

*Department of  
Engineering and Technology Management*

# *Student Handbook*

*February 2003 Version*



PORTLAND STATE  
UNIVERSITY

## **WELCOME!**

On behalf of the faculty and staff, I welcome you to the Department of Engineering and Technology Management (ETM) at Portland State University.

You are among a select group of individuals who have come from around the globe to study in what is recognized as one of the finest graduate programs in our field. The faculty and staff join me in our dedication to make this an academically and professionally rewarding experience for you.

The ETM faculty and students comprise a diverse group, not only in their personal backgrounds, but in their professional backgrounds as well. They are a group of men and women who are experts in their fields. Their academic and workplace credentials provide our students with depth both in research and in the application of that research in technical organizations. The leading edge research you will conduct with our faculty will be of critical importance to the management of technology for many years to come.

Portland State University's ETM Department is also home to one of the most prestigious international technology management conferences: Portland International Conference on Management of Engineering and Technology (PICMET). As a student, you will have the opportunity to be part of this conference, to meet scholars and researchers from around the world in formal and informal gatherings, and to make professional contacts well beyond the PSU campus.

This handbook has been provided to help smooth your first days in the program and to serve as a guide as you navigate your studies in the department. The handbook was compiled with suggestions from current students and contains information about the campus, the city, the programs offered by the department, and other essentials of academic life at PSU.

I believe you will find it a great resource as you make your way from graduate student to one of the new leaders in technology management.

With best wishes for a successful experience at ETM.

Sincerely,

Dundar Kocaoglu, Ph.D, Chair  
Department of Engineering & Technology Management  
College of Engineering & Computer Science

## VISION, MISSION, OBJECTIVE AND GOAL

- **Vision** – To develop leaders for a world in which technology is the dominant force and management of technology is the requirement for global leadership.
- **Mission** – To be a nationally and internationally recognized center of excellence in research, education and implementation of technology management.
- **Objective** – To be the first choice knowledge source for world-class industry and for students striving to be leaders in engineering and technology management worldwide.
- **Goal** – To prepare professionals in engineering, science and technology-related fields for leadership through technology management.

## ETM'S VALUES

- Strive for uncompromised excellence
- Bring the best people to ETM
- Have an open, participative environment
- Help all members of the ETM Department reach their full potential in their fields

## INTRODUCTION

Portland State University's ETM Department offers a variety of degrees at the Master's and Ph.D. levels tailored to the needs of engineers, scientists and professionals in related disciplines.

Programs offered by the ETM Department provide students with a firm foundation in the creation of value through engineering and technology while giving them a sound management education. This integrated learning experience:

- enables graduates to deliver effectively in the rapidly changing and complex world of engineering and technology, and
- provides graduates with a broad knowledge base for making and implementing decisions necessary for leadership on both strategic and operational levels.

ETM's core requirements cover the critical areas of technical management while enabling students to maintain identity in their technical background. Emphasizing the value of technology, analytical decision-making, group project work, and people skills, the curriculum is designed to equip graduates with a resilient base of engineering and technology management competencies.

## WHO ATTENDS ETM?

The ETM program is home to a diverse community of students with a wide range of academic and professional experience. This diversity adds a unique opportunity for our ETM students as they interact in classes, on research projects and in collaboration with individuals who contribute to each other's knowledge in ways not otherwise available.

- ETM students hold at least one degree in engineering-related disciplines.
- 20% have a Master's or Ph. D in their technical specialties.
- 65% are employed full time and pursue their studies part-time.
- 35% are full-time students.
- ETM students' ages range from 24 to 58 and the average is about 32.
- The average work experience is 7 years.
- The job titles of those employed in industry range from President or CEO to engineer, researcher, or programmer.

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"ETM opened up the way I approach decisions. By understanding the basics of decision analysis, one of the key principles of technology management, I was able to apply the same techniques to deciding whether to screen a population for disease or perform a particular diagnostic test. Upon graduation from the program, I confidently began my new position as faculty at a medical university."

Karen Eden, Assistant Professor, Oregon Health Sciences University, Portland Oregon

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## INTERNATIONAL INITIATIVES AND OPPORTUNITIES

PSU's ETM program is not only internationally diverse in terms of students and faculty, but also in leading global initiatives that capitalize on the wide range of engineering and technology management expertise across borders and boundaries.

- ETM is the headquarters for **PICMET (Portland International Conference on Management of Engineering and Technology)**. The first PICMET was held in 1991. Beginning in 1997, it has become a biennial conference that provides an invaluable opportunity for exchange of ideas, information, research results and experiences in development and implementation of technology management concepts. Leading decision makers, scholars and practitioners of technology management come together from more than forty countries to discuss existing and emerging issues in technology management and to present multiple perspectives in addressing them.
- From 1987 to 2002, ETM was the editorial headquarters for **IEEE Transactions on Engineering Management**, the prestigious, refereed international research journal, published by IEEE since 1954.
- From 1987 to 2000, ETM was the editorial headquarters for Wiley Series on Engineering & Technology Management, a book series which included twenty-three textbooks used in Engineering & Technology programs throughout the world.
- The Portland Chapter of **OMEGA RHO International Honor Society**, which recognizes academic excellence in Operations Research and related disciplines, is located in the ETM

Department. Omega Rho was founded in the spring of 1976 at a joint meeting of the Operations Research Society of America and the Institute of Management Sciences. Omega Rho is a Member Society of the Association of College Honor Societies. Chapters and members promote academic excellence in higher education and recognize superior scholarship and leadership in the fields of operations research and management science. Students from ETM, Business Administration, and Mathematics may qualify for membership. To be eligible, an ETM student must have a grade point average of 3.5 and have taken 17 hours of graduate courses and must then be nominated for membership.

- ETM has established a number of *international academic and research collaborations* with universities and research institutes including the University of Pretoria in South Africa, the Seoul National University in Korea, and ETRI (Electronics and Telecommunication Research Institute), also in Korea. The collaborative agreements cover joint research projects, faculty and student exchanges, courses, seminars, and other similar activities.

## **STUDENT LIFE**

A significant aspect of any graduate program is the interaction among students—the exchange of ideas as well as the opportunity to establish lifelong friendships and professional relationships. Students in the ETM program have many options for engaging in this interaction within the program, campus-wide, and in the city and region.

The ETM program provides a living, day-to-day, experience in diversity. Students in the program come from countries around the globe as well as from a wide variety of local and regional industries, corporations, and professional backgrounds. In an increasingly global economy, this diversity greatly enhances the program by bringing many cultural and professional perspectives directly into our classrooms, seminars and study groups. Students can learn firsthand how engineering and technology management might be applied in different settings—geographically, culturally, and by engineering discipline.

It is the norm, not the exception, to have student teams with members from competing companies and diverse ethnic backgrounds. These teams develop projects focused on multiple industries in multiple countries.

## **SOCIAL EVENTS**

In addition to more formal opportunities for academic and professional exchange, the ETM program sponsors several social events each year for students, their families, faculty and alumni. These include potluck dinners each quarter, a pre-graduation awards and honors ceremony and celebration, and other informal parties organized by students and faculty. ETM students play on department soccer teams, travel to regional tourist sites, and attend arts and cultural events together. Many students, including those from other programs, have commented favorably on the friendliness and “family” feel of the ETM Department.

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“In this Department, students feel valued and wanted. This is what we need as students to be able to successfully pursue our studies...Students get any help they ask for and get even what they can't imagine. My experience has been positive. I am proud of being an ETM student.”

**Valentin Havugiyaremye,  
Rwanda, Africa**

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## STUDENT ORGANIZATIONS

In addition to social life within the Department, ETM students are invited to explore any of the nearly 200 student organizations on campus. These organizations include international clubs, special interest groups, athletic teams, business and professional organizations, and social and cultural groups. More information is available on the Student Services website at [www.ess.pdx.edu](http://www.ess.pdx.edu).

