COWLEY COLLEGE
& Area Vocational Technical School

COURSE PROCEDURE FOR

ADVANCED NONDESTRUCTIVE TESTING METHODS
NDT3469 3 Credit Hours

Student Level:
This course is open to students on the college level in either the freshman or sophomore year and to high school vocational students.

Catalog Description:

NDT 3469 - Advanced NDT Methods (3 hrs)
This course is designed to give the student an introduction to nondestructive methods used in manufacturing and service industries along with the basic methods previously studied.

Prerequisites:
NDT3451 Introduction to Nondestructive Testing

Controlling Purpose:
This course is designed to impart the fundamentals of acoustic emission and thermal inspection, their applications, techniques, process controls, and the terminology.

Learner Outcomes:
Upon completion of the course the student will be able to explain:

1. The uses of computers in thermal emission testing.
2. Basic concepts of thermal inspection.
3. The advantages and limitations of thermal inspection.
4. Uses of acoustic emission testing.
5. Basic concepts of acoustic inspection.
6. The advantages of limitations of acoustic emission.

The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.

Units Outcomes and Criterion Based Evaluation Key for Core Content:

The following defines the minimum core content not including the final examination period. Instructors may add other content as time allows.

Evaluation Key:

A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field.

B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.

C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.

D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.

F = Failing, will be computed in GPA and hours attempted.

N = No instruction or training in this area.

UNIT 1: Terminology Of Acoustic Emission

Outcomes: Upon completion of this unit, the students will be able to successfully list and use terms associated with thermal inspection.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						List and describe ten terms in acoustic emission.
						List and describe five uses of acoustic emission.

UNIT 2: Characteristics Of Acoustic Emission

Outcomes: Upon completion of this unit, the students will be able to successfully describe the characteristics of acoustic emission.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Describe the travel of sound in a “soft” part.
						Describe the travel of sound in a “hard” part.

UNIT 3: Sources Of Acoustic Emission

Outcomes: Upon completion of this unit, the students will be able to successfully assess the origin of sources of acoustic emission.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						State three sources of non-relevant sound.
						List five ways non-relevant sound can be distinguished.

UNIT 4: Wave Propagation

Outcomes: Upon completion of this unit, the students will be able to successfully describe wave propagation.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						List the speed and wave form sound will take in six common engineering materials.

UNIT 5: Uses Of Acoustic Emission

Outcomes: Upon completion of this unit, the students will be able to successfully list and describe uses for acoustic emission.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						List and describe three uses of acoustic emission in the aircraft industry.

UNIT 6: Types Of Generators And Sensors

Outcomes: Upon completion of this unit, the students will be able to successfully list and describe generators and sensors.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						List and describe five generators.
						List and describe five sensors, and state where they are used.

UNIT 7: Terminology Of Thermal Inspection

Outcomes: Upon completion of this unit, the student will be able to successfully explain the terminology used in thermal inspection.

A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						List and differentiate between ten terms commonly used in thermal inspection.
						Describe the uses of ten terms that apply to thermal inspection.

UNIT 8: Characteristics Of Thermal Inspection Outcomes: Upon completion of this unit, the students will be able to successfully explain the characteristics of thermal inspection.						
A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Describe why heat will not travel as fast in air as in metals.
						Develop a statement listing three characteristics of heat transfer.

UNIT 9: Uses Of Thermal Inspection Outcomes: Upon completion of this unit, the students will be able to successfully describe and demonstrate uses of thermal inspection.						
A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						List and describe ten uses of thermal inspection.
						List and describe two uses of thermal inspection in the medical industry.
						Perform temperature inspections on ten items and record the results.

UNIT 10: Lens/Optics And Filters Outcomes: Upon completion of this unit, the students will be able to successfully differentiate between lens/optics used in thermal inspection.						
A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						List two lenses and state the uses of each.
						List and describe five places a filter would be needed.

UNIT 11: Software/Computers Outcomes: Upon completion of this unit, the students will be able to successfully describe the advantages of computers in thermal inspection.						
A	B	C	D	F	N	Specific Competencies Demonstrate the ability to:
						Explain time of flight of heat through a material.
						Explain how image capturing will help in inspection.

Projects Required:
As assigned

Textbook:
Contact Bookstore for current textbook.

Materials/Equipment Required:
None

Attendance Policy:
Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:
The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:
Based on classroom occupancy

Course Timeframe:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

402.00 Academic Code of Conduct
263.00 Student Appeal of Course Grades
403.00 Student Code of Conduct

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability, which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.