ENGINEERING, M.ENG.

MASTER OF ENGINEERING—NAMED OPTION: ENGINEERING DATA ANALYTICS

The named option of applied computing and engineering data analytics in the master of engineering degree is an online master’s degree program that teaches students how to use hardware and software to analyze, process, and build conclusions using "big data" in the design, testing, and operations phases of numerous computationally intensive engineering processes.

The degree offers students a chance to become proficient in:

- High performance computing
- Modeling, simulation, and visualization
- Emerging hardware and software
- Programming languages
- Problem-solving methodologies
- Pattern recognition
- Optimum design

Students will also have the opportunity to sharpen their digital and technical communications skills, including project management, and how to lead technical teams.

Candidates must complete 30 credits. The degree may be earned by engineers who have a B.S. degree in engineering or computer science from an ABET-approved program, a GPA of 3.0 (on a scale where 4.0 = A), and three letters of recommendation. Interested applicants with B.S. degrees in related fields should contact the graduate programs coordinator for more specific admission information at gradadmissions@epd.wisc.edu. For more details, see the program website (https://epd.wisc.edu/online-degree/engineering-data-analytics).

MASTER OF ENGINEERING—NAMED OPTION: ENGINE SYSTEMS

The named option engine systems in the master of engineering degree is the only online engineering master's degree focused on internal combustion engine development. This interactive, web-based program provides internal combustion engine engineers with a broad base of skills in:

- Dynamics and design
- Material science and fluid mechanics
- Electronics and control
- Global teamwor

The program is tailored for working engineers, offering:

- An online platform accessible to you from anywhere in the world
- Flexible learning times
- Courses and projects that apply immediately to real-world work
- A supportive structure that keeps you on track

A cohort of 30 students begins in June each year. Candidates must complete 30 credits in required courses and specific electives. The degree may be earned by engineers who have:

- A B.S. degree in engineering from an ABET-approved program
- A minimum undergraduate grade-point average (GPA) of 3.00 on the equivalent of the last 60 semester hours (approximately two years of work) or a master’s degree with a minimum cumulative GPA of 3.00
- Four years of post-baccalaureate work experience in engineering

Interested applicants with B.S. degrees in related fields should contact the graduate programs coordinator for more specific admission information at gradadmissions@epd.wisc.edu. For further details about the program, contact Wayne Pferdehirt, program director, at 608-265-2361, wppferde@wisc.edu, or see the program website (https://epd.wisc.edu/online-degree/master-of-engineering-engine-systems).

Note: The named option in engineering management in the master of engineering degree program was formerly named professional practice (MEPP). The program was renamed in summer 2014.
MASTER OF ENGINEERING–NAMED OPTION: MANUFACTURING SYSTEMS ENGINEERING

The named option manufacturing systems engineering in the master of engineering degree is an online master’s degree program designed to prepare students for the application of advanced technologies and processes in the manufacturing industry. Students will gain cross-functional expertise to drive creative product and process development, efficient production, and timely delivery to the customer through a systematic approach to finance, methods, materials, and technology.

The degree offers students a chance to:

- Analyze, compare, and contrast technical and business systems to optimize their organizations
- Solve problems and drive innovation in the manufacturing systems industry
- Apply their new skills in a global context

Candidates must complete 30 core credits. The degree may be earned by engineers who have a B.S. degree in engineering from an ABET-approved program, a GPA of 3.0 (on a scale where 4.0 = A), and three letters of recommendation. Interested applicants with B.S. degrees in related fields should contact the graduate programs coordinator for more specific admission information at gradadmissions@epd.wisc.edu. For more details, see the program website (https://epd.wisc.edu/online-degree/manufacturing-systems-engineering).

MASTER OF ENGINEERING–NAMED OPTION: SUSTAINABLE SYSTEMS ENGINEERING

The named option sustainable systems engineering in the master of engineering degree is an online master’s degree program designed to prepare students to analyze, design and operate complex systems with low negative impact on the quality of water, land, air, energy, economics, and society. Students will gain an understanding of sustainable principles, applied engineering methods, and professional skills.