## FOR INTERNATIONAL STUDENTS

The ETM program prides itself on the diversity of its students and faculty, and we provide guidance to our international students beyond traditional academic advising. While no formal program is established for this, we understand the language and other cultural issues faced by international students as they adjust to life at Portland State University and in the city. Faculty, staff, and peers work to help students make these adjustments.

PSU also has a well-established English as a Second Language program, language tutors, a Writing Center, and an Office of International Affairs which offers information and services to international students and scholars. *(For contact information, see the Facilities and Resources Section.)*

Students, faculty, staff, and community members are invited to meet informally in the PSU Multicultural Center in 228 Smith Memorial Center to share in dialogue and activities that further understanding among people of different cultures. The Center presents programs and events that promote appreciation for cultural diversity.

## THE PORTLAND ADVANTAGE

Portland is known as the Rose City and is situated in one of the most beautiful and livable areas in the world. The city serves as a center for high technology industries that helped nickname it the Silicon Forest, and it owes the name to the presence of a large semiconductor community, spearheaded by Intel's largest site in the world, and on an ocean of pristine forest.

But Portland is also a cultural hub with a world class symphony orchestra; an opera company; theatre and dance; contemporary, ethnic, and traditional music; art galleries and museums; parks and outdoor activities, including waterfront festivals for all ages and interests. Many cultural organizations offer discounted prices to students with proper university identification.

Portland, and the region, afford ETM students unparalleled opportunities for professional advancement as well as unlimited recreational opportunities featuring dramatic Pacific Ocean, clear waters of myriads of streams, rivers, and lakes, and snow-packed Cascade Mountains.

Students who wish to travel outside the Portland area will find additional historic, cultural, economic, recreational, and industrial attractions in all areas of the northwest from Seattle and the beautiful San Juan Island country to the north; the Willamette Valley, a primary agricultural center, and California to the

south; and the Cascade range, the deserts and farmland of eastern Oregon, Washington and Idaho to the east.



### ***Transportation***

Portland's public transportation system has an international reputation. The system comprises buses that run on a grid through the city and the downtown bus mall; the MAX trains that run well outside the city to the east and west; the new trolley that links PSU with downtown Portland and the developing Pearl District just to the north; bike and walking trails; and nine bridges that span the Willamette River, linking the eastern and western sections of Portland. Buses, MAX and the Portland trolley run frequently to and from PSU traveling throughout the city. Bus passes are available at discounted rates for students. Additional information is available at the information kiosk outside the University Bookstore on campus between 5<sup>th</sup> and 6<sup>th</sup> Avenues or at [www.tri-met.org](http://www.tri-met.org).

## **FINANCIAL AID , ASSISTANTSHIPS, STUDENT EMPLOYMENT AND INTERNSHIPS**

### ***Graduate Student Assistantships***

The ETM Department does not offer financial assistance to students at the Master's level.

Applicants admitted as full-time Ph.D. students are automatically considered for financial assistance. Because of the large number of applications to the department, Graduate Student Assistant (GSA) awards are highly competitive. A typical award includes tuition remission plus a modest monthly stipend. The workload required of the GSA is up to 12-15 hours per week.

The award is equivalent to approximately \$14,000 for the academic year. This does not cover all expenses, however. A GSA must provide about \$8-10,000 additional support from his/her own resources external to the university.

Criteria for choosing GSAs are similar to those for admission—grades, references, GRE scores, and overall academic ability.

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“The core of my ETM education was in project management and systems thinking with technology roots. This combination is perfect for fostering successful technology executives.”

Janice Forrester,  
Application Architect,  
Nike Corporation,  
Beaverton, Oregon

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### ***Research Assistantships***

Faculty in the department often have research grants that support one or more research assistants (RA). Faculty members choose RAs on an individual basis, but the most important criterion is the student's ability to contribute to the professor's research program. Ordinarily, students are given a research assistantship only after they have been in the graduate program for at least one year and have taken at least one class from the professor.

### ***Other University Sources of Financial Aid***

Additional sources of financial assistance are administered by other PSU offices. Students should contact the Office of Financial Aid for information, 503-725-3461, 174 Neuberger Hall. (**NOTE: Some of these sources have early deadlines.**)

*The Oregon Laurels Graduate Tuition Remission Program* provides tuition remission to academically qualified Oregon residents on a competitive basis; contact the Office of Graduate Studies for further information, 503-725-3483, 117 Cramer Hall .

A limited number of *scholarships* are available for graduate students; contact the Information and Academic Support Center, 503-725-4005, 118 Smith Memorial Center.

A list of *on-campus job opportunities* is posted outside the Human Resources Office, 322 University Services Building.

*Loans and work-study* programs are administered by the Office of Financial Aid (see above for contact information).

### ***Off-Campus Jobs***

Portland State is fortunate to be surrounded by high-tech and other industries, and ETM majors are in demand as part-time employees at local companies. Information about other job opportunities in the Portland area is posted regularly in the newsgroup *psu.jobs* and on the bulletin board outside the Human Resources Office, 322 University Services Building.

### ***Internships***

ETM students have opportunities to serve as interns for industry and high tech companies in the area. An internship is often used to evaluate a potential full-time employee. Upon graduation, interns may be permanently employed by the company, although there is no guarantee.

## **FACILITIES & RESOURCES**

### **PSU BOOKSTORE**

The Bookstore, located at 1715 S.W. Fifth Avenue, handles all textbooks and coursepacks for the University. In addition, the Bookstore has an extensive selection of general books including bestsellers,

popular fiction, special interest, computer books and children's books. The store carries a complete selection of school, office, engineering and art supplies and is the main supplier of PSU sportswear, imprinted souvenirs and gifts. Powersource Electronics is the Bookstore's in-house computer store and provides a wide selection of calculators, computer supplies and accessories as well as software and computer upgrades. Computer Software is available to students at an educational discount.

The Bookstore is established as a co-operative. For a fee of \$1.00, members save on purchases made annually. Information and application are available at the Bookstore's front desk.

## **COMPUTER LABS**

### ***ETM Computer Lab***

The Department of Engineering and Technology Management provides computer access to ETM students in the departmental computer lab with 8 computers. Computer speed ranges from 400 MHz Pentium 2 to 1.6 GHz Pentium 4 with CD-ROMs and ZIP drives running Windows XP connected to a Windows 2000 network. The Department also offers e-mail accounts to ETM students via an Exchange 2000 e-mail server accessible via the Internet.

The ETM Department maintains and supports the application programs used for class work. Some programs are also available in a student version and ETM students can obtain these from Liono Setiowijoso, ETM Computer System Specialist, 503-725-4669, LL-50-02 Fourth Avenue Building (FAB), or at [liono@etm.pdx.edu](mailto:liono@etm.pdx.edu).

Students need a network account to access the ETM network. Contact Liono Setiowijoso (see above). The new account becomes available in 24 hours.

### ***University Computer Labs***

Additional computer labs are located on campus and are available to students, faculty and staff. Computers in these labs have a wide variety of software and applications. Laboratory attendants are on duty at all times, and user guides, manuals and tutorials are available. The main labs are located at 112 Shattuck Hall (503-725-3140); 107 Shattuck Hall (503-725-3113); and on the first floor of the Library (503-725-8425). Contact any lab for more information.

## **PSU LIBRARY**

The PSU Millar Library on the western Park Blocks is the primary source for research materials and assistance. The Library's Graduate Student program has been designed to provide personalized assistance with thesis, dissertation, and other research projects.

Librarians can be contacted in person or online, and many resources are available online as well. Tours can be arranged to acquaint students with the many services of the Library as well as the location of particular collections you will need for your academic research. Graduate students can also participate in special topics workshops, connect with a Library subject specialist in their fields, and obtain personalized consultation services for in-depth research.

For more information on Graduate Student Library Services, contact Michael Bowman, Engineering Librarian, [bvmi@odin.pdx.edu](mailto:bvmi@odin.pdx.edu), 503-725-3690 or Daphne Allen, Business Administration/Economics Librarian, [allend@pdx.edu](mailto:allend@pdx.edu), 503-725-4125.

