Engineering Sustainable Systems: Specialization in Sustainable Water Resources (Civil Engineering Degree) Requirements

Standard Civil Engineering Requirements

1. Minimum of 15 credit hours in CEE courses
2. 6 credit hours in non-CEE Course (3 credits must be an advanced mathematics elective) cognate requirements

Standard SNRE Requirements (Aquatic Science)

1. Minimum of 25 credit hours in SNRE courses
2. 9-12 credit hours (3 courses) in Aquatic Science specialization courses
3. 13 credit hours in SNRE Core Requirements
    a. 10 credit hours in core courses
    b. 2 courses in analytics (from SNRE Acceptable Analytics list)
4. 6 credit hours in Opus option requirement or non-Opus option
5. 4 credit hours of non-SNRE cognate requirements (satisfied by dual degree coursework)

Sustainable Water Resources Specialization Requirements

1. Select Hydraulics and Hydrology degree option
2. Plan of study must meet all of the degree requirements for the Civil Engineering degree option and all of the SNRE requirements
    a. This plan of study cannot contain less than 54 credits
    b. The following courses are required (9 credits)
        i. CEE 520: Deterministic and Stochastic Models in Hydrology
        ii. CEE 521: Flow in Open Channels
        iii. CEE 522: Sediment Transport
    c. A minimum of 2 additional CEE courses in Environmental and Water Resources Engineering option
    d. Civil engineering cognate requirements can be met be one advanced mathematics course (proper choice of SNRE analytics courses can also satisfy this requirement) and one SNRE course
    e. SNRE core courses (NRE 509, NRE 510, NRE 580)
    f. 9-12 credit hours (3 courses) in Aquatic Science specialization courses. Must include distribution courses, one from each focus area. These course requirements could be petitioned for replacement with an equivalent course taken previously
        i. Organismal biology – 1 course from
            1. NRE 409 Ecology of Fishes
            2. NRE 422 Biology of Fishes
            3. EEB 457 Algae in Freshwater Systems
            4. NRE 516 Aquatic Entomology
        ii. Ecosystem Ecology – I course from
            1. NRE 476 Ecosystem Ecology
            2. EEB 483 Limnology
            3. NRE 520 Fluvial Ecosystems
        iii. Ecosystem Modeling –1 course from
            1. NRE 501 Ecosystem Modeling and Synthesis

2. NRE 534 GIS and Landscape Modeling
3. EEB 401 Interrogating Data with Models

g. SNRE Analytics requirement: NRE 538 or approved alternative and one additional analytics course
h. SNRE cognate requirements may be met by CEE coursework
i. Students would generally not be expected to complete an Opus, but could petition to do a Master's thesis, project or practicum for up to 6 credit hours

Engineering Sustainable Systems: Specialization in Sustainable Water Resources (Environmental Engineering Degree) Requirements

Standard Civil Engineering Requirements

1. Satisfy Environmental Engineering Core Course requirement (5 specific requirements, listed below; credit given for equivalent upper division coursework taken at the undergraduate level
2. Minimum of 9 credit hours beyond those used to fulfill the Core Course requirement
3. Minimum of 15 credit hours in CEE courses
4. 6 credit hours in non-CEE courses; (3 credits must be an advanced mathematics elective) cognate requirements

Standard SNRE Requirements (Aquatic Science)

1. Minimum of 25 credit hours in SNRE courses
2. 9-12 credit hours (3 courses) in Aquatic Science specialization courses
3. 16 credit hours in SNRE Core Requirements
    a. 10 credit hours in core courses
    b. 2 courses in analytics (from SNRE Acceptable Analytics list)
4. 6 credit hours in Opus option requirement or non-Opus option
5. 4 credit hours of non-SNRE cognate requirements (satisfied by dual degree coursework)

Sustainable Water Resources Specialization Requirements

1. Environmental Engineering degree option
2. Plan of study must meet all of the degree requirements for the Environmental Engineering degree option and all of the SNRE requirements
    a. This plan of study cannot contain less than 54 credits
    b. Environmental Engineering Degree Core Requirements: must take these courses or equivalent upper level technical courses as undergraduate
        i. CEE 460: Design of Environmental Engineering Systems
        ii. CEE 581: Aquatic Chemistry
        iii. CEE 582: Environmental Microbiology
        iv. CEE 428: Introduction to Groundwater Hydrology or CEE 526: Design of Hydraulic Systems
        v. CEE 587: Water Resource Policy or NRE 562: Resource Policy and Management or NRE 571: Environmental Economics
    c. The following courses are required (9 credits)
        i. CEE 520: Deterministic and Stochastic Models in Hydrology
        ii. CEE 521: Flow in Open Channels

iii. CEE 522: Sediment Transport

d. Civil engineering cognate requirements can be met be one advanced mathematics course (proper choice of SNRE analytics courses can also satisfy this requirement) and one SNRE course
e. SNRE core courses (NRE 509, NRE 510, NRE 580)
f. 9-12 credit hours (3 courses) in Aquatic Science specialization courses. Must include distribution courses, one from each focus area. These course requirements could be petitioned for replacement with an equivalent course taken previously
    i. Organismal biology – 1 course from
        1. NRE 409 Ecology of Fishes
        2. NRE 422 Biology of Fishes
        3. EEB 457 Algae in Freshwater Systems
        4. NRE 516 Aquatic Entomology
    ii. Ecosystem Ecology – I course from
        1. NRE 476 Ecosystem Ecology
        2. EEB 483 Limnology
        3. NRE 520 Fluvial Ecosystems
    iii. Ecosystem Modeling –1 course from
        1. NRE 501 Ecosystem Modeling and Synthesis
        2. NRE 534 GIS and Landscape Modeling
        3. EEB 401 Interrogating Data with Models
g. SNRE Analytics requirement: NRE 538 or approved alternative and one additional analytics course
h. SNRE cognate requirements may be met by CEE coursework
i. Students would generally not be expected to complete an Opus, but could petition to do a Master's thesis, project or practicum for up to 6 credit hours