The program is tailored for working engineers, offering:

- Knowledge and skills that can immediately be applied to work situations
- Project-based learning with experienced professionals
- Award-winning distance-learning design

Candidates must complete 30 credits, consisting of required courses, approved electives, and a capstone project. The degree may be earned by engineers who have a B.S. degree in engineering from an ABET-approved program, a GPA of 3.0 (on a scale where 4.0 = A), and three letters of recommendation. Interested applicants with B.S. degrees in related fields should contact the graduate programs coordinator for more specific admission information at gradadmissions@epd.wisc.edu. For more details, see the program website (https://epd.wisc.edu/online-degree/sustainable-systems-engineering).

MASTER OF ENGINEERING–NAMED OPTION: TECHNICAL JAPANESE

The named option technical Japanese in the master of engineering degree provides the necessary skills and knowledge to interact effectively with Japanese counterparts in the technical or business arena. This degree program begins in the fall of each year. To obtain the degree, candidates must complete at least 30 credits of approved course work (beyond a B.S. degree) in technical Japanese, Japanese language, and technology development in Japan.

Students with a bachelor’s degree other than a B.S. degree must provide transcript evidence of the completion of a minimum of 16 semester credits of undergraduate courses in science or engineering in order to be admitted to this degree program. All applicants must have at least a 3.0 GPA from their undergraduate institution (where 4.0 = A).

All courses are offered regularly to students on the UW-Madison campus, and are also offered at a distance. Students must complete E P D/E ASIAN 374 Intermediate Technical Japanese I/E P D/E ASIAN 375 Intermediate Technical Japanese II. At least 18 credits must come from approved courses numbered 600 or higher. No more than 6 credits of independent study (E P D 699 Independent Study) are allowed. Most students enroll in one course per semester over a period of four years; however, it is possible for highly motivated students to complete the degree in one academic year. For questions concerning the curriculum or the application process, contact Professor James L. Davis, program director, at 608-262-4810, jdavis@engr.wisc.edu.

REQUIREMENTS

MINIMUM DEGREE REQUIREMENTS AND SATISFACTORY PROGRESS

To make progress toward a graduate degree, students must meet the Graduate School Minimum Degree Requirements and Satisfactory Progress (http://guide.wisc.edu/graduate/#policiesandrequirementstext) in addition to the requirements of the program.

NAMED OPTIONS


MINIMUM GRADUATE DEGREE CREDIT REQUIREMENT

30 credits

MINIMUM GRADUATE RESIDENCE CREDIT REQUIREMENT

16 credits

MINIMUM GRADUATE COURSEWORK (50%) REQUIREMENT

M.Eng.–named option in Applied Computing and Engineering Data Analytics: Half of degree coursework (at least 15 credits out of 30 total credits) must be in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the
university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

M.Eng.–named option in Engine Systems: All courses in this fixed curriculum program are graduate-level courses, identified with the Graduate Level Coursework attribute in the university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle), and are offered exclusively to Graduate students in the M.Eng. degree program.

M.Eng.–named option in Engineering Management: All courses in this fixed curriculum program are graduate-level courses, identified with the Graduate Level Coursework attribute in the university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle), and are offered exclusively to Graduate students in the M.Eng. degree program.