In addition to its own extensive collection, PSU is part of a network of institutions that participate in the Interlibrary Loan (ILL) program. This means students can access nearly any book, journal or newspaper microfilm, dissertation, video or other published documents available in any library. Materials are generally available from 6-10 days after request and request forms are available online.

Beginning Summer 2002, PSU will have an online public access catalog (ViKat). By Fall 2002, PSU Library users will be able to search the ORBIS catalog and submit online requests for delivery of materials to PSU. Check the Library's website to find the schedule for drop-in sessions scheduled to help you learn more about using the new catalog.

### **STUDENT I.D. CARD**

All students, including part-time students, may obtain a photo identification card. The cost is \$7.00 (\$20 for a replacement or change). To obtain your photo ID card, take your current term paid fee receipt/validation sticker to the ID Card window in the Neuberger Hall lobby. Call 503-725-3442 for more information. Your student ID card will allow you access to the library and other locations on campus, and may be used to obtain discounts on tickets for entertainment events, bus passes, and other non-academic activities.

### **PSU WRITING CENTER**

The PSU Writing Center, 188F Cramer Hall, offers assistance with writing at any level and in any discipline. Highly trained consultants—writers and teachers from the English and Linguistics departments—assist student writers with revision of work in progress, interpreting assignments, and working with documentation. The consultants also help students develop powerful, effective writing that presents student ideas, research, scholarship and expertise in the best form.

For more information, contact the Writing Center at 503-725-3570 or [writingcenter@pdx.edu](mailto:writingcenter@pdx.edu).

### **RECREATION**

Students who wish to participate in informal recreation on campus may use the PSU facilities on campus in the Peter S. Stott Center. Any registered student is eligible with proper ID. Activities include badminton, basketball, general exercise, jogging, handball, table tennis, sauna, swimming, tennis and golf. Lockers are available for a fee. For information, call 503-725-4977.

### **HEALTH SERVICES AND COUNSELING**

The Student Health Service (SHS) is located in Room D-4 in the Neuberger Hall basement and is open Monday through Friday. Contact SHS to determine your eligibility for health services and for information

on services available to students, including emergency treatment. Call 503-725-3462 or e-mail [askshs@ess.pdx.edu](mailto:askshs@ess.pdx.edu). Additional information is available online at [www.ess.pdx.edu/shs](http://www.ess.pdx.edu/shs).

It is not unusual for students to experience stress or feel overwhelmed by academic, work, or family responsibilities some time during their university careers. PSU's Counseling & Psychological Services staff is available to help students cope with these difficulties. The help may range from a single session to discuss an immediate problem to a series of sessions to help with ongoing difficulties. Call 503-725-4423 for information or go to [www.ess.pdx.edu/CAPS](http://www.ess.pdx.edu/CAPS). The office is in Smith Memorial Center, Room M343.

## **ACADEMIC LIFE**

### **ACADEMIC HONESTY**

The purpose of an academic career in a program such as ETM is to create new knowledge building on what has been done before. Students who claim the work of others as their own cheat not only the University, the program and their peers, but also themselves.

Academic honesty is a cornerstone of any meaningful education and a reflection of each student's maturity and integrity. The Office of Student Affairs is responsible for working with University faculty to address complaints of academic dishonesty. The Student Conduct Code, which applies to all students, prohibits all forms of academic cheating, fraud, and dishonesty.

These acts include, but are not limited to:

- plagiarism
- buying and selling of course assignments and research papers
- performing academic assignments (including tests and examinations) for other persons
- unauthorized disclosure and receipt of academic information
- other practices commonly understood to be academically dishonest.

Allegation of academic dishonesty may be addressed by the instructor, may be referred to the Office of Student Affairs for action, or both. Allegations referred to the Office of Student Affairs are investigated following the procedures outlined in the Student conduct Code. Acts of academic dishonesty may result in one or more of the following sanctions:

- a failing grade on the exam or assignment for which the dishonesty occurred
- disciplinary reprimand
- disciplinary probation
- loss of privileges
- required community service
- suspension from the University for a period of up to two years
- dismissal from the University.

In addition to the University policy, the ETM Department has developed its own Department-specific policy on academic honesty and plagiarism. Copies are available in the office and on the ETM website.

*All students must read and adhere to this policy.*

## **ACADEMIC ADVISING**

All students will be assigned an academic advisor to help guide decisions about courses to take, research projects, and general issues that come up during graduate studies. Students will meet initially with their advisors to establish a plan for the student's academic career in the department. Additional meetings will be scheduled jointly by the advisor and the student.

As required by University graduate procedures, doctoral students must form a five-person doctoral committee including the committee chair and at least one member from ETM, one member from the System Science Program, and a faculty representative for the Graduate Office.

Students pursuing the master's degree will form a thesis committee of at least three and not more than five faculty members, including the candidate's advisor as chairperson and a representative of the Office of Graduate Studies.

## **PROGRAM LENGTH**

Students pursuing a doctoral degree are expected to advance to candidacy within one year after the comprehensive, upon the acceptance of the dissertation proposal by the student's doctoral committee. Doctoral research must be completed with minimum 27 dissertation credits and defense within five years of advancement to candidacy.

Students pursuing a master's degree full-time generally complete the program within two years. All coursework must be completed within seven years.

## **ACADEMIC LOAD**

The normal academic load for a full-time graduate student is 12 credits each term including coursework and thesis. Graduate students must seek approval to register in excess of 16 credits a term. Actual course load for students in ETM will vary depending on a student's particular work and academic situation.

Academic load for doctoral students will be determined in consultation with the student's advisor.

## **REGISTRATION**

PSU has an efficient online registration system that is fully explained in the Schedule of Classes Bulletin issued each term. In addition to classes listed in the Bulletin, be sure to check with the Department for additional electives or changes each quarter. Advance registration is possible using the Touchtone Telephone Response (TTVR) or the PSU homepage Web access ([www.pdx.edu](http://www.pdx.edu)) registration system. Advance registration is scheduled according to priority dates published in the Schedule of Classes.

Registration and changes are continuous, and students may register through the second week of a term. A student is formally registered only when all procedures have been completed and tuition and fees paid for the term. Students are financially responsible for all classes and credits in which they are registered on or

after the first day of the term. *A pre-registered student must drop all courses prior to the first day of the term in order to avoid a refund percentage charge.*

## **GRADES**

A complete explanation of PSU Graduate Grading System is included in the Bulletin/Catalog issued each year. Graduate courses are graded on a standard A through F system with a limited number of courses offered on a Pass/No pass basis. Students must have a B average (3.00 GPA) on courses fulfilling degree requirements (courses listed on the GO-12 form for master's students). Incompletes may be assigned when coursework is not completed and when work to date is below a certain level. Work must be completed by an agreed-upon deadline. An Incomplete grade becomes part of the permanent transcript record after the deadline expires.

Students may also withdraw from classes through the end of the fourth week with no record on the transcript and no explanation for the action. As a courtesy, students are advised to notify the instructor concerned of the intended or completed withdraw. Students who withdraw after the fourth week and before the end of the eighth week will have a W recorded on the transcript and must obtain instructor approval.

### ***Academic Probation***

Students who do not maintain a 3.00 GPA may be placed on academic probation. If there is the possibility that your GPA will drop below this, you must meet with your advisor to discuss the situation. Students on academic probation will not be permitted to graduate, to be advanced to doctoral candidacy, to receive approval of the master's degree program, to receive or continue to hold an assistantship, or to register for more than a total of 9 credits in any term. Students who raise the GPA to 3.00 within the next 9 graduate credits in graded courses will be removed from academic probation.

If you are concerned about your academic status, meet with your advisor and develop a strategy for completing your work with full academic standing.

### ***Distribution***

Grades are posted to the Student Information System approximately one week after finals week. Students may access grades on the touchtone system or by requesting an unofficial transcript from the web (see PSU homepage: [www.pdx.edu](http://www.pdx.edu)).

