faculty members have diverse qualifications and interests, have general technical/industrial/engineering expertise, research and management experience, and are competent to be the Advisor or Committee Member for a student in any Concentration.

Table 2. MSTM Graduate Faculty Members

Faculty Member	Primary ¹ MSTM Concentration Affiliation
Troy Allen	Aviation
Nesli Alp	Quality
Affan Badar	MET, Quality
Phillip Cochrane	Automotive

1 Any MSTM graduate faculty member can chair or serve on any student's Committee. Other graduate faculty from COT and ISU at large can serve on any student's Committee.

Kara Harris	
Michael Hayden	Manufacturing, Quality
Kristina, Lawyer	Automotive, MET
Steve McCaskey	Aviation
James McKirahan	Manufacturing, Quality
Alister McLeod	Manufacturing
Ahmed Mohamed	
Randy Peters	Automotive
Marion Schafer	Packaging
Mehran Shahhosseini	MET
James Smallwood	Manufacturing
Michael Williamson	

Committee Members

In addition to the Advisor, two other 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 and instructors in the AETM Department and assigned to the technology programs in Table 1 can serve on a Committee. It may be appropriate for members in other academic programs to serve on a Committee. Off-campus personnel with the appropriate credentials can be approved to be an ad hoc member.

Coordinator

The Coordinator is the faculty member who provides leadership for the program. The Coordinator provides initial advice until the Technology Concentration, permanent Advisor, and COS are finalized (hopefully by the middle of the student’s first semester). 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 the student is required to successfully 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 and the proposed Technology Concentration. Concomitant with the finalized COS, two additional Committee Members will be selected.

As a prospective student you should familiarize yourself with the COS form. You should think about your Technology Concentration. Consider your academic and work background. Consult information in this document and the Graduate Catalog (for a description of the program and courses). You must select a Technology Concentration before you are admitted.

Technology Concentrations

The Technology Concentration provides a focus to the degree and meshes with the student's prior course work, experiences, and goals. The Concentrations follow. See the Graduate Catalog for more information about the program and courses.

Automotive Concentration

- AET 533 - Service Facility Organization and Management
- AET 557 - Fleet Management
- AET 577 - Advanced Vehicle Technologies

Aviation Concentration

- AVT 577 - Intermodal Transportation & Logistics
- AVT 592 - Business Principles of Global Aviation
- AVT 623 - Applications in Crew Resource Management

Manufacturing Concentration

- TMGT 563 - Six Sigma Green Belt
- TMGT 571 - Production Planning and Control
- TMGT 578 - Industrial Organization and Functions

Mechanical Engineering Technology Concentration

- MET 504 - Engineering Design and Management
- MET 608 - Application of Simulation Modeling and Analysis
- MET 633 - Computer Aided Graphics Software

Packaging Concentration

- PKG 582 - Package Development and Analysis
- PKG 584 - Packaging Design, Analysis and Testing
- PKG 586 - Packaging Machinery Systems

Quality Concentration

- MET 611 - Experimental Design and Process Analysis
- MET 612 - Reliability, Maintainability, and Serviceability
- TMGT 563 - Six Sigma Green Belt

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 course.

Credit for Prior Learning

For some courses it may be possible to receive credit for prior life experiences, e.g., via work experience. 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 and Concentration 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 has been taken as an undergraduate or cannot due to not being scheduled, another suitable course is substituted.

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.
 - The Committee will approve the proposal.
 - The student will present and defend the results of the Culminating Experience to the Committee.
 - The student will make any corrections and present a finished and appropriately bound final report or 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.

- The routing of paperwork for a project progresses only to the AETM Department level.

- The time line 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 time line.

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. Also, a copy of the thesis is placed in the library. A project is the same level of quality but doesn't 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).

Selecting a Topic and Committee Members

There are many factors that 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 tools 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 don't 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.).

Committee Members

Committee Members volunteer to serve on a student's Committee. Some potential members are too busy working on other Committees, don't have the expertise, or decline for other reasons. In making a decision, 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

Proposal and Pre-proposal Elements

Some Committee Members require a proposal to be a completed chapters 1, 2, and 3 (but written in future tense). Others only require a proposal be a complete chapter 1 with chapters 2 and 3 outlined. Most Committee Members will expect a proposal to contain chapters 1 & 3 as complete as possible with chapter 2 substantially complete. 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 the specialization?
- Does the question/problem/task focus on management?
- Does the question/problem/task focus on technology? The 3 taken together could be stated: Is the problem about the management of technology in the specialization context?
- Is the activity research?
 - A systematic activity?
 - Meant to produce generalizable knowledge?
 - In a discipline or field (a field such as 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 required approximately 18 credit hours (1 academic full-time year) of effort?

