

Washington University in St. Louis
School of Engineering & Applied Science
Department of Energy, Environmental and Chemical Engineering
Master of Engineering in Energy, Environmental and Chemical Engineering

List of Classes for Entering Class: Fall 2017

Curriculum Structure for Master of Engineering in EECE:

The list is dynamic and will change from time to time. Students have the flexibility of choosing other classes with the permission of their academic advisor. The MEng degree requires a total of 30 credits with 15 from core courses. At least 18 of the 30 total credits should be from EECE. Courses should be 500-level, although up to two 400-level courses can be selected with the approval of the academic advisor. BS/MEng students are permitted to double count 6 credits towards both degrees (400-level and up). Courses from University College and Engineering Continuing Studies (“U” and “T” designations) will not count towards the degree unless explicitly listed below or if granted special authorization from an advisor.

Core Courses (total of 5 required courses)

1) Technical Core (choose 2, 3 credit classes)

- a) Transport Phenomena in Energy, Environmental and Chemical Engineering (E44 EECE 501, Fall)
- b) Advanced Thermodynamics in EECE (E44 EECE 502, Fall)
- c) Aerosol Science and Technology (E44 EECE 504, Fall)
- d) Environmental Organic Chemistry (E44 EECE 531, Fall)
- e) Kinetics and Reaction Engineering Principles (E44 EECE 507, Spring)
- f) Bioprocess Engineering I: Fundamentals & Applications (E44 EECE 506, Spring)

2) Mathematics (choose 1, 3 credit class)

- a) Mathematical Methods in Engineering (E44 EECE 503, Fall)
- b) Mathematics of Modern Engineering I (E35 ESE 501, Fall)
- c) Mathematics of Modern Engineering II (E35 ESE 502, Spring)
- d) Statistical Computation (L24 Mathematics 475, Fall)

3) Project Management (choose 1, 3 credit class)

- a) Engineering Project Management (E44 EECE 597, Summer)
- b) Engineering Project Management (E37 MEMS 5804, Fall)
- c) Project Planning and Administration (T55 ETEM 523A, Spring)
- d) Foundations of Project Management (T81 INFO 5504, Fall, Spring)
- e) Project Management Standards (T81 INFO 5505, Spring)
- f) Managing Teams and Projects (T81 INFO 509B, Fall, Spring)

4) Social, Legal, and Policy Aspects (choose 1, 3 credit class)

- a) Environmental Policy (L11 Econ 451, Fall, Summer)
- b) Sustainability Exchange: Community & University Practicums (E44 EECE 412, Fall, Spring)
- c) Interdisciplinary Environmental Clinic (L82 EnSt 539, Fall, Spring)
(Note: You must apply to be in this class – see online course description for details)
- d) Health Economics and Policy (B63 MGT 564, Fall)
- e) Designing Sustainable Social Policies and Programs: A Systems Dynamics Approach (S65 SWCD 5660, Fall, Spring)
- f) Integrated Urban Ecosystems and Sustainable Design Principles (I50 INTER D 406, Spring)
- g) Foundations of Public Health: Environmental Health (S55 MPH 5005, Fall, Spring)

Note: It is optional for students to attend the EECE Seminars held on Fridays at 11 a.m.; however in order to receive the 1 unit of credit, a student must be officially registered (E44 EECE 509 Section 01). Up to 2 units of credits by attending EECE Seminars will be allowed towards the MEng degree.

Elective Courses (minimum of 15 credits)

Any graduate courses (not just those listed on the following pages) may be chosen for electives. Exceptions include “U” and “T” designations, unless listed explicitly in this document or granted special authorization. See <http://courses.wustl.edu> for a complete listing of available courses.

Students can sign up for Independent Study (E44 EECE 500) with a professor. The Independent Study could be in the form of a research project, industry-directed consulting, or an internship set up by the student. Approval by the academic advisor (via an Independent Study Petition form, available from the Graduate Administrator) is necessary for Independent Study credits. The degree earned will be MEng, even if research is done by the student under supervision of a faculty member. Up to 6 units of Independent Study credits can count towards the MEng degree. It is the student’s responsibility to set up their own Independent Study; arrangements should be in advance (during the prior semester, if possible).

Pathways that are comprised of specific courses can be completed to result in a certificate of specialization. These certificates are optional, but they may help guide your choice of courses. Careful choice of courses could result in multiple certificates. Available pathways are listed below.

