

# Nondestructive Examination Technology

The Nondestructive Examination (NDE) Technology curriculum prepares students for careers in non-destructive testing of materials, equipment and/or components. NDE test methods assess an object's integrity without affecting its function. NDE is used in many industries, including construction, petrochemical, pulp and paper, power generation and aerospace.

Coursework includes ultrasonics, radiography, liquid penetrant, visual, magnetic particle and eddy current examination. Students gain knowledge of these methods through applied theory and hands-on applications.

The NDE curriculum meets classroom and laboratory training requirements of Recommended Practice No. SNT-TC-1A of the American Society for Nondestructive Testing (ASNT), permitting graduates the opportunity to obtain method-specific NDE certification after a few months of on-the-job experience with their employers. Career opportunities exist in applied NDE, material sciences, technical sales and quality control in many industries.

Many of the courses are offered through a Fast Track program (any semester course offered in less than a 16 week semester). When creating a class schedule, pay particular attention to the start/end dates and times of the courses.

For specific information about potential positions and wages in NDE employment, visit the Central Piedmont Career Coach website.

## Non-Destructive Examination Technology (A50350)

### Degree Awarded

An Associate in Applied Science Degree in Non-Destructive Examination Technology is awarded by the college upon completion of this program.

### Admissions

- Completion of a high school diploma or equivalent is required.
- Many courses have prerequisites; check the Courses section for details.

### Contact Information

Non-Destructive Examination Technology is in the Skilled Trades Division. To receive a suggested sequence of courses, contact instructors through the NDE Technology program office at 704.330.4434. For more information, contact the Skilled Trades Division at 704.330.4413.

#### General Education Requirements

ENG 111	Writing and Inquiry	3.0
Select 3 credits of the following:		3.0
ENG 112	Writing and Research in the Disciplines	
ENG 113	Literature-Based Research	
ENG 114	Professional Research & Reporting	
Take 3 credits from the following:		3.0
MAT 121	Algebra/Trigonometry I	
MAT 171	Precalculus Algebra	

Select 3 credits of the following:		3.0
COM 110	Introduction to Communication	
COM 231	Public Speaking	

Select 3 credits of the following:		3.0
ART 111	Art Appreciation	
ART 114	Art History Survey I	
ART 115	Art History Survey II	
DRA 111	Theatre Appreciation	
DRA 111	Theatre Appreciation	
HUM 120	Cultural Studies	
HUM 130	Myth in Human Culture	
MUS 110	Music Appreciation	
PHI 215	Philosophical Issues	
PHI 240	Introduction to Ethics	
REL 110	World Religions	

Select 3 credits of the following:		3.0
ECO 251	Principles of Microeconomics	
ECO 252	Principles of Macroeconomics	
HIS 111	World Civilizations I	
HIS 112	World Civilizations II	
HIS 131	American History I	
HIS 132	American History II	
POL 120	American Government	
PSY 150	General Psychology	
SOC 210	Introduction to Sociology	

#### Major Requirements

WLD 141	Symbols and Specifications	3.0
NDE 110	Intro to Nondestructive Examination	3.0
NDE 111	NDE Codes and Specifications	2.0
NDE 142	Visual Testing-1,2	2.0
NDE 143	Liquid Penetrant Testing-1,2	2.0
NDE 152	Magnetic Particle Testing-1,2	2.0
NDE 121	Principles of Ultrasonic Examination-UT Level I	4.0
NDE 122	Angle Beam Examination	4.0
NDE 131	Radiation Safety and Principles of Radiographic Testing	4.0
NDE 132	RT Industrial Applications	3.0
NDE 153	Eddy Current Testing-1	3.0
NDE 221	UT Industrial Applications	4.0
NDE 231	Advance Radiographic Testing Techniques	3.0
NDE 252	Eddy Current Testing (ET)	2.0
CIS 110	Introduction to Computers	3.0
Select one of the following:		4.0
PHY 110 & PHY 110A	Conceptual Physics and Conceptual Physics Lab	
PHY 131	Physics-Mechanics	
PHY 151	College Physics I	

#### Technical Electives

Select 2.0 credits from the following:		2.0
ACA 122	College Transfer Success	
DFT 151	CAD I	