## **PROGRAMS AND DEGREES**

ETM's objective is to generate and transfer knowledge for making and implementing decisions that provide leadership in the management of engineering and technology. The ETM program addresses these issues at both strategic and operational levels of decision making.

ETM programs are designed for engineers and scientists moving toward technical management responsibilities while maintaining identity in their technology.

## CHOOSE FROM THESE ACADEMIC PROGRAMS AND DEGREES

- Ph.D. in Systems Science/Engineering Management
- Master of Science in Engineering Management (M.S.E.M)
- Master of Engineering (M.Eng.) in Engineering Management (four options)
  - Technology Management
  - Project Management
  - Civil Engineering Management
- Master of Engineering in Manufacturing Engineering (M.Eng.) (a description of this program is forthcoming) from whom?

## DUAL DEGREE OPTIONS

- M.S. in Engineering Management and M.S. in another Engineering discipline
- M.S. in Engineering Management and MBA.
- M.S. in Engineering Management and M.S. in another discipline offered at PSU.

## PROGRAM INFORMATION

### *Ph.D. in Systems Science/Engineering Management*

The Ph.D. in Systems Science/Engineering Management provides students the opportunity to pursue in-depth investigation towards advancing the state of the art of knowledge in the field of Engineering and Technology Management through the single-discipline option in the Systems Science Ph.D. Program.

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“As a business unit manager trying to move into the world of information technology, I found that PSU's Engineering and Technology Management program provided me with the tools I needed. The faculty and staff are knowledgeable and approachable and the diverse cultural blend among students and staff is enlightening.”

--Bridget Haggerty, MSEM '03,  
Manager, Academic Application,  
Oregon Health Sciences  
University

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### *Master of Science in Engineering Management*

The M.S. in Engineering Management (MSEM) provides students with a comprehensive program to meet the needs of engineers and scientists whose objective is to advance to technical management positions in business, industry, or government. Students in this program may complete a Capstone Project approved by the faculty member who supervises the work in lieu of a thesis.

**Note:** Classes for the M.S.E.M. degree are also available at the Capital Center in Washington County beginning Winter 2002. The full Master's degree program will be available in Washington County in the near future to meet the needs of students who live and work in that area.

### *Master of Engineering in Engineering Management*

The Master of Engineering Programs are open to full time employees or interns working in industry while pursuing their studies in the ETM.

Technology Management Option prepares engineers, scientists and individuals with related backgrounds who are developing and utilizing technology within corporate strategies.

Project Management Option provides a focused coverage of the analytical framework, organization concepts and interpersonal skills necessary for managing projects and programs.

Civil Engineering Management Option allows ETM specialization in Civil Engineering including Civil Engineering subdisciplines such as construction, transportation, water resources, structures and environmental engineering.

### ***Master of Engineering in Manufacturing Engineering***

The Master of Engineering in Manufacturing Engineering focuses on conceptual framework, infrastructure, and tools that are crucial to the design and deployment of manufacturing systems.

### ***Dual Degree Options***

Motivated and qualified students may work on completing two master's degrees simultaneously. Up to one third of the credits in the program with the *lesser number* of credits may be applied towards the other master's degree.

For example, to pursue a Master of Science in Electrical Engineering and an M.S. in Engineering Management, a student must be admitted to both programs, develop an approved curriculum plan with the help of the departments' advisors, and then can use up to 15 credits from the Electrical and Computer Engineering department to fulfill electives in the Engineering and Technology Management department.

In the past, students have successfully completed dual master's degrees resulting in an M.S. in Engineering Management combined with an M.S. in another Engineering department, an MBA, or a master's degree in other disciplines.

### ***Post-Baccalaureate Students***

Prior to admission to the ETM, a student may apply to the university for admission as a Post-Baccalaureate student. Such students are allowed to take ETM courses to demonstrate their academic performance for evaluation by the ETM Admissions Committee upon completion of twelve credits.

### ***Special Students***

ETM courses are available to students admitted to other graduate programs at PSU. A limited number of non-admitted students may also be considered for enrollment in select courses as special students with permission of the Department Chair.

## **PH.D. PROGRAM – PH.D. IN SYSTEMS SCIENCE/ENGINEERING MANAGEMENT**

The Ph.D. in Systems Science/Engineering Management provides students with opportunities to pursue in-depth investigation towards advancing the state-of-the-art knowledge in the field of Engineering Management.

Students conduct their research in a wide range of areas including:

- Benchmarking
- Conflict Resolution
- Creativity
- Data Envelopment Analysis
- Decision Modeling
- Decision Support Systems
- Innovation Management
- Judgment Quantification
- Knowledge-based Systems
- Manufacturing Management
- New Product Development
- Organizational Culture
- Productivity Analysis
- Project Management
- R&D Management
- Reengineering
- Resource Optimization
- Simulation
- Strategic Management
- Team Building
- Technology Acquisition
- Technology Assessment
- Technology Management
- Technology Marketing
- TQM (Total Quality Management)

Program requirements are a master's degree in engineering management or equivalent coursework, 9 credits of Systems Science core courses, 9 credits of additional Systems Science or approved Engineering and Technology Management systems-related courses, and 9 credits of other approved coursework. Twenty-seven credits of dissertation research are also required.

### ***Ph.D. Curriculum***

- Minimum course requirements: 64 quarter-credits beyond the Bachelor of Science degree distributed as follows:  
  
16 credits in Engineering and Technology Management  
16 credits in Systems Science  
16 credits in the minor area  
16 credits in research methodology area.
- Comprehensive examinations in all four areas within five years of admission to the Ph.D. program. Each written examination is four hours long. The written exams are followed by a 2-3 hour oral examination.
- Formation of a 5-person doctoral committee including the committee chair and at least one member from ETM, one member from the Systems Science Program, and a faculty representative for the Graduate Office.
- Advancement to candidacy within one year after the comprehensives, upon the acceptance of the dissertation proposal by the student's doctoral committee.
- Completion of the doctoral research and the dissertation defense within five years of advancement to candidacy.

### **M.S. ENGINEERING MANAGEMENT**

The Master of Science in Engineering Management (MSEM) provides students with a comprehensive program to meet the needs of engineers and scientists whose objective is to advance to technical management positions in business, industry, or government.

- Minimum course requirements: 52 credits in approved graduate courses distributed as follows:  
  
28 credits in the Core Curriculum  
4 credits (or 8 with thesis option) to meet the Capstone requirement  
20 credits (or 16 with thesis option) in electives.

***Core: 28 credits (All courses listed offer 4 credits.)***

EMGT 520	Management of Engineering and Technology
EMGT 530	Decision making in Engineering and Technology Management
EMGT 540	Operations Research in Engineering and Technology Management
EMGT 545	Project Management in Engineering and Technology

EMGT 555      Technology Marketing

*One of the following two courses:*

EMGT 522      Communication and Team Building

MGMT 550      Organizational Management

*One of the following two courses:*

EMGT 535      Engineering Economic Analysis

ACTG 511      Financial Accounting

*Capstone Requirement (One of the following):*

EMGT 503      M.S. Thesis (8 credits)

EMGT 506      Special Project in ETM ( 4 credits)

EMGT 589      Capstone Project (4 credits)

EMGT 590      Engineering Management Synthesis (4 credits)

***Electives (20 credits or 16 credits with thesis option)***

The Department of Engineering and Technology Management offers a wide range of elective courses. In addition, students may choose electives from several other programs throughout the University with the approval of their advisor.

