EENV - Environmental Engineering

EENV 102 Introduction to Environmental Engineering Design and Sustainability: 3 Credits (2 Lec, 1 Lab)
(Sp) Students will gain a fundamental understanding of environmental engineering and sustainability, learn engineering tools, receive an introduction to the engineering design process and build professional skills. Lab includes a semester long group project on an environmental engineering topic.

EENV 202 Sustainable Waste Management: 3 Credits (2 Lec, 1 Lab)
Students will apply fundamental concepts of systems thinking, sustainability and ethics to environmental engineering projects focused on solid and hazardous waste management.

EENV 240 Chemistry for Environmental Engineers: 3 Credits (3 Lec)
PREREQUISITES: CHMY 143 or CHMY 153 Fundamentals of physical, biochemistry and organic chemistry with an emphasis on environmental engineering applications

EENV 292 Independent Study: 1-3 Credits (1-3 Other)
PREREQUISITE: Consent of instructor and approval of department head. () On demand. Directed research and study on an individual basis
Repeatable up to 6 credits.

EENV 340 Principles of Environmental Engineering: 3 Credits (3 Lec)
PREREQUISITE: CHMY 143 or CHMY 153
COREQUISITE: EGEN 335 or ECIV 337 or ECHM 321. Fundamentals of environmental engineering with emphasis on water and wastewater
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EENV 341 Physical and Chemical Treatment Processes: 4 Credits (3 Lec, 1 Lab)
PREREQUISITE: EENV 240 and ECHM 201 . Principles of water chemistry, reactor theory, and unit operations are applied to water treatment processes, with a focus on municipal drinking water systems

EENV 342 Biological Treatment Processes: 4 Credits (3 Lec, 1 Lab)
PREREQUISITE: EENV 240. (Sp) Principles of microbial kinetics, biological reactors and unit operations are applied to water treatment, with an emphasis on municipal wastewater

EENV 387 Environmental Laws and Regulations: 3 Credits (3 Lec)
PREREQUISITES: CHMY 211 or EENV 240 or CHMY 321 or EGEN 335 or ECIV 337. Introduction to major environmental laws and regulations and the impacts of pollution by review of case studies

EENV 432 Advanced Engineering Hydrology: 3 Credits (3 Lec)
PREREQUISITE: ECIV 333. (F) Hydrology emphasizing engineering design. Topics include modern techniques for flow estimation, flood routing and sediment yield; design of conveyance structures; and water project development

EENV 434 Groundwater Supply/Remediation: 3 Credits (3 Lec)
PREREQUISITE: EGEN 335 or ECIV 337 or ECHM 321. Introduction to fundamental concepts, applied analysis and design related to groundwater flow, well mechanics, contaminant transport and remediation technologies Co-convened with ECIV 529, graduate students interested in this course should enroll in ECIV 529

EENV 436 Stormwater Management & Engineering: 3 Credits (3 Lec)
PREREQUISITE: ECIV 333 and EENV 340 or EENV 341. Planning and design of stormwater management systems in urban and suburban watersheds, as well as during construction. Topics include stormwater quality, principles of hydrology and hydraulic engineering, design of conventional and low-impact stormwater controls, and stormwater regulations

EENV 440 Water Chemistry for Envr Engr: 3 Credits (3 Lec)
PREREQUISITE: EENV 340 or EENV 341 Fundamentals of aquatic chemistry and principles of water technology for environmental engineers. Based on chemical thermodynamics. Students learn to quantify water quality and control parameters characterizing water quality. Co-convened with EENV 540. Students enrolled in this course will not be able to take EENV 540 and have it count toward degree requirements

EENV 441 Natural Treatment Systems: 3 Credits (3 Lec)
PREREQUISITE: EENV 340 or EENV 342. Planning, design, and operation of remediation facilities emphasizing natural versus mechanical elements. Specific topics include stabilization ponds, constructed wetlands, land treatment, and on-site domestic systems

EENV 443 Air Pollution Control: 3 Credits (3 Lec)
PREREQUISITE: EGEN 335 or ECIV 337, and CHMY 141 or CHMY 151. (F) Fundamentals of air quality management with emphasis on the design of processes and equipment for controlling gaseous and particulate emissions

EENV 445 Hazardous Waste Treatment: 3 Credits (3 Lec)
PREREQUISITE: EENV 340 or EENV 341. () Fall, odd years. Principles, theory, and practice of treating hazardous materials

EENV 489R Environmental Engineering Design I: 2 Credits (1 Lec, 1 Lab)
PREREQUISITE: EGEN 310R, ECIV 333 and EENV 341 and student must be within two semesters of graduation
COREQUISITE: EGEN 325 or EGEN 330. Senior capstone course. Discussion of the design process from conceptual/preliminary design to final design, plans, and specifications. Develop proposal for engineering services, including scope of work, data acquisition, and organization of design team
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EENV 490R Undergraduate Research: 1-6 Credits (1 Other)
(F, Sp, Su) Directed undergraduate research which may culminate in a research paper, journal article, or undergraduate thesis. Course will address responsible conduct of research. May be repeated.
Repeatable up to 12 credits.