Advanced Energy Technologies (choose total of 5 courses)

Group 1: Fundamentals (choose 2)

- a) Kinetics and Reaction Engineering Principles (E44 EECE 507, Spring)
- b) Principle & Methods of Micro & Nanofabrication (E37 MEMS 5611 and same as E44 EECE 595, Spring)
- c) Aerosol Science and Technology (E44 EECE 504, Fall)
- d) Atmospheric Science and Climate (E44 EECE 514, Spring)
- e) Advanced Thermodynamics in EECE (E44 EECE 502, Fall)
- f) Electrochemical Engineering (E44 EECE 574, Spring)

Group 2: Energy Generation and Conservation (choose 3)

- a) Energy and Buildings (E44 EECE 591, Spring)
- b) Combustion Phenomena (E44 EECE 512, Fall)
- c) Bioenergy (E44 EECE 556, Spring, 2 units)
- d) Solar Energy Thermal Processes (E37 MEMS 5422, Summer)
- e) Wind Energy Systems (E37 MEMS 5705, Spring)
- f) Biomass Energy Systems and Engineering (E44 EECE 552, Spring)
- g) Sustainability Exchange: Community & University Practicums (E44 EECE 412, Fall, Spring)
- h) Energy Conversion and Storage (E44 EECE 413, Fall)

Bioengineering and Biotechnology (choose total of 5 courses)

Group 1: Fundamentals (choose 3)

- a) Bioprocess Engineering I: Fundamentals and Applications (E44 EECE 506, Spring)
- b) Kinetics and Reaction Engineering Principles (E44 EECE 507, Spring)
- c) Metabolic Engineering and Synthetic Biology (E44 EECE 551, Fall)
- d) Biomass Energy Systems and Engineering (E44 EECE 552, Spring)
- e) Molecular Biochemical Engineering (E44 EECE 554, Spring)
- f) Bioenergy (E44 EECE 556, Spring, 2 units)

Group 2: Technology and Industry (choose 2)

- a) Biotech Industry Innovators (L41 BIOL 5014, Spring)
- b) Pharmaceutical Research and Development: Case Studies (L41 BIOL 5077, Fall, 2 units)
- c) Computational Molecular Biology (E62 BME 537, Fall)
- d) Genomics (L41 BIOL 5488, Spring)

Energy and Environmental Nanotechnology (choose total of 4 courses)

Group 1: Basics and Fundamentals (choose 2)

- a) Aerosol Science and Technology (E44 EECE 504, Fall)
- b) Advanced Thermodynamics in EECE (E44 EECE 502, Fall)
- c) Environmental Nanochemistry (E44 EECE 534, Spring)
- d) Electrochemical Engineering (E44 EECE 574, Spring)

Group 2: Applications (choose 2)

- a) Principle & Methods of Micro & Nanofabrication (E44 EECE 595, Spring)
- b) Energy Conversion and Storage (E44 EECE 413, Fall)
- c) Sustainability Exchange: Community & University Practicums (E44 EECE 412, Fall, Spring)
- d) Materials Characterization Techniques II (E37 5604, Fall)

Energy and Environmental Management (choose total of 5 courses)

Group 1: Energy and Environmental Engineering (choose at least 2)

- a) Aerosol Science and Technology (E44 EECE 504, Fall)
- b) Environmental Organic Chemistry (E44 EECE 531, Fall)
- c) Energy and Buildings (E44 EECE 591, Spring)
- d) Interdisciplinary Environmental Clinic (L82 EnSt 539, Fall, Spring)
- e) Electrochemical Engineering (E44 EECE 574, Spring)

Group 2: Business-Related Classes (choose at least 2, must total to 6 credits)

- a) Basics of Bio-Entrepreneurship (B63 MGT 500U, Spring; 3 credit)
- b) Ethical Issues in Managerial Decision Making (B63 MGT 502, Fall, Spring; 1.5 credit)
- c) Introduction to Entrepreneurship (B63 MGT 521, Fall, Spring; 3 credit)
- d) Business Planning for New Enterprises [The Hatchery] (B63 MGT 524, Fall, Spring, Summer; 3 credit)
- e) Management and Corporate Responsibility (B63 MGT 529, Fall, Spring, Summer; 1.5 credit)
- f) Business & Society (B63 MGT 731, Fall, Spring; 1.5 credit)
- g) Negotiation (B66 OB 461, Fall; 3 credit)
- h) Negotiation and Conflict Management (B66 OB 561, Fall; 1.5 credit)
- i) Leading Change (B66 OB 565, Fall, Spring; 1.5 credit)

Environmental Engineering Science (choose total of 5 courses)

Group 1: Air and Aerosols (choose at least 1)

- a) Aerosol Science and Technology (E44 EECE 504, Fall)
- b) Atmospheric Science and Climate (E44 EECE 514, Spring)
- c) Advanced Thermodynamics in EECE (E44 EECE 502, Fall)

Group 2: Water/Aquatics (choose at least 1)

- a) Environmental Organic Chemistry (E44 EECE 531, Fall)
- b) Aquatic Chemistry (E44 EECE 505, Fall)
- c) Physical and Chemical Processes for Water Treatment (E44 EECE 533, Spring)

Group 3: Policy and Practice (choose 1)

- a) Sustainability Exchange: Community & University Practicums (E44 EECE 412, Fall, Spring)
- b) Environmental Policy (L11 Econ 451, Fall)
- c) Health Economics and Policy (B63 MGT 564, Fall)