COWLEY COLLEGE
& Area Vocational Technical School

COURSE PROCEDURE FOR

MACHINING II
MTT3562 3 Credit Hours

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 3562 - MACHINING II (3 hrs)
Fundamental machine shop instruction involving safety, use and care of hand and measuring tools, drill press operation, basic lathe operations, and single point tool grinding. Screw threads and their application, classes of fits, and tolerances are stressed.

Prerequisites:
MTT3561 MACHINING I or instructor approval.

Controlling Purpose:
Students will learn to conduct job hazard analysis for conventional mills and lathes, develop math skills for machine tool operations, perform preventive maintenance and housekeeping on conventional mills and lathes, select work holding devices for mills, lathes and other machine tools, calculate feeds and speeds, remove material using milling and turning processes, align milling head, use a vertical mill to center drill, drill and ream holes, change tools and tool holders on milling machines, and maintain saws and grinders.

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: Perform Basic Trigonometric Functions

Outcomes: Upon completion of this course the student will be able to demonstrate basic trigonometry functions to set up and run a taper on the lathe and set up a sin bar for cutting an angle on the mill.

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 2: Select Cutting Tools

Outcomes: Upon completion of this course the student will be able to demonstrate how to select the proper tool for the projects they will complete.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
						Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.

UNIT 3: Perform I.D. Boring And Facing Operations

Outcomes: Upon completion of this course the student will be able to demonstrate how to face and bore on the conventional lathe.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
						Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.
						Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields.

UNIT 4: Machine Angles Using A Vertical Mill

Outcomes: Upon completion of this course the student will be able to demonstrate how to setup and mill angles on the conventional milling machines.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
						Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.
						Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields.

UNIT 5: Plan A Sequence For Milling Operations

Upon completion of this course the student will be able to demonstrate the steps needed to successfully complete milling projects.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
						Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.

UNIT 6: Align Work Piece, Work Holding Devices, Jigs And Fixtures On Milling Machines

Outcomes: Upon completion of this course the student will be able to demonstrate how to dial in the mill head, vise, and work piece on the mill.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
						Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.
						Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields.

UNIT 7: Finish Holes Using Countersinks, Counter Bores, Reamers, And Taps

Outcomes: Upon completion of this course the student will be able to demonstrate how to properly use countersinks, counter bores, reamers and taps on various different projects produced on the milling machines.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
						Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.
						Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields.

UNIT 8: Perform Preventive And Housekeeping Maintenance On A Lathe

Outcomes: Upon completion of this course the student will be able to demonstrate how to properly clean and maintain their work area and machine, also keeping the oil levels correct and ways serviced.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
						Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.

UNIT 9: Perform O.D. & I.D. Threading Operations

Outcomes: Upon completion of this course the student will be able to demonstrate how to manufacture inside and outside threads for mating parts.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 10: Perform O.D. & I.D. Taper Operations

Outcomes: Upon completion of this course the student will be able to demonstrate how to properly setup and run inside and outside tapers for mating parts.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 11: Establish Zero Reference Point For Work Piece To Be Machined

Outcomes: Upon completion of this course the student will be able to demonstrate how to find the zero reference point of the work piece using the proper techniques.

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 12: Machine Parts Using Milling Cutters And Milling Machines

Outcomes: Upon completion of this course the student will be able to demonstrate the ability to machine parts on the vertical mills holding tolerances within +/- .003

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 13: Tap Holes On A Vertical Mill

Outcomes: Upon completion of this course the student will be able to demonstrate how to properly setup and tap holes on the vertical milling machine per blueprint.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 14: Machine Keyways On A Vertical Mill

Outcomes: Upon completion of this course the student will be able to demonstrate how to machine keyways on vertical mill using the proper tools and print 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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.

UNIT 15: Inspect And Dress Grinding Wheels

Outcomes: Upon completion of this course the student will be able to demonstrate the proper way to inspect and dress a grinding wheel.

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.
						Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking.
						Apply safety principles in a work environment to minimize hazards and prevent losses to productivity.

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.