Current (and typical) ETM electives include the following (*all courses here offer 4 hours credit*):

EMGT 525      Strategic Planning in Engineering and Technology Management

EMGT 537      Productivity Analysis

EMGT 546      Project Scheduling and Network Analysis

EMGT 550      Manufacturing Systems Engineering

EMGT 551      Manufacturing Systems Management

EMGT 552      Intelligent Manufacturing Systems

EMGT 553      Manufacturing Systems Simulation

EMGT 560      TQM: Total Quality Management

EMGT 563      Reengineering the Technical Enterprise

EMGT 565      Research Methods for Engineering and Tech. Management

EMGT 571      Expert Systems in Engineering

EMGT 510      Competitive Strategies in Technology Management

EMGT 510      Critical Writing for Technology Management

EMGT 510      Digital Economy

EMGT 510      Economics Of Technological Innovation

EMGT 510      Effective Presentations in Technology Management

EMGT 510      International Law for Technology Management

EMGT 510      New Product Development

EMGT 510      Organization Transformation Management

EMGT 510      Probability and Statistics for Technology

EMGT 510      Project Management Framework

EMGT 510	Project Management Tools
EMGT 510	Strategic Management of Technology
EMGT 510	Technology Assessment And Acquisition
EMGT 510	Technology Forecasting
EMGT 510	Technology Transfer

## **M.E. ENGINEERING MANAGEMENT**

The Master of Engineering programs are open to full-time employees or interns working in industry while pursuing their studies in the ETM Department.

### ***Project Management Option***

***Core: Minimum 24 credits chosen from the following courses with approval of the academic advisor. (All courses offer 4 credit hours unless noted.)***

EMGT 520/620	Engineering and Technology Management
EMGT 522/622	Communication and Team Building
EMGT 530/630	Decision Making in Engineering and Technology Management
EMGT 535/635	Engineering Economic Analysis
EMGT 545/645	Project Management in Engineering
EMGT 546/646	Project Scheduling and Network Analysis
EMGT 560/660	Total Quality Management
EMGT 506/606	Independent Study (1-4 credit hours)

EMGT 589 Capstone Master of Engineering Project (9 credit hours)

***Electives: Minimum 12 credit chosen from the courses offered by ETM or from the approved courses offered by other academic units of the university.***

### ***Technology Management Option***

***Core: Minimum 24 credits of coursework chosen from the following courses with approval of the academic advisor. (All courses offer 4 credits unless noted.)***

EMGT 510/610 SMT	Strategic Management of Technology
EMGT 510/610 TF	Technology Forecasting
EMGT 510/610 TA	Technology Assessment & Acquisition
EMGT 510/610 NPD	New Product Development
EMGT 520/620	Engineering and Technology Management
EMGT 525/625	Strategic Planning in Engineering Management
EMGT 535/635	Engineering Economic Analysis
EMGT 555/655	Technology Marketing
EMGT 506/606	Independent Study (1-4 hours)

EMGT 589 Capstone Master of Engineering Project (9 hours)

***Electives: Minimum 12 credits chosen from the courses offered by the ETM or from the approved courses offered by other academic units of the university.***

## **M.E. MANUFACTURING ENGINEERING**

***Core: 30-36 credits of coursework chosen from the following courses with the approval of the academic advisor. (All courses carry 4 hours unless noted.)***

ACTG 511	Financial Accounting
EMGT 510 CE	Concurrent Engineering (3-4 hours)
EMGT 510 DOE	Design of Industrial Experiments (2-4 hours)
EMGT 510 SPC	Statistical Process Control (3-4 hours)
EMGT 510 STA	Applied Statistics for Engineers (3-4 hours)
EMGT 522	Communication and Team Building
EMGT 525	Strategic Planning in Engineering Management
EMGT 545	Project Management in Engineering
EMGT 550	Manufacturing Systems Engineering
EMGT 551	Manufacturing Systems Management
ME 551	Numerical Methods
MGMT 550	Organizational Management

***Electives: 9 –15 credits of coursework approved by the academic advisor. Up to 6 elective credits may be project work.***

## **GRADUATION PROCEDURES**

The following outline is taken from the Graduate Studies website and summarizes the Portland State University procedural requirements for master's degrees. Additional requirements may be imposed by specific programs. Additional information can be found in the Graduate Studies section of the *Portland State University Bulletin* and online at [www.gsr.pdx.edu/gs](http://www.gsr.pdx.edu/gs).

*Be sure to also see the Graduate Candidates' Guidelines published by the Office of Graduate Studies.*

### ***Summary of Procedures for Master's Degrees from the office of Graduate Studies and Research***

**Steps marked with \*\*\* are required for every master's degree.**

1. Apply for admission about six months prior to the beginning of the term for which admission is requested. Check with the specific department about the deadlines.
2. Prior to registration, become familiar with general regulations and procedures for the master's degree as described in the *Bulletin*.
3. Prior to first term registration, meet with faculty advisor assigned by program director and plan a preliminary program of study.

4. If graduate courses taken while an undergraduate at PSU and not used in the bachelor's degree are to be considered for use in the graduate program, the ***Reservation of Graduate Credit*** form (GO-10) must be filed in the Office of Graduate Studies no later than the term following admission to a graduate degree program. (Valid only for courses completed at PSU.)
5. If transfer credit from another accredited institution is to be presented, the ***Proposed Transfer Credit for Master's Degree*** form (GO-11) must be filed in the Office of Graduate Studies for approval. It is suggested that this form be submitted early in the student's program; it must be approved before the ***Graduate Degree Program*** (GO-12) can be approved.
6. If admitted to conditional or qualified status, remove all deficiencies and/or conditions. Advisor will submit a ***Petition for Change of Status*** form (GO-7) to change from qualified to regular status; most *university* conditional admissions will automatically be changed to regular status after completion of the first 9 graded graduate hours with a 3.00 or better GPA.
7. If a foreign language is required, see the Department of Foreign Languages and Literatures in the first term. The Foreign Language department will submit the results of the foreign language exam or equivalent to the Office of Graduate Studies. This requirement must be met before the GO-12 can be approved and before any final exam may be taken.
8. \*\*\* Submit a final ***Graduate Degree Program*** form (GO-12), planned with and approved by the faculty advisor and signed by the department chair or department graduate committee chair, to the Office of Graduate Studies no later than the first week of the term of graduation.
9. \*\*\* File ***Application for Degree*** form in the Office of Graduate Studies no later than the first week of the term of graduation.
10. A minimum enrollment of one credit is required during the term in which oral or written exams are taken. A thesis student must be registered for at least one credit in every term in which the student is working on any phase of thesis, including data development or collection, writing, revision, defense, and finalization through acceptance by the Office of Graduate Studies.
11. If thesis is to be submitted:
  - a) thesis proposal, Human Subjects Research Review Committee approval, and appointment of departmental thesis committee must be completed before submission of the GO-12 (see #8 above);
  - b) advisor submits the ***Appointment of Final Oral Examination Committee*** form (GO-16M) for appointment of the Representative of the Office of Graduate Studies by the end of the first week of the term of graduation (earlier in summer term); see the *Bulletin* (p. 101) for committee requirements;
  - c) the oral examination must be scheduled at least five weeks prior to the end of the term and the Graduate Office Representative must receive a complete copy of the thesis at least two weeks prior to the examination date (for summer term, the oral examination must be held during the regular eight week session);
  - d) student must check with faculty advisor and thesis committee chair to assure completion of requirements prior to final examinations;
  - e) three copies of the unbound thesis and four copies of the abstract, in final approved form, must be submitted to the Office of Graduate Studies at least three weeks prior to close of the term in

which the degree will be granted. Deadlines for each term are available in the Office of Graduate Studies. Required changes must be made before graduation.

12. For non-thesis final oral examinations, the committee consists of at least two members of the student's department, including the student's advisor.
13. If there are any changes in the approved program, a ***Change in Graduate Degree Program*** form (**GO-13**) must be filed.
14. Schedule and pass final master's examinations, if required, at least two weeks before date of graduation.
15. An Incomplete or In-Progress grade in any course, excluding thesis (see #16 below), which is on the approved program (GO-12) must be removed no later than two weeks before graduation.
16. \*\*\* Advisor is responsible for the completion of the form ***Recommendation for the Degree*** (**GO-17M**), which is forwarded to the Office of Graduate Studies no later than the last day of the term of graduation. In-Progress grades for required thesis credits are changed on the form, eliminating the need for the *Supplemental Grade Report* for these courses.
17. The Dean of Graduate Studies certifies that all requirements for the degree have been met and recommends the awarding of the degree.
18. Graduation.

