Graduate Degree Programs
WPI offers graduate study leading to the master of science, master of engineering, master of mathematics for educators, master of business administration, and the doctor of philosophy degrees. Please see index on page 10 for details.

The schedule of courses over a period of time generally allows a student taking three or four courses per semester to complete the course requirements for most Master's degree programs in about two years. Students taking two courses per semester complete the course requirements for the master of science or engineering degrees in about three years, or the master of business administration degree in about four years.

Master of Business Administration (M.B.A.) Program
Provides students with strategies for the successful application of technology to complex business environments. The degree requirements are described in this catalog and in a separate brochure available from the Department of Management at 508-831-5218.

Master of Mathematics for Educators (M.M.E.) Program
WPI offers a specific part time program (since 1975), Masters in Mathematics for Educators, for teachers of mathematics at the middle school, secondary, and community college levels. Students in this program may earn a content-based degree afternoons and evenings while still teaching full time. Taught by professors of mathematics at WPI, the program is designed to permit the teachers to learn from professors' research interests and includes an understanding of current developments in the field. Scholarship aid, which covers approximately 40% of the cost of tuition, is available to qualified participants. This degree may be used to satisfy the Professional License requirements of Massachusetts for teachers holding the Initial License.

Master of Science (M.S.) Degree Programs
Available, on a full-time and part-time basis, in the following disciplines:
• Applied Mathematics
• Applied Statistics
• Biology/Biotechnology*
• Biomedical Engineering
• Chemical Engineering*
• Chemistry
• Civil Engineering
• Computer Science
• Construction Project Management
• Electrical and Computer Engineering
• Environmental Engineering
• Financial Mathematics
• Fire Protection Engineering
• Industrial Mathematics
• Information Technology
• Interdisciplinary Studies
  • Impact Engineering
  • Manufacturing Engineering Management
  • Power Systems Management
  • Systems Engineering
  • Systems Modeling
• Marketing and Technological Innovation
• Manufacturing Engineering
• Materials Process Engineering
• Materials Science and Engineering
• Mechanical Engineering
• Operations Design and Leadership
• Physics

*available only on a full-time basis

Master of Engineering (M.E.) Programs
Offered in:
• Biomedical Engineering
• Clinical Engineering
• Environmental Engineering
• Master Builder Program

Interdisciplinary Master's Programs
New fields of research and study that combine traditional fields in innovative ways are constantly evolving. In response to this, WPI encourages the formation of interdisciplinary master's programs to meet new professional needs or the special interests of particular students. Currently there are five Interdisciplinary MS degree programs: Impact Engineering, Manufacturing Engineering Management, Power Systems Management, Systems Modeling, and Systems Engineering.

Interdisciplinary master's programs may include a thesis or project requirement and require at least 30 credits beyond the bachelor's degree. Proposals for such programs are initiated by groups of at least two faculty members from different academic departments who share a common interest in a cross-disciplinary field. The sponsoring group submits a proposal for an interdisciplinary degree to the Committee on Graduate Studies & Research (CGSR) that includes the details of a program of study and the credentials of the members of the group. At least one member of the group must be from a department or program currently authorized to award the masters degree and no more than half of the total academic credit may be taken in any one department. The CGSR may request additional input from the sponsors or appropriate departments.
The Doctor of Philosophy (Ph.D.) Program

Available in the following disciplines:
- Biotechnology
- Biomedical Engineering
- Joint Ph.D. in Biomedical Engineering and Medical Physics with UMass Medical School
- Chemical Engineering
- Chemistry
- Civil Engineering
- Computer Science
- Electrical and Computer Engineering
- Environmental Engineering
- Fire Protection Engineering
- Interdisciplinary Studies
- Manufacturing Engineering
- Materials Science and Engineering
- Mathematical Sciences
- Mechanical Engineering
- Physics
- Interdisciplinary Ph.D. in Social Science

Interdisciplinary Doctoral Programs

WPI encourages the formation of interdisciplinary doctoral programs to meet new professional needs or the special interests of particular students. Such programs are initiated by groups of at least three full-time faculty members who share a common interest in a cross-disciplinary field. A sponsoring group submits to the Committee on Graduate Studies and Research (CGSR) a proposal for an interdisciplinary degree, together with the details of a program of study and the credentials of the members of the group. At least one member of the group must be from a department or program currently authorized toward the doctorate.