EENV 491 Special Topics: 1-3 Credits (1-3 Lec)
PREREQUISITE: Course prerequisites as determined for each offering. On demand. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number
Repeatable up to 12 credits.

EENV 492 Independent Study: 1-3 Credits (1-3 Other)
PREREQUISITE: Junior standing, consent of instructor, and approval of Department Head. (F, Sp, Su) Directed research and study on an individual basis
Repeatable up to 4 credits.

EENV 498 Internship: 1-3 Credits (1-3 Other)
PREREQUISITE: Junior standing, consent of instructor and approval of Department Head. An individualized assignment arranged with an agency, consulting firm, business, or other organization to provide guided environmental engineering experience in the field. Students may not take this course the semester they graduate

EENV 499R Environmental Engineering Design II: 2 Credits (1 Lec, 1 Lab)
PREREQUISITE: EENV 489R. (F, Sp) Senior capstone course. Design of an engineering project. Evaluation of design alternatives and design recommendations. Development of construction documents. Discussion of project management, cost estimates, and engineering services during construction

EENV 534 Environmental Engineering Investigation: 3 Credits (3 Lec)
PREREQUISITE: EENV 434 or ECIV 529. Laboratory and field investigations for design and analysis of environmental engineering systems with focus on site investigations, remediation and incorporation of modeling studies

EENV 540 Water Chemistry for Envr Engr: 3 Credits (3 Lec)
PREREQUISITE: EENV 340 or EENV 341. Fundamentals of aquatic chemistry and principles of water technology for environmental engineers. Based on chemical thermodynamics. Students learn to quantify water quality and control parameters characterizing water quality. Co-convened with EENV 440. Students enrolled in this course will not be able to take EENV 440 and have it count toward degree requirements. -

EENV 561 Environ Eng Reactor Theory: 3 Credits (3 Lec)
PREREQUISITE: EENV 340 or EENV 341. Theory and mathematics of reactors commonly used in water and wastewater operations

EENV 562 Water Treatment Process/Design: 3 Credits (3 Lec)
Principles, theory, and practice of water treatment plant design.

EENV 563 Wastewater Treat Proc/Design: 3 Credits (3 Lec)
PREREQUISITE: EENV 561. Principles, theory, and practice of wastewater treatment plant design

EENV 570 Montana Water Rights and Water Law: 3 Credits (3 Lec)
(Sp) This course is an introduction to Montana water rights and water law. The fundamental principles of Montana water law, beginning with the prior appropriation doctrine, will be covered. The current statutory framework, ongoing statewide adjudication process, and forums within which water rights are handled will also be studied. An understanding of different the courts and agencies involved with water rights and their roles will be included. Common issues, problems, and processes affecting water rights that may be encountered in the use, enforcement, and transfer of water rights will be explored. Finally, this course will briefly introduce students to Federal and Indian water rights, compacts, and interstate water concerns.

EENV 575 Research or Prof Paper/Project: 1-4 Credits (1 Other)
PREREQUISITE: Graduate standing. (F, Sp, Su) A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major adviser and graduate committee
Repeatable up to 6 credits.

EENV 589 Graduate Consultation: 1-3 Credits (1-3 Other)
PREREQUISITE: Master's standing and approval of the Dean of Graduate Studies. This course may be used only by students who have completed all of their coursework (and thesis, if on a thesis plan) but who need additional faculty or staff time or help
Repeatable up to 3 credits.

EENV 590 Master's Thesis: 1-10 Credits (1 Other)
PREREQUISITE: Master's standing. May be repeated
Repeatable up to 99 credits.

EENV 591 Special Topics: 1-3 Credits (1-3 Lec)
PREREQUISITE: Upper division courses and others as determined for each offering. On demand. Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number
Repeatable up to 12 credits.

EENV 592 Independent Study: 1-3 Credits (1 Other)
PREREQUISITE: Graduate standing, consent of instructor, approval of Department Head and Dean of Graduate Studies. (F, Sp, Su) Directed research and study on an individual basis
Repeatable up to 6 credits.

EENV 598 Internship: 2 Credits (2 Other)
PREREQUISITE: Graduate standing, consent of instructor and approval of Department Head. An individual assignment arranged with an agency, business or other organizations to provide guided experience in the field
Repeatable up to 12 credits.

EENV 690 Doctoral Thesis: 1-10 Credits (1-10 Other)
(F, Sp, Su) (1-10 Ind; max unlimited) F,S,Su Prerequisite: Doctoral Standing.