*For specific deadlines for each term, see the Graduate Candidates' Deadlines available on the web and in the Office of Graduate Studies, 111 Cramer Hall.*

### ***Summary of Procedures for Doctoral Degrees***

A full explanation of procedures for doctoral degrees is included in the *PSU Bulletin* (see Graduate Studies). Forms required are the **GO-16D**, Appointment of Final Oral Examination Committee and **GO-17D**, Recommendation for the Degree. All doctoral candidates will work closely with the chair and members of the dissertation committee as well as their advisors to be sure all university and department requirements are satisfied both before and after advancement to candidacy for the degree.

For additional information, refer to the *PSU Bulletin* or check online at [www.gsr.pdx.edu](http://www.gsr.pdx.edu).

## **COURSE DESCRIPTIONS**

***NOTE: Most ETM classes meet in the Fourth Avenue Building, but some may be scheduled in other nearby buildings on the downtown PSU campus. In addition, ETM courses are available through the Oregon Center for Advanced Technology & Engineering (OCATE) at CAPITAL Center in Washington County. These classes are listed in the regular PSU Time Schedule each quarter.***

The following comprise both core and elective courses in the ETM program. Additional electives are added on an on-going basis in response to changing needs in the program and in the field.

**EMGT 510/610 COM: Competitive Strategies in Technology Management**

This course provides background information and methodologies that will enable students to analyze, formulate and implement competitive technology strategies. The objectives of the course are to: 1) familiarize students with the historical background, key concepts and analytic techniques of strategic management, 2) provide students with an understanding of significant strategy archetypes from strategic management literature, and 3) familiarize students with the industry and competitor analytic techniques of Michael Porter.

*Prerequisite:* N/A.

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“The knowledge I received during my Masters studies was an advantage during my interviews. I knew about Total Quality Management, which impressed my boss during our conversation. I learned at ETM how to perform in teams. My thesis at ETM was about multicultural/multifunctional teams and every day I use what I have learned.”

--Matthias Pfeifer, Technical Support Engineer, Parametric Technology Corporation, London, England

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**EMGT 510/610 CWT: Critical Writing for Technology Management**

Critical thinking is the foundation of excellent writing. This course for technology management students is designed to expand and refine critical thinking skills and to apply these to technical writing projects. Students read and critique examples from current professional writing and other sources. Discussions focus on the nature and ethics of professional writing, research, organization of material, small group peer review, revision, and editing for submission or presentation. Students complete in-class and longer writing assignments and meet with the instructor in individual conferences to address specific writing problems. This course is particularly recommended for students who have experienced “writer’s block” or have difficulty completing writing projects.

*Prerequisite:* Graduate Standing.

**EMGT 510/610 DE: Digital Economy**

This four-part course is designed to equip students with both a practical and a conceptual understanding of what it takes to develop and maintain a competitive advantage in the new economy. The first part focuses on fundamental changes that the Internet and other forms of information dissemination have introduced into the economy and how this phenomenon has completely changed the rules of the competitive game. The second part develops a framework for strategy formulation from the identification of opportunities to the development of innovative, solid, and defensible business models. The third part covers the structural and process transformation necessary for organizations to become digital enterprises that are able to compete effectively. Internet marketing is the focus of the fourth part with emphasis on using the Internet to increase product value and customer satisfaction.

*Prerequisite:* Graduate Standing

**EMGT 510/610 ETH: Ethical Issues in Technology Management**

This course is designed to meet the needs of engineers who are or will be moving into greater responsibility for management as they advance in the profession. Students will examine ethical issues and unintended consequences in the management of engineering and technology and is based in part on the

work of Samuel Florman, author of *Existential Pleasures of Engineering*. The course will emphasize and bring together the theory of ethical behavior and the real world applications faced regularly in the business world today. This is not a “cookbook” course with simple answers, but rather an opportunity to examine the many complex options and increasing ethical dilemmas presented to today’s managers trying to satisfy demands from many directions. The course will stimulate our ethical imagination, help us to recognize ethical issues, help us to analyze relevant ethical concepts, stimulate our sense of responsibility, help us deal with ethical ambiguity and disagreement. The focus will be on discussion based on the readings, individual writing assignments based on the readings, and a group term project based on a case study. Case studies will include, but not be limited to the 1990's Explorer: Ford, Firestone, and Bridgestone; the Bophal, India Dow Chemical case; the Hyatt Hotel Pedestrian Bridge Collapse; the Challenger explosion; the mobile home – balancing the need for affordable housing against vulnerability to tornado destruction. A number of other cases will be introduced for consideration.

*Prerequisite:* Graduate Standing

### **EMGT 510/610 ETI: Economics of Technological Innovation**

This course focuses on the economics of technology-based innovation by examining how industries are transformed by new technologies, how new industries are formed, and what factors affect the innovation performance. The objective of the course is to develop an awareness of the range, scope, and complexity of the phenomena, issues, and problems related to economics and management of technological innovations. Because innovations are rooted both in the production structure and the institutional setup of the environment in which they take place, the course uses a systems perspective to develop insights into the conditions under which particular structural arrangements and systems are likely to facilitate technological innovation. A wide variety of factors associated with successful strategic innovation are studied. These include institutions, business and technology strategy, and industrial and organizational structures. The course is divided into two parts. The first part focuses mainly on theoretical framework of innovation process at the national and industrial level by introducing the following topics: Technology, Productivity and Growth; Technological Change; Market Structure and Innovation; Innovation and Industrial Evolution. The second part focuses on organizational issues involved in technological innovation and its implementation. The topics include: A Typology of Innovations; Patterns of Product and Process Change; The Capability to Innovate; Patterns of Innovation; Technology Strategy; Creating Knowledge, Learning and Dynamic Capability. The course utilizes cases, lectures, and readings. Students work in teams and are required to provide a written report and a presentation at the end of the course.

*Prerequisite:* Graduate Standing

### **EMGT 510/610 INNO: Innovation Management**

In this course, students will read about, analyze and discuss the diverse economic, social, cultural, psychological and technical phenomena that comprise technological innovation. Historical as well as current trends in innovation are examined to help understand, describe and explain phenomena that pertain to technological innovation; and give practicing managers a toolkit to successfully navigate the complex landscape that surrounds the innovation process.

*Prerequisite:* Graduate Standing

### **EMGT 510/610 ITM: International Law For Technology Management**

This course is designed to expose the student to key contemporary issues in international law relevant to strategic decision making in management of technology. Globalization of the economy and market

place, and the accompanying interdependence of nations, makes the study of international law crucial to anyone involved in technology management. Students will become familiar with the ways in which international economic policies, institutions, rules, procedures and agreements are evolving rapidly to respond to and manage the new economic world order. With the number of multinational corporations growing daily and their foreign presence "deepening" well beyond merely selling products, and most small and emerging businesses aiming at foreign markets, the context for business transactions, even business capital, is global. This course will help students understand the key factors of change, influence and success in this evolving context.

*Prerequisite:* Graduate Standing

### **EMGT 510/610 NPD: New Product Development**

This course focuses on the changing nature of new product introduction in high technology companies. The subject is presented from an Engineering and Technology Management perspective to provide the managers with concepts that they can use as a checklist in new product development projects in high tech environments. The topics covered in the course include Concurrent Engineering, Design for Manufacturing, and Quality Function Deployment. Class discussions are supplemented by case studies and guest speakers. Cases include Hewlett Packard, Northern Telecom, Sun Microsystems and Intel Corporation. Guest speakers include manufacturing managers, planning managers, and manufacturing engineers responsible for new product development and introduction in high technology companies. Readings include *Only the Paranoid Survive*, by Intel's CEO, Dr. Andy Grove, in which inflection points are discussed as important concepts in determining new product strategies.

