



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**METALLURGY
MTT3565 1 Credit Hour**

Student Level:

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

Catalog Description:

MTT 3565 - METALLURGY (1 hr)

Students learn the metallurgical terms and definitions in an effort to understand the behavior and service of metals in industry. Characteristics during heating, cooling, shaping, forming, and the stress related to their mechanical properties are covered, as well as the theory behind alloys, heat treatment processes and wear resistance.

Prerequisites:

None

Controlling Purpose:

Students learn the metallurgical terms and definitions in an effort to understand the behavior and service of metals in industry. Characteristics during heating, cooling, shaping, forming, and the stress related to their mechanical properties are covered, as well as the theory behind alloys, heat treatment processes and wear resistance.

Learner Outcomes:

- A. Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines.
- B. Manufacture parts from various materials in accordance with specifications from blueprints, electronic drawings and shop sketches.
- C. Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
- D. Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.
- E. Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields.
- F. Use CAD and CAM programs to design parts and program manufacturing machines.

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: Examine The History Of Iron And Steel And Its Role In Industry						
Outcomes: Upon completion of this course students will be able to demonstrate knowledge of the history of iron and steel and its role in industry.						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Manufacture parts from various materials in accordance with specifications from blueprints, electronic drawings and shop sketches.
						Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields.

UNIT 2: Summarize The Production Of Non-Ferrous Metals

Outcomes: Upon completion of this course students will be able to demonstrate knowledge on the production of non-ferrous metals

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 3: Summarize The Production Of Iron And Steel

Outcomes: Upon completion of this course students will be able to demonstrate knowledge on the production of iron and steel.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 4: Differentiate Special Alloys And Special Steels

Outcomes: Upon completion of this course students will be able to demonstrate how to differentiate special alloys and special steels.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Manufacture parts from various materials in accordance with specifications from blueprints, electronic drawings and shop sketches.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 5: Investigate Metallurgical Processes

Outcomes: Upon completion of this course students will be able to demonstrate how to investigate metallurgical processes.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 6: Anneal Materials To Specifications

Outcomes: Upon completion of this course students will be able to demonstrate or describe the process of annealing materials to specifications.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines.
						Manufacture parts from various materials in accordance with specifications from blueprints, electronic drawings and shop sketches.

UNIT 7: Determine Heat Treating Temperatures

Outcomes: Upon completion of this course students will be able to demonstrate how to determine heat treating temperatures.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 8: Harden Material To Specifications

Outcomes: Upon completion of this course students will be able to demonstrate or describe the processes to harden material to specifications.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines.
						Manufacture parts from various materials in accordance with specifications from blueprints, electronic drawings and shop sketches.

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.