DATE OF LAST REVIEW: 02/2013

COURSE TITLE: Machining IV
COURSE NUMBER: MACH0202
CREDIT HOURS: 3
INSTRUCTOR: Departmental Syllabus

PREREQUISITES: MACH0103 Bench Work, MACH0105 Quality Control and Inspection, MACH0107 Machine Tool Processes, MACH0108 Machining Fundamentals I, MACH0109 Machining Fundamentals II, MACH0201 Machining Fundamentals III and Fundamentals of Mathematics w/ a grade of "C" or higher or appropriate score on the Math assessment test.

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, http://www.kckcc.bookstore.com, for the required texts for your particular class.

COURSE DESCRIPTION: This course will introduce the learner with the advanced operations and to properly identify, set-up, and operate metal turning, milling equipment and Surface Grinders safely. This course will emphasize hands on approach as well as classroom activities to familiarize the student with the process to complete job task analysis. Materials covered in this course will enhance the procedures learned in MACH 0108, 0109, 0201. This course will also cover common mathematical formulas that will be implemented in to the curriculum to achieve expected learner outcomes.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.
COURSE OUTLINE:

I. General Applications.
   A. Analyze special tooling
   B. Define special holders
   C. Determines correct tool holding methods
   D. Plan tooling lists and selects proper tooling
   E. Plan sequence of operations
   F. Equipment adjustments to maintain accuracy
   G. Identify backlash and corrective actions
   H. Proper cleanliness of shop and related equipment
   I. Equipment safety
   J. Recordkeeping.
   K. Job planning.
   L. Identifies backlash and corrective actions

II. Lathe Operations
    A. Adjust equipment for speeds and feeds
    B. Machine parts to proper tolerances
    C. Set-up equipment for operations
    D. Turns parts within tolerance ranges
    E. Record maintenance performed on equipment
    F. Machine maintenance
    G. Perform PMI on engine lathes
    H. Identify types and classification for fits
    I. Calculation of formulas for common mathematic problems used in lathe operations

III. Vertical milling machine operations
    A. Adjust equipment for speeds and feeds
    B. Machine parts to proper tolerances
    C. Set-up equipment for operations
    D. Mill parts within tolerance range
    E. Machine maintenance
    F. Perform PMI on vertical mills
    G. Record maintenance performed on equipment
    H. Identify types and classification for fits
    I. Calculation of formulas for common mathematic problems used in milling operations

IV. Surface grinder operations
    J. Identify surface grinder nomenclature
    K. Conforms to safety with surface grinders
    L. Identify types of grinder wheels
    M. Identify work holding devices
    N. Grind parts within tolerance ranges
    O. Set–up surface grinders to perform operations
    P. Grind parts using work holding devices
    Q. Perform surface grinder maintenance
EXPECTED LEARNER OUTCOMES:
A. The student will be able to identify lathes, mills and surface grinders.
B. The student will be able to implement safety and working conditions.
C. The student will be able to correct machine discrepancies.
D. The student will be able to select tooling for job planning.
E. The student will be able to select diluting cutting fluids.
F. The student will be able to identify tool holders.
G. The student will be able to work holding methods and set-ups.
H. The student will be able to set-up turning equipment for part producing.
I. The student will be able to set-up milling equipment for part producing.
J. The student will be able to set-up grinding equipment for part producing.
K. The student will be able to calculate mathematical problems used in machining operations.

COURSE COMPETENCIES:
Upon completion of this course:

*The student will be able to identify lathes, mills and surface grinders.*

1. The student will be able to recite nomenclature of parts for lathe and mills.
2. The student will be able to identify parts of surface grinder.

*The student will be able to implement safety and working conditions.*

3. The student will be able to recite safety rules for lathe
4. The student will be able to recite safety rules for mills.
5. The student will be able to recite safety rules for grinder and procedures.
6. The student will be able to recite safety rules for grinder and procedures.
7. The student will be able to conduct a job hazard (JHA) for lathes, mills and grinders.
8. The student will be able to apply precautions needed to minimize shop hazards with equipment.
9. The student will be able to adhere to safety of equipment.

*The student will be able to correct machine discrepancies.*

10. The student will be able to record preventative maintenance log.
11. The student will be able to take affirm actions to correct cutting conditions.
12. The student will be able to check accuracy of equipment.
13. The student will be able to adjust equipment to maintain accuracy.
14. The student will be able to describe chatter and possible remedies.
15. The student will be able to correct common milling problems.

*The student will be able to select tooling for job planning.*

16. The student will be able to maintain log for tooling used.
17. The student will be able to select proper tooling for jobs.
18. The student will be able to identify special form tools.
19. The student will be able to set-up and select tooling.
20. The student will be able to set-up tool holders and tool blocks.
21. The student will be able to identify grinding wheels prescribed by ANSI standards.
The student will be able to create job analysis for production of parts from blueprints.