DFT 170	Engineering Graphics
EGR 120	Engineering and Design Graphics
EGR 125	Appl Software for Tech
EGR 150	Intro to Engineering
ELC 111	Introduction to Electricity
ELC 117	Motors and Controls
ISC 110	Workplace Safety
ISC 112	Industrial Safety
ISC 131	Quality Management
ISC 212	Metrology
MEC 180	Engineering Materials
NDE 221	UT Industrial Applications
NDE 222	Advanced Ultrasonic Testing Including Phased Array
NDE 231	Advance Radiographic Testing Techniques
NDE 242	Advanced Visual Testing (VT)
NDE 261	Performance Demonstration Initiative -1, Ultrasonic Testing, Carbon Steel Pipe Welds
NDE 262	Performance Demonstration Initiative -2, Ultrasonic Testing, Stainless Steel Pipe Welds
NDE 263	Perf Demonstration Initiative -3, Ultrasonic Testing, Thru Wall Sizing, Carbon Steel/Stainless Steel
NDE 264	Perf Demonstration Initiative -8, Ultrasonic Testing, Weld Overlay and Dissimilar Metal Thru Wall Sizing
NDE 265	Performance Demonstration Initiative -10 Ultrasonic Testing, Dissimilar Metal Detection and Length Sizing
NUC 110	Nuclear Reactor Systems
WLD 110	Cutting Processes
WLD 111	Oxy-Fuel Welding
WLD 112	Basic Welding Processes
WLD 115	SMAW (Stick) Plate
WLD 143	Welding Metallurgy
WBL 112	Work-Based Learning I
WBL 114	Work-Based Learning I

Total Credits 68

## Nuclear Plant Inspection Diploma (D50350-D1)

The Nuclear Plant Inspection Diploma focuses on the Ultrasonic testing method, specifically as it relates to nuclear power plant piping welds examined during construction and in-service inspections. Applied math and physics are an integral part of NDE and this curriculum. Students gain knowledge of the nuclear industry's Performance Demonstration (PD) examination for the detection and sizing of defects in welds, heat affected zones and base materials. This diploma prepares the student to be successful when taking a PD examination in accordance with ASME Section XI, Appendix VIII, Supplement 3. These PDs are not part of this curriculum course and are administered by the Electric Power Research Institute (EPRI) in Charlotte, N.C.

### Diploma Awarded

A Diploma in Nuclear Plant Inspection is awarded by the college upon successful completion of this program.

Working in nuclear plants or with companies supplying equipment for these plants requires additional security and adherence to specific work requirements (criminal convictions and substance use criteria). These additional requirements or security clearances are not included in this program. Some of these requirements are located in the United States Code of Federal Regulations (CFR) Title 10, Energy:

- 10 CFR Part 26, Fitness for Duty Programs
- 10 CFR 73.56, Personnel Access Authorization Requirements for Nuclear Power Plants

### General Education Requirements

ENG 111	Writing and Inquiry	3.0
MAT 121	Algebra/Trigonometry I	3.0
COM 110	Introduction to Communication	3.0

### Major Requirements

NDE 110	Intro to Nondestructive Examination	3.0
NDE 121	Principles of Ultrasonic Examination-UT Level I	4.0
NDE 122	Angle Beam Examination	4.0
PHY 131	Physics-Mechanics	4.0
NDE 221	UT Industrial Applications	4.0
NDE 261	Performance Demonstration Initiative -1, Ultrasonic Testing, Carbon Steel Pipe Welds	7.0
NDE 262	Performance Demonstration Initiative -2, Ultrasonic Testing, Stainless Steel Pipe Welds	7.0
NDE 263	Perf Demonstration Initiative -3, Ultrasonic Testing, Thru Wall Sizing, Carbon Steel/Stainless Steel	3.0

Total Credits 45

## Non-Destructive Examination Technology Certificates (C50350)

- Non-Destructive Examination Technology Certificate with a Specialization in Ultrasonic Examination (C50350-C1) (p. 3)
- Non-Destructive Examination Technology Certificate with a Specialization in Visual and Penetrant Examination (C50350-C2) (p. 3)
- Non-Destructive Examination Technology Certificate with a Specialization in Radiographic Examination (C50350-C4) (p. 3)
- Non-Destructive Examination Technology Certificate (p. 3) With a Specialization in Advanced Nuclear Plant Inspection of Ferritic and Stainless Steel Piping Welds (C50350-C5) (p. 3)
- Non-Destructive Examination Technology Certificate (p. 3) With a Specialization in Advanced Nuclear Plant Inspection - UT Inspection and Sizing of Piping and Dissimilar Welds (C50350-C6) (p. 3)
- Non-Destructive Examination Technology Certificate with a Specialization in Level 1 and Level 2 Surface Examination (C50350-C8) (p. 3)
- Non-Destructive Examination Technology Certificate with a Specialization in Advanced Visual Testing (C50350-10) (p. 3)
- Non-Destructive Examination Technology Certificate with a Specialization in Eddy Current Examinations (C50350-11) (p. 3)

These are special, short-term certificates offered in the NDET program. The courses listed are taken from the NDET diploma and 0 degree programs. These certificates are issued in accordance with Central Piedmont policy and certify that students have successfully completed the courses (GPA of 2.0 or higher) within the certificate program. These are not certificates to perform NDE. These certificates, along with the

process of NDE qualification and testing, are performed by the employer, not Central Piedmont.

