**STUDENT INFORMATION**

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| **Name:** | **NAU ID:** |
| **NAU E-mail Address:** | **Phone Number:** |
| **Term of Admission:** | **Expected Graduation Term/Year:** |
| **Advisor:** | **Required Credits for Degree Program: 60** |

**I. Infrastructure Foundations (15 units required):**

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
| CENE 539 | Public Policy and Regulatory Issues in Civil and Environmental Engineering |  |  |  |  |  |  |
| CENE 572 | GIS for Civil Engineers |  |  |  |  |  |  |
| CENE 599 | Contemporary Developments: Infrastructure |  |  |  |  |  |  |
| CENE 641 | Resilience of Infrastructure Systems |  |  |  |  |  |  |
| CENE 643 |  |  |  |  |  |  |  |

**II. Communications (3 units required):** Select from CENE 611, CENE 612, CENE 613

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
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**III. Statistics (9 units required):**

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
| STA 570 | Statistical Methods I |  |  |  |  |  |  |
| STA 571 | Statistical Methods II |  |  |  |  |  |  |
| STA 676 | Experimental Design |  |  |  |  |  |  |

**IV. Emphasis Requirements or Individualized Focus (18 units required):** Select from Environmental Emphasis; Structures Emphasis; Transportation Emphasis; Water Resources Emphasis.

* **Option 1: Environmental Emphasis**

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
| CENE 502 | Principles of Environmental Transport Processes |  |  |  |  |  |  |
| CENE 540 | Environmental Protection: Today and Tomorrow |  |  |  |  |  |  |
| CENE 562 | Water Quality Modeling |  |  |  |  |  |  |
| CENE 565 | Water and Wastewater Design for Rural Areas and Developing Countries |  |  |  |  |  |  |
| CENE 661 |  |  |  |  |  |  |  |
| CENE 663 |  |  |  |  |  |  |  |

* **Option 2: Structures Emphasis**

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
| CENE 536 | Advanced Steel Design |  |  |  |  |  |  |
| CENE 573 |  |  |  |  |  |  |  |
| CENE 672 |  |  |  |  |  |  |  |
| CENE 677 |  |  |  |  |  |  |  |
| CENE 680 | Earthquake Engineering |  |  |  |  |  |  |
| CENE 684 | Critical Issues in Deep Foundation Design |  |  |  |  |  |  |

* **Option 3: Transportation Emphasis**

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
| CENE 519 | Infrastructure Systems Abroad |  |  |  |  |  |  |
| CENE 542 | Infrastructure Economics |  |  |  |  |  |  |
| CENE 547 | Advanced Concepts in Traffic Safety |  |  |  |  |  |  |
| CENE 580 | Pavement Design |  |  |  |  |  |  |
| CENE 581 | Pavement Management and Preservation |  |  |  |  |  |  |
| CENE 645 |  |  |  |  |  |  |  |
| CENE 646 |  |  |  |  |  |  |  |

* **Option 4: Water Resources Emphasis**

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
| CENE 560 | Classical Open Channel Flow |  |  |  |  |  |  |
| CENE 568 | Engineering in Natural Systems: Rivers and Streams |  |  |  |  |  |  |
| CENE 599 | Contemporary Developments- Flow System Design |  |  |  |  |  |  |
| CENE 666 | Intelligent Water Management |  |  |  |  |  |  |
| CENE 668 |  |  |  |  |  |  |  |
| CENE 670 |  |  |  |  |  |  |  |

**V. Individualized Focus (18 units required):** In consultation with your coordinator, select additional CENE graduate coursework or Interdisciplinary electives to fulfill your research needs.

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
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**VI. Civil and Environmental Engineering Seminar (5 units required):**

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
| CENE 698 | Graduate Seminar |  |  |  |  |  |  |
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**VII. Dissertation (10 units required):**

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| **Course** | **Course Title** | **Replacement Course** | **Semester** | **Year** | **Units** | **Grade** | **T/P/I/A\*\*** |
| CENE 799 | Dissertation |  |  |  |  |  |  |
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**ADDITIONAL INFORMATION**

Up to 30 units of Graduate-level coursework from an MS degree may be applied toward the degree requirements with the approval of the dissertation committee

Students in this program must engage in original research in one of the focus areas of CENE, and will be primarily mentored through the program by their advisor. Students must secure an advisor by the end of their first term of study.

Milestones

* Qualifying exam: An emphasis specific comprehensive examination intended to establish the student's mastery of foundational CENE/Infrastructure topics, key expertise in their emphasis area, analytical and synthesis abilities, and potential for excellence in original research. You must receive a grade of Ph.D. Pass to continue degree progression.
* Advancement to Candidacy: This exam consists of written and oral portions: the Advancement Proposal and the Advancement Defense, respectively. The Advancement Proposal consists of a comprehensive and well-organized survey of foundational and related work to the student's dissertation topic, a dissertation abstract, a description of the methodology used, outcomes of major milestones completed, and a clear plan for completing any remaining work and preparing the final dissertation. The Advancement Defense is an oral seminar that presents and defends this work to the student's Dissertation Committee. The outcome of this combined exam may be a Pass or Fail. Students who do not receive a Pass may retake the exam the following semester.
* Dissertation Defense: This examination consists of written and oral portions: The Dissertation and Dissertation Defense, respectively. The Dissertation captures the summative outcomes of a student's research and the Dissertation Defense allows for a comprehensive oral examination by the Dissertation Committee to determine the merits and adequacy of the work. The outcome of this combined exam may be a Pass or Fail. Students who do not receive a Pass on this exam may retake the exam the following semester.

This Program of Study documents your progress on your academic requirements for the degree and catalog year listed above. For Department of Defense-related requirements, it serves as the evaluated and approved educational plan.

In addition to all University and Graduate College policies, procedures, and requirements, graduate students must also adhere to the academic requirements, policies, procedures, and criteria outlined by their program’s Graduate Student Handbook.

**Students:**

You must secure official approval by your advisor and Department Chair/Director before submitting the final Program of Study.

By signing or entering your name below, you agree to the following statement:

*“Students are responsible for complete knowledge of Academic Catalog requirements in their degree plan for their catalog year and adhering to all policies in the Academic Catalog.”*

**Advisors and Chairs/Directors:**

Please indicate approval of the curriculum on the Program of Study by placing your signature (formal electronic signatures are permitted) in the space provided.

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| **Student:** | **Date:** |
| **Advisor:** | **Date:** |
| **Chair:** | **Date:** |

**\*\*Transfer/Previous Graduate Degree/Internal Transfer/Accelerated (T/P/I/A)** – Must have Advisor approval

Transfer T = Course transferred from another university

Previous Graduate Degree P = Course taken at NAU from previous graduate degree

Internal Transfer I = Graduate level course taken as undergraduate; Not applied to undergraduate degree

Accelerated Program “Dual-use” A = Courses completed during the undergraduate career and used to satisfy both the Bachelors and Master’s degree requirements. ONLY for designated Accelerated students.