If the CGSR approves the proposal, the sponsoring group serves in place of a department in establishing specific degree requirements beyond those of the university, in advising, in preparing and conducting examinations, and in certifying fulfillment of degree requirements.

WPI and the University of Massachusetts Medical School have developed a joint doctoral program in biomedical engineering and medical physics.

Graduate and Advanced Certificate Programs

Keeping pace with technological advancement today is a never-ending task. WPI’s innovative graduate certificate programs help to update a professional person’s understanding of advancing technology with insights and the study of new concepts, without a major commitment of the student’s time and resources.

WPI offers two graduate certificate program options, the Graduate Certificate Program (GCP), and the Advanced Certificate Program (ACP). Each program offers academic advising by WPI faculty. GCP course credits may be applied to a WPI graduate degree, at the discretion of the appropriate department graduate committee, if the student is admitted to a degree program in the same discipline.

Graduate Certificate Programs

The Graduate Certificate Programs (GCP) provide an opportunity for students holding undergraduate degrees to continue their study in an advanced area. A B.S. or B.A. degree is the general prerequisite; however, some departments look for related background when making admission decisions. These programs require students to complete four to six thematically related courses in their area of interest.

Biomedical Engineering
(Undergraduate degree in engineering or science preferred)
- Medical Instrumentation and Devices

Civil and Environmental Engineering
(Undergraduate degree in Civil Engineering or Computer Engineering preferred)
- Construction Project Management
- Environmental Engineering
- Master Builder
- Materials/Transportation
- Structural Engineering
- Geotechnical Engineering

Computer Science
(Undergraduate degree in Computer Science or Computer Engineering preferred)
- Artificial Intelligence
- Computer and Communications Networks
- Computer Systems
- Database Design
- Graphics/Image Processing/Visualization
- Programming Languages
- Software Engineering and Interface Design

Electrical and Computer Engineering
(Undergraduate degree in Electrical or Computer Engineering preferred)
- Computational Fields
- Computer Systems
- Computer and Communications Networks

Fire Protection Engineering
(Undergraduate degree in science or engineering preferred)
- Building Firesafety
- Fire Protection Systems
- Fire Dynamics
- Computer Modeling
- Industrial Applications
- Failure Analysis/Investigation
- Performance-based design
- Other mutually agreed theme

Management
(Undergraduate degree in science, engineering or management preferred; individuals holding bachelor’s degree in other disciplines with relevant work experience also considered.)
- Information Security Management
- Information Technology
- Management of Technology
- Technology Marketing
- Customized Certificate of Management
Manufacturing Engineering
(Undergraduate degree in engineering, computer science, or management preferred)

Materials Science and Engineering
(Undergraduate degree in engineering management, chemistry, physics or mathematics preferred)

Mathematical Sciences
(Knowledge of differential equations equivalent to that provided by an introductory college course required for the Industrial Mathematics Certificate Program; knowledge of statistics equivalent to that provided by an introductory college statistics course required for the Industrial Statistics Certificate Program)

• Industrial Mathematics
• Industrial Statistics

Social Science and Policy Studies
• System Dynamics

Additional concentrations may be developed in consultation with an academic advisor.

Advanced Certificate Programs
The Advanced Certificate Programs (ACP) provide master’s degree holders with an opportunity to continue their studies in advanced topics in the disciplines in which they hold their graduate degree or that are closely related to their master’s degree fields. The ACP programs consist of a set of five courses, none of which were included in the student’s formal master’s program, or in another certificate program. The courses may include either a depth or a breadth option.

Each participating department identifies one or more guideline programs; however, each student’s program of study may be customized to satisfy the student’s unique interests. The program of study is reviewed and approved by an academic advisor. Students admitted to an Advanced Certificate program may also apply for admission to an M.S. or Ph.D. graduate program closely related to their previously earned master’s degree fields. Each department’s Graduate Committee will review such applications on a case-by-case basis to determine the applicant’s eligibility.

Credits from another WPI certificate or degree may not be applied to an Advanced Certificate.