M.Eng.–named option in Manufacturing Systems Engineering: Half of degree coursework (at least 15 credits of out 30 total credits) must be in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

M.Eng.–named option in Sustainable Systems Engineering: Half of degree coursework (at least 15 credits of out 30 total credits) must be in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

M.Eng.–named option in Technical Japanese: More than half of degree coursework (at least 18 credits of out 30 total credits) must be in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

PRIOR COURSEWORK REQUIREMENTS: GRADUATE WORK FROM OTHER INSTITUTIONS

With program approval, students are allowed to count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNDERGRADUATE

Up to 7 credits numbered 300 or above can be counted toward the minimum graduate degree credit requirement. Up to 7 credits of courses numbered 600 or above can be counted toward the minimum graduate coursework (50%) requirement. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNIVERSITY SPECIAL

With program approval, students are allowed to count up to 9 credits of coursework numbered 300 or above taken as a UW–Madison Special student toward the minimum graduate residence credit requirement, and the minimum graduate degree credit requirement, and up to 15 credits of courses numbered 700 or above taken as a UW–Madison Special student toward the minimum graduate coursework (50%) requirement.

Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

CREDITS PER TERM ALLOWED

15 credits

PROGRAM-SPECIFIC COURSES REQUIRED

M.Eng.–Named Option in Applied Computing and Engineering Data Analytics

Contact program for more information.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISYE 412</td>
<td>Fundamentals of Industrial Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>E/COMP SCI/EC/EMA/E P 759</td>
<td>High Performance Computing for Applications in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>LIS 751</td>
<td>Database Design for Libraries and Information Agencies</td>
<td>3</td>
</tr>
<tr>
<td>E PD 416</td>
<td>Engineering Applications of Statistics</td>
<td>3</td>
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</tbody>
</table>

M.Eng.–Named Option in Engine Systems

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>E PD 641</td>
<td>Essential Skills for Engineering Productivity</td>
<td>2</td>
</tr>
<tr>
<td>E PD 642</td>
<td>Thermal Systems Engineering</td>
<td>2</td>
</tr>
<tr>
<td>E PD 626</td>
<td>Engine Project Management</td>
<td>3</td>
</tr>
<tr>
<td>E PD 622</td>
<td>Engine Design I</td>
<td>2</td>
</tr>
<tr>
<td>E PD 623</td>
<td>Engine Design II</td>
<td>4</td>
</tr>
<tr>
<td>E PD 624</td>
<td>Engine Performance and Combustion</td>
<td>4</td>
</tr>
<tr>
<td>E PD 625</td>
<td>Engine Fluid Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>E PD 643</td>
<td>Analysis of Trends in Engines - Legislative Drivers and Alternative Fuels</td>
<td>1</td>
</tr>
<tr>
<td>E PD 644</td>
<td>Analysis of Trends in Engines - Powertrain Technologies and Manufacturing</td>
<td>1</td>
</tr>
<tr>
<td>E PD 627</td>
<td>Perspectives on Engine Modeling</td>
<td>2</td>
</tr>
<tr>
<td>E PD 629</td>
<td>Engine Systems and Controls</td>
<td>4</td>
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</tbody>
</table>

M.Eng.–Named Option in Engineering Management

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>E PD 378</td>
<td>Network Skills for Remote Learners</td>
<td>1</td>
</tr>
<tr>
<td>E PD 611</td>
<td>Engineering Economics and Management</td>
<td>3</td>
</tr>
<tr>
<td>E PD 612</td>
<td>Technical Project Management</td>
<td>3</td>
</tr>
<tr>
<td>E PD 617</td>
<td>Communicating Technical Information</td>
<td>3</td>
</tr>
<tr>
<td>E PD 470</td>
<td>Engineering Problem Solving with Computers</td>
<td>3</td>
</tr>
<tr>
<td>E PD 615</td>
<td>Independent Reading and Research in Applied Engineering</td>
<td>2</td>
</tr>
<tr>
<td>E PD 416</td>
<td>Engineering Applications of Statistics</td>
<td>3</td>
</tr>
<tr>
<td>E PD 613</td>
<td>International Engineering Strategies and Operations</td>
<td>3</td>
</tr>
</tbody>
</table>
### E P D 618
Applied Leadership and Management of Engineering Organizations 3

### E P D 518
Quality Engineering and Quality Management 3

#### M. Eng–Named Option in Manufacturing Systems Engineering
First term fall 2016—contact the program for more information.

