Senate Committee A: UNDERGRADUATE CURRICULUM

Monthly Meeting, January 12, 2023, 4:15pm

Committee A has recommended for approval a new minor degree in *Engineering solutions for climate adaptation & resilience.*

AY22-25-A

OLD DOMINION UNIVERSITY
PROPOSAL FOR A NEW MINOR, NEW INTERDISCIPLINARY MINOR OR SIGNIFICANT CHANGES TO AN EXISTING MINOR

A minor may be chosen by students to support the major, to offer greater job opportunities to the student on graduation, or to provide recognition of study in a second academic area. Completion of an approved minor will meet the upper-division General Education requirement. A minimum of 12 credit hours, normally at the advanced level (300-400) in a specified field of study is required.

Interdisciplinary minors require 12 credit hours of 300/400-level courses selected from at least two different disciplines with a maximum of six credits from any one discipline. Three credit hours in the interdisciplinary minor may be in the major, if a major course is listed as an option for the interdisciplinary minor. As such, it will be credited toward both the major and the interdisciplinary minor.

Please refer to the Undergraduate Catalog for the complete policy on minors.

Minimum enrollment expectations for minors are five graduates in five years or the minor will be discontinued.

Proposed Action (check one)

(●) New Minor ( ) New Interdisciplinary Minor ( ) Significant Changes to an Existing Minor

1. Name of proposed minor or minor to be changed:

   Engineering Solutions for Climate Adaptation & Resilience

2. Description of proposed minor or change to an existing minor:

   This minor will train students with an interest in developing engineering skills focused on adaptation and resilience to climate change and associated hazards. It will provide students with an understanding of the science, impacts, and management strategies of climate change.

3. Rationale for proposal:
   (address what the proposed minor will accomplish for students)

   Students entering the engineering and technology profession need understand how climate is changing, how it will impact society and what solutions can be adopted to mitigate the impacts of climate change.

4. Majors likely to enroll in the minor (for new minors):

   Civil and environmental engineering (CEE), and civil engineering technology (CET) majors.* Other engineering majors may also be interested.

5. Projected enrollment and why (for new minors):

   10/year. We currently have 5 to 6 students taking a 2 course series in this subject.

6. Proposed Effective Term:

   Fall 2023

* Civil engineering majors completing the minor are limited to a maximum of six credits of CEE coursework. Civil engineering technology majors are completing the minor are limited to a maximum of six credits of CET coursework.

7. Resources needed, including human resources, library resources, faculty resources, and funding resources:

   Two new courses will be included in the minor. One faculty from CEE and CET will be needed to teach new courses, 3 load hours. The minor will be supplemented with other existing courses in the Batten College of Engineering & Technology.

8. Program requirements: [List below all courses required for the minor, the prerequisites, and the total hours required for the minor. Submit the appropriate information through the online Course Inventory Management (CIM) process in CourseLeaf (nextcatalog.odu.edu/courseadmin) for all new courses/course changes.]

   Req'd Courses: CET 458 Managing the Climate Crisis * & CEE 457 Adaptation to Sea Level Rise*.
   Additional Courses (choose 2): CET 332, CET 420, CET 456, CEE 455, CEE 446 CEE 447, CEE 458, CEE 482. See attached document for detailed course information and prerequisites for additional courses. Total hours 12 ~~(*) no prereq.~~

9. Description (showing new copy or revised copy) for the next Undergraduate Catalog.

   This minor will train students with an interest in developing engineering skills focused on adaptation and resilience to climate change and associated hazards. It will provide students with an understanding of the science, impacts, and management strategies of climate change.

10. Schedule for offering courses (include whether the minor can be completed in two years and whether it will be available through Distance Learning) (for new minors):

    Each of the existing courses in the minor are offered yearly in each department. The minor will be able to be completed in two years. The minor will be able to be completed via distance learning.

11. Effect on current department course schedule (for new minors):

    There will be one additional course added for CEE and CET course offerings/year.

APPROVED

Anthony W. Dean — Digitally signed by Anthony W. Dean Date: 2022.12.22 15:13:26 -05'00'
College Dean — Date

Carol Considine — Digitally signed by Carol Considine Date: 2022.10.21 15:39:09 -04'00'
Originator of Request

Vukica Jovanovic — Digitally signed by Vukica Jovanovic Date: 2022.12.20 07:17:40 -05'00'
External Department Chair(s) (If applicable) — Date

Sherif Ishak — Digitally signed by Sherif Ishak Date: 2022.12.19 14:52:09 -05'00'
Department Chair

Chair, Faculty Senate Committee A — Date

Mujde Erten-Unal — Digitally signed by Mujde Erten-Unal Date: 2022.12.19 13:34:46 -05'00'
Chair, College Committee