Advanced Certificates are available in the following areas:

Civil and Environmental Engineering

• Waste Minimization and Management
• Building Regulatory Integration in Construction Management
• Computer Based Support Systems for Construction Management

Computer Science

• Advanced Computer Systems
• Advanced Computer Science
• Artificial Intelligence
• Data and Knowledge Based Systems
• Compilers and Languages
• Image Science

Electrical and Computer Engineering

• Electrical and Computer Engineering
• Computational Fields
• Computer and Communications Networks
• Advanced Computer Systems

Fire Protection Engineering

• Building Firesafety
• Fire Protection Systems
• Fire Dynamics
• Computer Modeling
• Industrial Applications
• Failure Analysis/Investigation
• Performance-based design
• Other mutually agreed theme

Mechanical Engineering

• Computational Mechanics
• Fluid Mechanics
• Stress Analysis
• Vibrations and Controls
• Manufacturing Engineering
• Materials Science and Engineering

Additional specializations may be developed in consultation with an academic advisor.

Application
Application to a GCP or ACP program requires submitting an official application form, official copies of transcripts for all college coursework completed, and a $70 application fee (waived for WPI alumni) to the Graduate Studies & Enrollment Office. Management certificate applicants must also submit three letters of recommendation and GMAT/GRE scores.

International students may apply to these programs, however for WPI to issue the Form I-20 for a student visa, international students must be registered for a minimum of 9 credits during their first semester and must complete their program within one academic year.

Admission and Matriculation
If a student intends to apply to a certificate program, the student must be admitted prior to the completion of the second course. Only two courses taken prior to application to a certificate program may be counted toward the certificate. If the student goes beyond the second course as a non-degree student, then that student may apply to a WPI graduate degree program but will not be eligible to apply to or receive a graduate certificate.

No certificate will be awarded without prior acceptance into a certificate program. Admission to a certificate program of any department is granted by the faculty of the sponsoring department. A student accepted into a M.S. or Ph.D. degree program cannot retroactively apply to a certificate program.

Switching From a Certificate Program to a Graduate Degree Program
Many certificate students eventually choose to apply to a WPI graduate degree program. Admission to a certificate program is not equivalent to admission to a degree program. Students enrolled in a certificate program who would like to pursue a M.S. or Ph.D. degree must meet the application and admission requirements for the specific degree program as described in the graduate catalog.

Certificate students who have been denied admission to a degree program, have not applied to a degree program, or have an incomplete degree program application on file, will receive pass-fail grades for all credit earned beyond the certificate requirements.

Once accepted to both a GCP program and a degree program, no more than 6 credits from a degree program may be used to meet the GCP requirements. No credits may be double counted between an ACP and a graduate program.
Earning a Second Certificate

If a certificate student intends to pursue a second certificate in the same discipline, an application for admission to a degree program is required prior to the completion of the first course taken as part of the additional certificate. After applying to WPI’s graduate program, if the student chooses not to complete that degree, he/she can still continue with the second certificate if accepted into that second certificate program.

A student admitted into a certificate program who wishes to work towards a second certificate offered by a different department or program must apply to that second certificate program for admission.

Courses counted towards one certificate may not count towards any other certificate.

Registration Procedures

GCP and ACP students register at the same time as other WPI graduate students, follow the same registration procedures, and participate in the same classes.

Tuition and Fees

Tuition and fees for GCP and ACP students are the same as for all other WPI graduate students.

Academic Policies

Academic policies regarding acceptable grade point averages for certificate students follow the same guidelines as those established for degree-seeking graduate students, with the following exception: if after completing 9 credits a certificate program student’s grade point average falls below 2.5, he/she will be withdrawn from the program unless the academic department intervenes.

Program Planning

Certificate students will be assigned a faculty academic advisor, and will be required to complete a Plan of Study. The Plan of Study must be approved and signed by the academic advisor before the end of the student’s first semester in the program. The student, the academic advisor and the department will maintain copies of the plan. Students may initiate written requests to the advisor, via the Program Modification Form, to modify the Program of Study. The student, the academic advisor and the department should retain copies of any approved program modification(s).