MS Thesis or Project

The MS thesis 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. A project tends to be more practical in nature, e.g., fixing a specific real problem, creating something, or other R&D. It is common for a project to have a task or requirement statement in lieu of a research question or problem. Compared to a thesis, a project has less of an expectation for generalizability, the importance to the field, and the significance of the problem than does a thesis. The project would still typically require a report equivalent to a thesis, e.g., an APA formatted 5-chapter thesis/dissertation mode. For a project, those 5 chapters are often shorter than for a thesis with the project documentation being a substantial appendix. 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.

Comprehensive Evaluation

The Comprehensive Evaluation is to be taken during the student's last semester in the program and has both a written and oral component. 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 Technology Concentration, 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 (but does not have to be).

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, there are several key activities that require a meeting. Typically, these meetings are accomplished by an on-campus meeting or a phone 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. As a general rule, 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 should have taught the student how to write a proposal. The proposal is typically a future-tense version of chapters 1, 2, and 3 of the completed project report or thesis. The intent is that the student writes the proposal in the 698 course.

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 is the problem 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. When conducted by teleconference, the student usually emails PowerPoint slides (along with the proposal) to Committee Members so they can follow along with the student. 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 not uncommon to not 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 have to 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 someone who is 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 project or thesis defense meeting.

Note that it takes some planning and forethought to set up the meetings. Note that there are deadlines 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 or 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. Following is the typical sequence of slides for a completed project or thesis (a proposal defense would be the same but only include the information for chapters 1-3).

- A slide or two about your BS, work experience, and qualifications, e.g., certifications.
- 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.
 - Chapter 1: Introduction—the question or problem of the study and why it is important and other key parts.
 - Chapter 2: Review of Literature—the most important terms, concepts, and existing research.
 - Chapter 3: Methods—key parts, e.g., sampling, instruments, and analysis techniques.
 - Chapter 4: Results—key findings and products.
 - Chapter 5: Conclusion—key interpretations and recommendations. Make sure you loop back and discuss to what extent the questions, problems, goals, etc. from Chapter 1 were addressed.

It should take no longer than 20 minutes to go through the slides. After, you are done presenting, the Committee Members will ask you questions, suggest clarifications to the report, and discuss whatever the members think should be discussed.

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. The Department Chair maintains a rollout or planned long-term schedule of courses. Consult the rollout but realize that changing circumstances can cause the actual schedule to be different from the planned schedule. Therefore, 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.

1. If you are in the Quality or MET concentrations it is very important (critical for Quality) to take the 607 statistics course as soon as you can. This class is the prerequisite for most of the Quality concentration courses and some of the MET courses.
2. Take any course that is a prerequisite for another course.
3. It is very useful to take the 698 research course and the 607 statistics course as soon as practical. If you are not Quality or MET, you can delay taking these courses a semester or two but be cognizant of the rollout. Also, 607 and 698 must be completed before a student works on their project or thesis. Therefore, for every concentration, 607 and 698 should be taken the first year.
4. Take any core courses that are only offered once every two years.
5. Take any concentration course that is offered (assuming you have had the prerequisite).
6. Take an advisor-approved elective course.

Funding

You may have to contact several offices in search of funding opportunities. Use the ISU A-Z pulldown menu for help in finding web pages, contact information, and physical office locations. You can also use ISU's search function to find information, using keywords such as *funding*,

grants, awards, scholarships, assistantships, employment, and similar terms. 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

In the AETM Department, the Department Chair makes final decisions about Departmentally-funded graduate assistantships (GA) and student workers. Most of our GA and student worker needs are very specific. Our GAs and student workers mostly help professors teach specific courses, e.g., fluid power, diesel engines, foundry, Pro E CADD, etc. The AETM Department is provided with a limited number of GAs and student workers. Most often, GAs and student workers are selected after they have been in one or our programs for a year (because then we can best assess how to match them to our specific needs). You should talk to the Department Chair in-depth 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.

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