#### M. Eng–Named Option in Sustainable Systems Engineering

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>E P D 660</td>
<td>Core Competencies of Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>E P D 641</td>
<td>Essential Skills for Engineering Productivity</td>
<td>2</td>
</tr>
<tr>
<td>E P D 661</td>
<td>Industrial Ecology: Sustainability Tools in Context</td>
<td>3</td>
</tr>
<tr>
<td>OTM 770</td>
<td>Sustainable Approaches to System Improvement</td>
<td>4</td>
</tr>
<tr>
<td>E P D 669</td>
<td>Sustainable Systems Engineering Capstone</td>
<td>3</td>
</tr>
</tbody>
</table>

#### M.Eng.–Named Option in Technical Japanese

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>E P D/E ASIAN 330</td>
<td>Basic Technical Japanese I</td>
<td>3</td>
</tr>
<tr>
<td>E P D/E ASIAN 332</td>
<td>Basic Technical Japanese II</td>
<td>3</td>
</tr>
<tr>
<td>E P D/E ASIAN 374</td>
<td>Intermediate Technical Japanese I</td>
<td>3</td>
</tr>
<tr>
<td>E P D/E ASIAN 375</td>
<td>Intermediate Technical Japanese II</td>
<td>3</td>
</tr>
<tr>
<td>E P D/E ASIAN 601</td>
<td>Japanese for Business and Industry</td>
<td>3-4</td>
</tr>
<tr>
<td>E P D/E ASIAN 602</td>
<td>Japanese for Politics and Government</td>
<td>3-4</td>
</tr>
<tr>
<td>E P D 603</td>
<td>Advanced Technical Japanese Seminar</td>
<td>3-4</td>
</tr>
<tr>
<td>E P D 604</td>
<td>Research in Japanese Technical Literature</td>
<td>2-6</td>
</tr>
</tbody>
</table>

1 Two courses may be waived with previous experience as determined by the program director.

#### OVERALL GRADUATE GPA REQUIREMENT

3.00 GPA required.

#### OTHER GRADE REQUIREMENTS

Must retake any courses for which a grade below C is recorded.

#### PROBATION POLICY

The status of a student can be one of three options:

1. Good standing (progressing according to standards; any funding guarantee remains in place).
2. Probation (not progressing according to standards but permitted to enroll; loss of funding guarantee; specific plan with dates and deadlines in place in regard to removal of probationary status).
3. Unsatisfactory progress (not progressing according to standards; not permitted to enroll, dismissal, leave of absence or change of advisor or program).

#### ADVISOR / COMMITTEE

All students have both a plan advisor and academic advisor (typically the program director or academic director for each program); programs without a fixed curriculum are required to meet with their advisor to outline an approved plan of study by the end of their first academic term.

#### ASSESSMENTS AND EXAMINATIONS

No formal examination required.

#### TIME CONSTRAINTS

Master’s degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

#### LANGUAGE REQUIREMENTS

No language requirements.

#### ADMISSIONS

The Graduate School sets minimum requirements for admissions (https://grad.wisc.edu/admissions/requirements). Academic program admission requirements are often more rigorous than those set by the Graduate School. Please check the program’s website for details.

#### LEARNING OUTCOMES

**KNOWLEDGE AND SKILLS**

- acquire a strong background in engineering principles and a thorough knowledge of the latest.
- acquire practical engineering experience that will be immediately applicable in the workplace.
- demonstrate an ability to formulate, analyze, and solve advanced engineering problems.
- demonstrate creative, independent problem solving skills.
- apply the latest scientific and technological advancements, advanced techniques, and modern engineering tools to these problems.
- acquire knowledge and practice of career-enhancing competencies that enhance professional opportunities and personal success.

**PROFESSIONAL CONDUCT**

- recognize and apply principles of ethical and professional conduct.