

# Bachelor of Science in Environmental Engineering

## Program Description

The uniqueness of the NTU Environmental Engineering Program is based on the distinction that environmental engineers are the stewards of Earth Systems. Environmental engineers use a holistic approach based on knowledge derived from broad subjects such as physics, chemistry, biology, hydrogeology, and mathematics to improve and manage environmental challenges. The NTU Environmental Engineering program is an infusion of classroom learning (theory), state-of-the-art technological application, and a hands-on research experience, which prepares students to be tomorrow's leaders in their community, and the Nation thereby increasing Native student capacity with research capabilities as stewards of Earth Systems.

The environment is a major focus on the Navajo Nation; with an area over 27,000 square miles. The Navajo Nation environment is situated in the southwestern Colorado Plateau. Characterized in geography and topography by arid deserts less than 3,000 feet to mountains reaching greater than 10,000 feet. There are environmental challenges in this geography and topography. The Cold War between the U.S. and Soviet Union resulted in uranium contamination; these sites have caused major health challenges in the Navajo population culminating in uranium contamination deaths. In addition to this historical contamination, other challenges exist such as contaminated water to global climate change effects. Navajos are concerned about violations of Navajo culture because of environmental practices at odds with traditional concepts.

Students learn about mass transfer, solid and hazardous chemicals/wastes management, risk assessment, hydrologic processes, soil erosion processes, chemical and physical properties of soils, contaminant partitioning, fate and transport in the subsurface, phases of solids, liquids, gases, sampling techniques, analysis techniques, water and wastewater treatment operations, atmospheric processes, hands-on labs, and other subjects which allow them to protect, conserve, restore environmental systems that have been affected. Environmental Engineering is a branch of engineering that uses a holistic approach in working with the environment, including human resources, materials, equipment, and energy; using mathematics, physical sciences, and social sciences to protect, conserve, and restore the environment. They design and improve earth systems for the furtherance of improving environmental processes as part of protection, conservation, or restoration of the environment.

The program is designed to help the Native Nation, state, and federal agencies and companies prepare for careers in the 21st century. Graduates of Environmental Engineering should be able to seek gainful employment in most disciplines related to the environment including governmental regulatory agencies, environmental consulting firms, or academia. Graduates of this program can be employed in companies that need the following personnel: water and wastewater treatment plants, water and wastewater system designs, contamination site clean-up companies, hazardous chemical production industries, land management, natural resource management, air quality engineering, mining, teaching, environmental technicians, or environmental policy analysts.

## Degree Checklist

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A Bachelor of Science degree in Environmental Engineering requires **125-126** credit hours and the Environmental Engineering degree is designed for a four-year program of study. The minimum credit load for a full-time student is 12 credit hours per semester.

A student needs to complete general courses and general education electives within the first two years of study with a grade point average of 2.0 or better before taking the upper-level core courses (300 and 400-level courses). **However, to complete the program within four years, a credit load of 15 to 18 per semester is recommended.** Also, this time can be reduced by attending summer sessions and/or interim sessions

Educational Requirements	Credit	Prerequisites	Semester/Year	Grade
<b>Semester 1:</b>				
ENGR-123 Computer Skills for Engineering	3			
ENGR-130 Engineering Graphics	3			
CS-101 Programming I	3			
ENGL-1110 Composition I	3	<i>ENGL 100 or Accuplacer</i>		
SSC 100 College Success	1			
MATH-1510 Calculus I	4	<i>MATH 1230 &amp; MATH 1240</i>		
<b>Semester 2:</b>				
ENGR-103 Introduction to Engineering	3			
ENGR-169 Basic Statistics & Probability	3			
EE-101 Fundamentals of Electrical Engineering	3			
GIT-105 Fundamentals of Cartography	3			
PHYS-1310 Calculus Based Physics	4			
<b>Semester 3:</b>				
MATH-1520 Calculus II	4	<i>MATH-1510</i>		
CHEM-1217C Principles Chemistry I	4	<i>MATH-1220 or CHEM-1120C</i>		
ENGL 1120 Composition II or Professional and Technical Communication	3	<i>ENGL 1110</i>		
ENVE-2110 Fundamentals of Environ. Engineering	3	<i>ENGR-103</i>		
ENGR-236 Inferential Engineering Statistics	3	<i>MATH 1510 &amp; ENGR-169</i>		
<b>Semester 4:</b>				
NAV-XXX or NAVA-XXXX Dine Studies Course	3-4			
CHEM-1225C General Chemistry II	4	<i>CHEM-1217C</i>		
ENVE 286 Applications of Biology to Engineering	3	<i>MATH 1220 or PHYS 1310C</i>		
MATH 2410 Differential Equations	4	<i>MATH 1520</i>		
COMM 1130 Public Speaking	3			
<b>Semester 5:</b>				
IE 380 Project Management	3	Junior Standing		
ENVE 355 Soil Mechanics	3			
CHEM 2130C Organic Chemistry I	4	<i>CHEM 1225C</i>		
MTH 410 Linear Algebra	3	<i>MATH 1520</i>		
ME 353 Fluid Mechanics	3	<i>PHYS 1230C &amp; MATH 1510</i>		
<b>Semester 6:</b>				
HUMN 1180 History of American Indian in Media	3			
IE 323 Human Factors	3	<i>ENGR 236</i>		

GEOL 1120C Environmental Geology	4			
Fine Arts Creative Course	3			
<b>Semester 7:</b>				
ENVE 403 Water & Waste Treatment System Design	3	<i>CHEM 2130C</i>		
ENV 425 Advance Environmental Law	3			
ENVE 472 Hydrogeology	3			
ENVE 442 Environmental Engineering Lab	2	<i>CHEM 2130C</i>		
ENVE 455 Fate & Transport Process in Environment Engr	3	<i>GEOL 1120C &amp; ME 353</i>		
<b>Semester 8:</b>				
ENVE-430 Capstone	3	<i>IE 380 &amp; ENVE 481</i>		
ENVE-468 Air Pollution Control	3	<i>ENVE-455</i>		
ENVE-XXX Environmental Engineering Elective	3	<i>Advisor Approval</i>		
ENVE-481 Hazardous Waste Mgmt & Risk Assessment	3	<i>CHEM-2130 or GEOL-1120C</i>		
<b>Summer Semester:</b>				
ENVE-312 Summer Internship	3			
<b>Total Credit Hours required for degree is:</b>	<b>125-126</b>			

### Electives List

ENVE 491	Environmental Organic Chemistry
ENVE 493	Clay Minerals
ENVE 495	Radioactive Waste
ENVE 497	Green Chemistry
ENVE 499	Methods of Materials Characterization

	Signatures	Date
Student:		
Advisor:		
Registrar:		
Graduation Date:		