Completion Time Limit

Certificate students will have four years from the date of matriculation to complete their program. International students may apply to these programs. However, in order to maintain valid student visa status, international students must be registered for a minimum of 9 credits during their first semester and must complete their program within one academic year.

Transfer of Credits

A maximum of 6 credits from another university may be used towards a certificate. Individual departments may establish stricter requirements.

Program Completion

Satisfactory certificate completion requires a cumulative grade point average of 3.0 or better (A = 4.0), with individual course grades of C or better in each course completed in the certificate program. Upon satisfactory completion of the program, students will receive a certificate of graduate study or advanced graduate study in the chosen discipline. Students are responsible for submitting the signed completed Plan of Study to the Registrar’s office to receive the approved certificate.

Combined Bachelor’s/Master’s Program

The Combined Bachelor’s/Master’s Program is a unitary program leading a student to a bachelor of science degree and to a master of business administration, master of engineering, or master of science degree. The purpose of the Combined Bachelor’s/Master’s Program is to give WPI undergraduates an opportunity to earn a bachelor’s and a master’s degree from WPI concurrently in less time than would be required if the student were to complete work on the bachelor’s degree before beginning work on the master’s degree. To gain the full benefit of this program, a student should apply for the Combined Program well before the bachelor’s degree is completed. Application at the beginning of the junior year is recommended.

For the master of science and master of engineering degrees, the Combined Program typically allows a student to complete requirements for both degrees in about one more year of full-time study than would be required to earn the bachelor’s degree. With careful planning, a student can obtain a similar reduction in the amount of time required to earn an M.B.A. Undergraduate students may apply up to four courses to the master’s degree (varies by department), with prior written approval from professors and the academic department. The M.S. portion of the program must be completed as a full-time student. See department descriptions for more information.

Advanced Study for Nondegree Students

For individuals with an earned bachelors degree who do not want to commit themselves to a certificate or degree program but who wish to enroll in a single course or a limited number of courses in a specialized field, WPI provides the opportunity to participate in graduate level courses on an ad hoc basis. When registering for courses as a nondegree student, grading may be either conventional (A, B, C) or Pass/Fail. Pass/Fail grading must be elected at the time of registration, and courses taken on the Pass/ Fail basis are not transferable to any master’s degree program.

The fact that a student has been allowed to register for graduate courses (and earn credit) does not guarantee that the student will be admitted to that department’s certificate or graduate program at a later date. Students are therefore encouraged to apply for admission to a certificate program prior to any course registration. The maximum number of courses that may be taken as a nondegree student is four. Individual departments may establish stricter requirements.
Colleges of Worcester Consortium

The Colleges of Worcester Consortium was established in 1967. In the Consortium, 20,000 students from eight four-year colleges with graduate programs, two two-year schools, a medical school and a veterinary school have access to all the educational benefits of these institutions as well as nine other specialized institutions in the area. The Consortium members and associates whose facilities and programs have been particularly useful to WPI graduate students are Assumption College, Clark University, College of the Holy Cross, Tufts School of Veterinary Medicine, University of Massachusetts Medical School, and Worcester State College. Cross-registration in courses and the use of special laboratory facilities are encouraged. The Consortium operates a free bus service for transporting students between the colleges.

Extended Education

The Division of Extended Education has become a vital part of WPI as the university strives to meet the needs of individual adult learners as well as organizations in both the public and not-for-profit sectors. Through the following educational and training opportunities, you can explore the wide variety of ways the Division can assist you. But whatever your needs, whether they are in training and development or graduate education in business, engineering, or science, the Division of Extended Education at WPI can apply its custom solutions to help improve your organization’s performance.

Continuing & Professional Education

Continuing & Professional Education at WPI provides career training and development to individuals and organizations, including both CEU-based and non-credit programs, seminars, and workshops. In addition to a wide variety of courses on topics that are important to career advancement and success in many organizations, such as project management (8 courses), process improvement (9 courses), six-sigma (6 courses), lean enterprise (11 courses), geometric dimensioning & tolerancing (7 courses), and management development (10 courses), CPE can offer customized training to meet your specific needs. CPE also offers a wide variety of Information Technology programs and the Fundamentals of Engineering Review course.