Students may earn certificates which build to earning a diploma or degree. Students may earn certificates in the same semester that they earn a degree or diploma.

### Non-Destructive Examination Technology Certificate with a Specialization in Ultrasonic Examination (C50350-C1)

#### Major Requirements

MAT 121	Algebra/Trigonometry I	3.0
NDE 110	Intro to Nondestructive Examination	3.0
NDE 121	Principles of Ultrasonic Examination-UT Level I	4.0
NDE 122	Angle Beam Examination	4.0
Total Credits		14

### Non-Destructive Examination Technology Certificate with a Specialization in Visual and Penetrant Examination (C50350-C2)

#### Major Requirements

NDE 110	Intro to Nondestructive Examination	3.0
WLD 141	Symbols and Specifications	3.0
NDE 142	Visual Testing-1,2	2.0
NDE 143	Liquid Penetrant Testing-1,2	2.0
CIS 110	Introduction to Computers	3.0
Total Credits		13

### Non-Destructive Examination Technology Certificate with a Specialization in Radiographic Examination (C50350-C4)

#### Major Requirements

NDE 110	Intro to Nondestructive Examination	3.0
NDE 131	Radiation Safety and Principles of Radiographic Testing	4.0
NDE 132	RT Industrial Applications	3.0
MAT 121	Algebra/Trigonometry I	3.0
Total Credits		13

### Non-Destructive Examination Technology Certificate With a Specialization in Advanced Nuclear Plant Inspection of Ferritic and Stainless Steel Piping Welds (C50350-C5)

The Non-Destructive Examination Technology Certificate Specialization in Ultrasonic Examination (C50350-C1) is a prerequisite for this certificate.

#### Major Requirements

NDE 221	UT Industrial Applications	4.0
NDE 261	Performance Demonstration Initiative -1, Ultrasonic Testing, Carbon Steel Pipe Welds	7.0
NDE 262	Performance Demonstration Initiative -2, Ultrasonic Testing, Stainless Steel Pipe Welds	7.0
Total Credits		18

### With a Specialization in Advanced Nuclear Plant Inspection - UT Inspection and Sizing of Piping and Dissimilar Welds (C50350-C6)

#### Major Requirements

NDE 263	Perf Demonstration Initiative -3, Ultrasonic Testing, Thru Wall Sizing, Carbon Steel/Stainless Steel	3.0
NDE 264	Perf Demonstration Initiative -8, Ultrasonic Testing, Weld Overlay and Dissimilar Metal Thru Wall Sizing	3.0
NDE 265	Performance Demonstration Initiative -10 Ultrasonic Testing, Dissimilar Metal Detection and Length Sizing	3.0
NDE 221	UT Industrial Applications	4.0
Total Credits		13

### Non-Destructive Examination Technology Certificate with Specialization in Level 1 and Level 2 Surface Examination (C50350-C8)

NDE 110	Intro to Nondestructive Examination	3.0
NDE 112		3.0
NDE 142	Visual Testing-1,2	2.0
NDE 143	Liquid Penetrant Testing-1,2	2.0
NDE 152	Magnetic Particle Testing-1,2	2.0
Total Credits		12

### Non-Destructive Examination Certificate in Advanced Visual Testing (C50350-C10)

#### Major Requirements

NDE 110	Intro to Nondestructive Examination	3.0
NDE 142	Visual Testing-1,2	2.0
NDE 242	Advanced Visual Testing (VT)	3.0
WLD 141	Symbols and Specifications	3.0
NUC 110	Nuclear Reactor Systems	3.0
Total Credits		14

### Non-Destructive Examination Technology Certificate Specialization in Eddy Current Examinations (C50350-11)

NDE 110	Intro to Nondestructive Examination	3.0
NDE 153	Eddy Current Testing-1	3.0
NDE 252	Eddy Current Testing (ET)	2.0
WLD 141	Symbols and Specifications	3.0
Select one course from the following options:		1.0
ISC 110	Workplace Safety	
ISC 112	Industrial Safety	
ISC 131	Quality Management	
Total Credits		12