Provost — Date

ADMINISTRATIVE CODING

Effective Term_____ Major Code _____

College _____ Degree Code _____

Department _____

Course Number	Course Name	Credits	Prerequisites
CEE 455	Pollution Prevention and Green Engineering	3	CEE 350
CEE 446/546	Urban Storwater Hydrology	3	CEE 340
CEE 447/547	Groundwater Hydraulics	3	CEE 340
CEE 458	Sustainable Development	3	Junior standing
CEE 482	Introduction to Coastal Engineering	3	CEE 330 Hydromechnics and instructor permission
CEE 451 ~~CET xxx~~	Adaptation to Sea Level Rise	3	CEE 340 Hydraulics and Water Resources, or CET 332 Water Resource Engineering

CET 332*	Water Resource Engineering	3	CET 330 Fluid Mechanics
CET 420*	Hydrology and Drainiage	3	CET 330 Fluid Mechanics
CET 456	Resiliency and Sustainability	3	CET 355
CET 458 ~~/CEE xxx~~	Managing the Climate Crisis	3	junior standing

NOTES:

1 - For CEE students doing R&A minor, if one opts to take "CET 332 Water Resources Engineering" to fulfil the R&A minor requirement, one can either as-is or have a choice to substitute "CET 332 Water Resources Engineering" with "CEE 340 Hydraulics and Water Resources". take CET 332

2 - After satisfying 6 cr hrs of R&A minor required courses, student is required to take any two R&A minor optional courses to meet the remaining 6 cr. hr @ to receive a R&A minor degree. For CEE students only, if CEE students take 400-level CEE technical elective courses in the R&A minor optional course list upto 6 cr. hrs of tech elective courses will be double-counted toward one's CEE curriculum credit hrs as well as toward one's R&A minor per Major-Minor credit sharing agreement approved by AA

3 - For CEE students only, if a CEE student is double minoring in Environmental Engineering as well as in R&A minors, 6 cr hrs of the Major-Minor credit can be applied to per minor and cannot be repeated to both. For example, 6 cr hrs of 400-level CEE technical elective courses in the R&A minor option can be toward R&A minor but such double-count cannot be repeated toward Environmental Engineering minor, and vice versa. However CEE student can split and apply 3 cr hrs double-count toward R&A minor and apply the other 3 cr hrs double-count toward Environmental Engineering minor under the Major-Minor credit sharing agreement. double counted

6 cr. hrs. into 3 credits each

Civil engineering majors completing the minor are limited to a maximum of 6 credits of CEE coursework.

Civil engineering technology majors completing the minor are limited to a maximum of 6 credits of CET coursework.

Catalog Class Description
Application of engineering methods for the prevention of pollution. Review of the pollution prevention related regulations. Study of source reduction methods, analysis for environmentally conscious manufacturing methods, process changes, life cycle analysis, and water/energy conservation methods. Evaluation of pollution prevention case studies.
Storm rainfall analysis, design rainfall hydrographs, runoff calculation procedures, detention basins, use of mathematical models to analyze and design urban stormwater drainage systems.
Description of well hydaulics in single and multiple well systems Determination of aquifer parameters from pumping tests. Use of computer models to determine drawdowns due to mulitple well systems.
Overview of social, economical, technical environmental aspects of regional, national and international efforts to achieve sustainable development. Discussion of the integration of industrial activity and ecological concerns utilizing principles of zero emissions, pollution prevention and design for the environment.
Classical small amplitude wave theory, wave transformations in shallow water, shoaling, refraction, diffraction, reflection, breaking. Wave induced near shore currents and sediment transport processes. Alternatives to mitigate coastal erosion processes. Introduction to coastal structures
flooding in coastal locations. This is having a wide-ranging influence on our neighborhood, as well as our community's infrastructure and economy. This course will study adaptation measures to flooding due to sea level rise and storm events. It will evaluate natural and nature-based systems, engineered systems, different floodproofing methods, impacts of sea level rise on coastal water quality and on the potential impacts on

Hydrologic and Hydraulic principles are utilized in the planning, design, operation and construction of water management projects. The course addresses fundamental Hydrology - the occurrence and movement of surface water including weather and climate; precipitation; evaporation; transpiration; runoff; infiltration; stream flow; hydrograph analysis; erosion; and sedimentation. Additional topics covered will include water distribution, use of water, and sustainability of water as a natural resource.
Hydrologic and Hydraulic principles are utilized in the planning, design, operation and construction of water management projects. Topics include elements of stormwater drainage pertaining to hydrology, hydraulics of open channel and pipe flow, stormwatear management and issues pertinent to state stormwater regulation and hte Chesapeake Bay Preservation Act.
An investigation of emerging construction industry trends in resilience and sustainability. Evaluation of applications for vulnerable, small-scale and rural projects. Quantify increases in project value by incorporating life cycle analysis, planning for continuity of function, and deliberate risk management.
An investigation of emerging construction industry trends in resilience and sustainability. Evaluation of applications for vulnerable, small-scale and rural projects. Quantify increases in project value by incorporating life cycle analysis, planning for continuity of function, and deliberate risk management.

~~take "CET 332 Water Resources Engineering"~~