Corporate Education

WPI’s Corporate Education develops for-credit graduate programs in partnership with organizations that need to develop managers and technical professionals. These partnerships afford many advantages to companies and their employees, including a broad knowledge base that can be applied to various aspects of the business; enhanced camaraderie between participating employees; educational credit that can be applied to graduate degrees; an equal educational experience for all participants. Many aspects of WPI’s Corporate Education programs can be tailored to meet the needs of individual organizations, including programs that include a variety of courses and disciplines; unique scheduling formats that allow completion of graduate certificates in less than 11 months or full MS degrees in 18 months; and classes that can be taught on your site, at WPI’s campus, or through real-time video conferencing to multiple locations.

School of Industrial Management (SIM)

The connection between technology and business management has never been more powerful than it is today. Technological advances have changed the very nature of business by creating and eliminating markets, altering communication patterns and setting new rules about the flow of information.

SIM has the unique ability to combine technology-based courses with management courses to offer customized certificate programs for industry. Drawing from more than 50 years of experience, SIM offers challenging, technology-oriented business programs that give its graduates a distinct edge in the high-tech management marketplace.

SIM professors are experts in all aspects of technology management: running high-tech firms; converting technological innovations into commercial products, services and organizations; and integrating technology into existing organizations.

Call 508-831-5208 for more information.
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- Ph.D. in Biomedical Engineering
- WPI/UMMS Joint Ph.D. in Biomedical Engineering and Medical Physics
- Graduate Certificate

#### Chemical Engineering
- Master of Science in Chemical Engineering
- Ph.D. in Chemical Engineering

#### Chemistry and Biochemistry
- Master of Science in Chemistry
- Master of Science in Biochemistry
- Ph.D. in Chemistry

#### Civil and Environmental Engineering
- Master of Science in Civil Engineering
- Master of Science in Environmental Engineering
- Interdisciplinary Master of Science in Construction Project Management
- Master of Engineering in Civil Engineering
- Ph.D. in Civil Engineering
- Graduate Certificate
- Advanced Certificate

#### Computer Science
- Master of Science in Computer Science
- Master of Science in Computer Science Specializing in Computer and Communications Networks (CCN)
- Ph.D. in Computer Science
- Graduate Certificate
- Advanced Certificate

#### Electrical and Computer Engineering
- Master of Science in Electrical and Computer Engineering
- Master of Science in Electrical and Computer Engineering Specializing in Computer and Communications Networks (CCN)
- Ph.D. in Electrical Engineering
- Graduate Certificate
- Advanced Certificate

#### Fire Protection Engineering
- Master of Science in Fire Protection Engineering
- Ph.D. in Fire Protection Engineering
- Graduate Certificate
- Advanced Certificate

#### Interdisciplinary Studies
- Master of Science, Interdisciplinary Studies
  - Impact Engineering
  - Manufacturing Engineering Management
  - Power Systems Management
  - Systems Engineering
  - Systems Modeling
- Ph.D., Interdisciplinary Studies

#### Management
- Master of Business Administration (M.B.A.)
- Master of Science in Information Technology
- Master of Science in Marketing and Technological Innovation
- Master of Science in Operations Design and Leadership
- Graduate Certificate

#### Manufacturing Engineering
- Master of Science in Manufacturing Engineering
- Ph.D. in Manufacturing Engineering
- Graduate Certificate

#### Materials Process Engineering
- Master of Science in Materials Process Engineering

#### Materials Science and Engineering
- Master of Science in Materials Science and Engineering
- Ph.D. in Materials Science and Engineering
- Graduate Certificate

#### Mathematical Sciences
- Master of Mathematics for Educators
- Master of Science in Applied Mathematics
- Master of Science in Applied Statistics
- Professional Master of Science in Financial Mathematics
- Professional Master of Science in Industrial Mathematics
- Ph.D. in Mathematical Sciences
- Graduate Certificate

#### Mechanical Engineering
- Master of Science in Mechanical Engineering
- Ph.D. in Mechanical Engineering
- Advanced Graduate Certificate

#### Physics
- Master of Science in Physics
- Ph.D. in Physics

#### Social Science and Policy Studies
- Interdisciplinary Ph.D. in Social Science
- Graduate Certificate in System Dynamics