*Prerequisite:* Graduate Standing.

### **EMGT 510/610 OTM: Organization Transformation Management**

As the society is transformed from the industrial age to the information age, digitalization of information is providing an environment of quick market and technology changes, particularly in the high-tech industry. At the same time, traditional management styles inherited from the industrial age are being widely used. This disparity has created opportunities for new wealth for those who manage their businesses by leading the changes, while it has also caused many giant corporations to go through multiple reengineering efforts without positive results. To meet this fast paced digital environment, we need management paradigms different from the traditional ones. This course introduces Organization Transformation Management (OTM). In addition to incorporating lessons from traditional management paradigms such as total quality management (TQM), strategic planning, and reengineering, OTM introduces the virtual contract organization (VCO) concept. VCO is a concept with four key aspects: 1) effective integration of knowledge-to-money process, 2) a model for effective communication, 3) a model for safe-motivated empowerment, and 4) global synergism for high productivity. OTM provides for future risk management practices that encourage organizations to be proactively analogous to market and technology changes. Examples and case studies, mostly from the high-tech industry, are included in the course.

*Prerequisite:* Graduate Standing..

### **EMGT 510/610 PMF: Project Management Framework**

Unlike traditional courses in project management that look at management of a single project, this course focuses on management of an engineering and technology organization's pool of projects, a discipline often referred to as enterprise project management. The role of projects in the enterprise's competitive strategy and their linkages are emphasized. Concepts and processes for building project management culture, standard methodology for management of projects, information systems, project management office, and scorecard, all on the enterprise level are reviewed. Also covered are project

management competency sets, role of top management, and maturity models. Case studies, presentations, term projects, teamwork, and interactive exercises are included in the course.

*Prerequisite:* Graduate Standing.

### **EMGT 510/610 PMT: Project Management Tools**

This course provides students with an integrated set of advanced techniques for solving project management problems. Work Breakdown Structure (WBS) and performance measurement baseline are studied in-depth as the framework for the integration of scope, time, and cost dimensions of projects. Project scheduling techniques will cover CPM/PERT, GERT and Critical Chain. Coupled with them will be Monte Carlo simulation, a risk management technique. Also included are techniques for cost budgeting, cost baselining (cash flow), and earned value analysis. Case studies, presentations, term projects, teamwork, and interactive exercises are included in the course.

*Prerequisite:* Graduate Standing.

### **EMGT 510/610 PRO: Probability and Statistics for Technology Management**

This course introduces students to elements of probability and probability distributions, sampling, statistical inference, and hypothesis testing.

*Prerequisite:* Course in differential, integral calculus, linear algebra, and matrix.

### **EMGT 510/610 SMT: Strategic Management of Technology**

Strategic issues in managing technology are addressed from the General Manager's perspective. Various strategies implemented in technology-based companies are studied. The interactions between corporate strategies and corporate culture are discussed. Examples are brought from high-technology companies ranging from recent start-ups to mature organizations. Case studies and a project are included in the course.

*Prerequisite:* Graduate Standing

### **EMGT 510/610 TAA: Technology Assessment & Acquisition**

Technology assessment and acquisition are strategic tasks to which companies in all industries are paying more attention than ever before. The course covers a wide range of topics related to technologies requiring a multi-dimensional analysis. The major dimensions include organizational structure, human interface, marketing structure, product development strategies, and innovation diffusion patterns. These and other dimensions of technology assessment and acquisition are addressed in the course by supplementing the lectures with class discussions, assigned readings, case studies and guest speakers from local companies.

*Prerequisite:* Graduate Standing

### **EMGT 510/610 TF: Technology Forecasting**

Technology forecasting has a major impact on technology acquisition and development. There are many success stories as well as failures in technology forecasting. Several

methodologies and their impacts on business strategies are discussed in this course. The emphasis is on how to make technology forecasting beneficial for the organization. Case studies, assigned readings, and guest speakers supplement lectures and class discussions. The cases are selected from Harvard Business School Case Studies, including cases on Zenith, Phillips and America On Line. Assigned reading includes articles selected from Technology Forecasting and Social Change and IEEE Transactions on Engineering and Technology Management, Harvard Business Review, and

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“Formal courses in the Engineering Management Program gave me the tools to expand my career into business line management at Portland General. Without the program, my career would have peaked at deploying technology projects—not directing the focus of the investment in new technological areas and opportunities at Portland General.”

**--Greg Jones,  
MSEM '98, Director,  
Portland General  
Broadband**

Journal of Product Innovation and Management. Guest speakers include management professionals from technology-based companies.

*Prerequisite:* Graduate Standing.

### **EMGT 510/610 TT: Technology Transfer**

Along the technology management spectrum, technologies are born as concepts and go through several phases before they are integrated into new products, systems, and cultures. This course explores these different phases through case studies, readings and recently published research books. Readings and cases explore subjects including global technology flows, international licensing, institutional dynamics, success and failure in commercialization, international technology transfer, managerial/organizational issues, measures of technology transfer effectiveness, and technology transfer between basic research and industry, among others.

*Prerequisite:* Graduate Standing.

### **EMGT 510/610 TMP: Effective Presentations for Technology Management**

Engineering and technology managers are called on to make both internal and external presentations to clients and prospective clients, regulators, employees, professional peers, and the public. The focus of this class will be on presentation content rather than technology. While skillful use of technology is valuable, an effective presentation requires more than a set of slides or the ability to use PowerPoint. And an effective presentation is not just a reiteration of written material. Students will learn how to structure presentations for different situations, how to characterize and respond to particular audiences, how to design and organize the message and materials, how to pace and deliver the message, and how to handle external factors that affect presentation success. Students will prepare and deliver individual and team presentations for constructive class critique and will also attend and critique presentations outside class.

*Prerequisite:* Graduate Standing.

### **EMGT 520/620: Management of Engineering and Technology**

This course is a study of fundamental concepts of engineering and technology management that provides students with an in-depth understanding of the underlying principles of this discipline. Areas of study include innovation process; technological change; technological organizations; motivation and leadership theories applicable to engineers and scientists, engineering and R&D projects; resource management in current and emerging technologies; and strategic management of technological system interfaces. Ongoing Engineering and Technology Management research is critically evaluated in classroom discussions. Case studies and a team project are included.

*Prerequisite:* Graduate Standing.

### **EMGT 522/622: Communication and Team Building**

This course focuses on developing high performance teams for engineering-driven companies including fundamental concepts that make an effective team; building a high-performance team; the keys to high performance; converting risks into assets; the power of commitment and discipline, and constructive communication; getting results through team dynamics, creative problem solving; and measuring team performance. Case studies, presentations, term projects, teamwork, and interactive exercises are included.

*Prerequisite:* Graduate standing or eligibility for admission to Engineering and Technology Management Program.

### **EMGT 525/625: Strategic Planning in Engineering Management**

This course is designed to present critical issues in shaping the competitive strategy for engineering-driven companies in a turbulent business environment. The key steps and ends results of the planning

process are analyzed. Corporate mission, Key Result Areas (KRAs) and situational analysis including strengths, weaknesses, opportunities and threats in KRAs are covered. Discussions include how to identify planning assumptions, determine critical issues, set objectives, and formulate strategy. Finally, leadership, organizational culture and structure to support the implementation of a strategic plan as well as the strategic control systems are reviewed. Case studies, presentations, term projects, teamwork, and interactive exercises are included in the course.

*Prerequisite:* EMGT 520/620 or equivalent.

### **EMGT 530/630: Decision Making in Engineering and Technology Management**

Decision and value theory concepts are applied to technical and management decisions under uncertainty. Multicriteria decisions are analyzed. Subjective, judgmental decisions are quantified for expert decisions and conflict resolution in strategic decisions involving technological alternatives. The hierarchical decision modeling approach is introduced. Individual and aggregate decisions are measured. Decision discrepancies and group disagreements are evaluated. Case studies are included in the course.

*Prerequisite:* EMGT 520/620, Knowledge of Probability/ Statistics.

### **EMGT 535/635: Engineering Economic Analysis**

Economic evaluation of engineering and R&D projects is discussed from the Engineering and Technology Management viewpoint. Topics include true value of money, tax considerations, break-even sensitivity analyses, project evaluations under uncertainty, risk sharing, capital budgeting, and multicriteria decisions. Case discussions are included.

*Prerequisite:* Linear algebra, probability/statistics.

### **EMGT 537/637: Productivity Analysis**

Productivity analysis techniques, applications, and case studies are covered from engineering and management perspectives. Topics include benchmarking, process analysis, production functions, parametric productivity analysis techniques, and nonparametric productivity analysis techniques.

*Prerequisite:* Linear programming, Probability/statistics.

### **EMGT 540/640: Operations Research in Engineering and Technology Management**

This course focuses on the use of operations research techniques in making Engineering and Technology Management decisions; application and interpretation of linear programming and goal programming problem formulations; mathematical model building; the basic principles behind the Simplex algorithm and multiple objective linear optimization; post optimality analysis from the viewpoint of technology management; and other operations research techniques such as queuing models. A term project involving an actual operational problem is included.

*Prerequisite:* Linear algebra and probability/statistics.

### **EMGT 545/645: Project Management in Engineering and Technology**

This course discusses critical issues in the management of engineering and high technology projects; analysis of time, cost, and performance parameters from the organizational, people and resource perspectives; project planning, evaluation and selection, including project selection models; project and matrix organizations; project teams; scheduling with CPM/PERT algorithms; budget and schedule control; and termination of projects. Case discussions and a term project are included.

*Prerequisite:* EMGT 520/620, EMGT 530/630, or equivalents.

### **EMGT 546/646: Project Scheduling and Network Analysis**

This course is an in-depth study and review of the major problems and analytical techniques used in the planning and scheduling of key industrial projects. Specifically, the course focuses on two

primary areas: 1) network analysis used in the planning of projects, and 2) scheduling analysis used in the scheduling of resources during the course of a project. Special focus is placed on modeling techniques such as CPM/PERT, GERT, etc. in conjunction with mathematical programming and computer simulation. Emphasis is on solving real-world project schedules.

*Prerequisite:* Probability/statistics, linear algebra, EMGT 545/645 or equivalent.

### **EMGT 550/650: Manufacturing Systems Engineering**

This course presents underlying concepts of manufacturing or production systems; product and process planning; job/flow shops; group technology, and flexible manufacturing cells.

*Prerequisite:* Graduate standing or eligibility for admission to the Engineering and Technology Management Program

### **EMGT 551/651: Manufacturing Systems Management**

This course reviews traditional and emerging techniques in manufacturing management; the evolution of concepts from EOQ to MRP and JIT including what has gone wrong with them. Other management level issues such as shop floor control, production scheduling, and inventory management are included

*Prerequisite:* EMGT 550.

### **EMGT 552/652: Intelligent Manufacturing System**

This course introduces students to applications of AI/expert system tools for solving manufacturing system design and management problems. The first part of the course: introduces basic concepts of intelligent manufacturing. In the second part, KB techniques and software used in the design of products, processes, facilities and management systems requires to manufacture a product are discussed. The third part includes integration of KB techniques for designing an intelligent manufacturing system as well as current and future research in each of the functional areas.

*Prerequisite:* EMGT 550/650.

### **EMGT 553/653: Manufacturing System Simulation**

This course introduces discrete simulation techniques for the modeling of random processes and probabilistic events in the simulation of manufacturing systems and concepts of systems modeling with emphasis on the use of an animated simulation package throughout the course.

*Prerequisite:* EMGT 550, basic knowledge of probability and statistics.

### **EMGT 555/655: Technology Marketing**

This course is designed to introduce students to the special issues faced by managers marketing technological products in markets characterized by rapid environmental change. Topics include an examination of the marketing/engineering/manufacturing interface, product innovation strategies, value-based pricing, buyer behavior and strategic selling, competitive market analysis and positioning, and distribution strategies. Emphasis is placed on strategies for marketing technology products in industrial markets.

*Prerequisite:* Graduate Standing

### **EMGT 560/660: Total Quality Management**

This course introduces critical principles and procedures of quality management in a competitive global environment; contemporary definitions of quality; quality in production/services; quality economics; quality philosophies; planning, organizing and controlling for quality human resource and empowerment strategies, and QC tools. Case studies, presentations, term projects and teamwork are included.

*Prerequisite:* Graduate standing, or eligibility of admission to the Engineering and Technology Management Program.

**EMGT 563/663: Reengineering the Technical Enterprise**

This course presents the critical issues in re-inventing engineering-driven companies in the real world. The basic building blocks, reengineering stages and key success factors are covered. Also reviewed are the tools, challenges and resistance to reengineering. Case studies, presentations, term projects and teamwork are included.

*Prerequisite:* EMGT 560/660 or equivalent.

**EMGT 565/665: Research Methods for Engineering and Technology Management**

This course focuses on research methods in Engineering and Technology Management; specifically statistical techniques including proper selection, use, and interpretation of parametric and nonparametric tests along with factor and discriminant analysis. The course also includes design of experiments, model misspecification and the use of statistical software.

*Prerequisite:* Graduate standing; probability and statistics.

**EMGT 571/671: Expert Systems Engineering**

This course offers insights into artificial intelligence and exposes students to the building of expert systems (ES) with an emphasis on solving a variety of Engineering and Technology Management problems. Topics include components of ES and design methodology, principles of heuristic and logic programming, fundamental issues related to knowledge acquisition, representation, inferencing and learning along with design and implementation of inference engines and their implementation. The course includes fuzzy reasoning, neural nets, learning mechanisms and a review of some of the more popular AI and ES shells.

*Prerequisite:* N/A.

**EMGT 589: Capstone Project**

For the M.S. degree in Engineering Management; this course can be taken in lieu of a Master's Thesis or EMGT 590 to satisfy curriculum requirements. Students conduct individual research on a Capstone project approved by the faculty member who supervises the work. Findings are presented in a report after being accepted by the supervising professor.

*Prerequisite:* ETM core or equivalent.

**EMGT 590: Engineering and Technology Management Synthesis**

This is the Capstone course in the Engineering and Technology Management Program. It synthesizes the concepts and methodologies of engineering and technology management into an individual or group project. The research base for the project may come from any combination of the study areas covered in the Engineering and Technology Management Program.

*Prerequisite:* Completion of the Engineering and Technology Management Program core courses or equivalents.



“ETM’s project management courses helped me secure my first job as a project coordinator at ALCATEL. There, I was able to apply the skills I’d absorbed in ETM. Combining these skills with real life experience paved the way for upper levels of management. Later, I transferred to Cisco Systems.”

**Dogush Kuran,  
Industry Account Manager,  
Cisco Systems, Turkey**



## FACULTY AND STAFF

### FACULTY



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**STAFF**



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As Executive Director of PICMET, Ann White directs tactical operations for the conference. Her know-how and experience with technical conferences have served as a significant resource for volunteers working to make PICMET the premier conference it has become. Since she graduated from Portland State University and joined ETM,

Ann has enjoyed multicultural interactions with students, helping them learn more about American culture. She has also served as Editorial Assistant for *IEEE Transactions on Engineering Management*.

**ENGINEERING MANAGEMENT ADVISORY COUNCIL (EMAC)**

ETM has a 14-member Advisory Council (EMAC) representing the industrial base in the Portland Metropolitan Area. EMAC provides advice and counsel on the changing needs and strategic directions of technology-based industry, and assists the ETM in the continuous improvements of graduate offerings in Engineering & Technology Management.

Current members of EMAC are:

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- David J. Brown, Tektronix, Inc.
- Jon Clemens, Ph.D., Sharp Labs
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- John H. Matlock, Ph.D., Komatsu America
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