The student will be able to create job analysis for one off replication of parts.

The student will be able to analyze blueprints to select correct tooling and layout.

The student will be able to create blueprint for part replication.

The student will be able to select and apply cutting fluids.

The student will be able to select diluting cutting fluids.

The student will be able to identify differences in cutting fluids.

The student will be able to mix cutting fluids.

The student will be able to correctly measure concentration of cutting fluids.

The student will be able to apply cutting fluids.

The student will be able to select diluting cutting fluids.

The student will be able to identify tool holders.

The student will be able to identify tool blocks.

The student will be able to set-up tool blocks.

The student will be able to identify use for tool blocks.

The student will be able to special tool holder set-up procedures.

The student will be able to work holding methods and set-ups.

The student will be able to identify part holding chucks, collets, and centers.

The student will be able to identify 4 jaw chucks.

The student will be able to identify face plate.

The student will be able to identify 4-Jaw chuck.

The student will be able to identify parts 3-Jaw chuck.

The student will be able to identify collets chucks.

The student will be able to identify dividing head.

The student will be able to identify magnetic chucks.

The student will be able to identify rotary table.

The student will be able to set-up turning equipment for part producing.

The student will be able to adjust equipment for speed and feeds for different materials.

The student will be able to create job procedure list for sequence of operations.

The student will be able to identify graduations marked on machine dials.

The student will be able to indicate parts in a 4-jaw chuck.

The student will be able to demonstrate knowledge of the uses of dro’s.

The student will be able to cut taper utilizing tail stock offset method. (OD)

The student will be able to cut taper utilizing taper attachment method. (ID)

The student will be able to perform parting operation.

The student will be able to perform grooving operations (ID and OD).

The student will be able to machine parts utilizing mandrels.

The student will be able to grind shaft with tool post grinder.

The student will be able to eccentric turning offset to specified size.

The student will be able to demonstrate radii turning operation.

The student will be able to perform production job planning sheet.

The student will be able to machine parts between centers.
60. The student will be able to cut internal and external single point 60* threads.
61. The student will cut internal and external 60 threads.
62. The student will be able to cut internal and external single point 29* threads.
63. The student will be able to cut special internal and external 60* multi lead threads.
64. The student will be able to repair damaged threads.
65. The student will be able to machines parts to specified size.
66. The student will be able to perform machine maintenance.
67. The student will be able to record maintenance performed on equipment.

The student will be able to set-up milling equipment for part producing.
68. The student will be able to adjust equipment for speed and feeds for different materials.
69. The student will be able to adjust equipment to maintain accuracy.
70. The student will be able to demonstrate knowledge of the uses of dro’s.
71. The student will be able to identify graduations marked on machine dials.
72. The student will be able to set-up tool holders and collets.
73. The student will be able to demonstrate knowledge of climb milling vs. conventional milling operations.
74. The student will be able to demonstrate the use of parallels.
75. The student will be able to machine parts to specified size.
76. The student will be able to perform machine maintenance.
77. The student will be able to machine parts to tolerance with indexing head procedures.
78. The student will be able to machine parts to tolerance with rotary table.
79. The student will be able to machine dove tail male and female.
80. The student will be able to machine T-slot male and female.
81. The student will be able to tap holes in parts on vertical mill.
82. The student will be able to bore holes to size with adjustable boring head.
83. The student will be able to identify part holding devices for milling procedures.
84. The student will be able to machine key slots in shaft (woodruff, plane, and closed end)
85. The student will be able to perform pocketing operations.
86. The student will be able to describe slitting saw operations.
87. The student will be able to record maintenance performed on equipment.

The student will be able to set-up grinding equipment for part producing.
88. The student will be able to describe max depth of cut for grinding operations.
89. The student will be able to test grinding wheels for trueness and damage.
90. The student will be able to mount grinding wheels and dress using appropriate methods.
91. The student will be able to describe the importance of blotters.
92. The student will be able to adjust automatic grinder for speeds, feeds and limits of travel.
93. The student will be able to set-up surface grinder work holding devices.
94. The student will be able to grind parallel surfaces.
95. The student will be able to grind parts square.
96. The student will be able to grind vertical surfaces.
97. The student will be able to grind angles with magnetic sine plate.
98. The student will be able to inspect surface finishes.
99. The student will be able to perform surface grinder maintenance.
The student will be able to perform machine maintenance.
The student will be able to record maintenance performed on equipment.
The student will be able to identify set-ups used in grinding operations.

The student will be able to calculate mathematical problems used in machining operations.
The student will be able to identify fits and calculates parts for final machining.
The student will be able to calculate feed and speeds with chip load per tooth.
The student will be able to calculate trigonometric functions.
The student will be able to convert metric to American and back to mm.
The student will be able to calculate depth of cuts.
The student will be able to calculate sine bar formulas to determine block height and angles in DD, MM, SS.
The student will be able to calculate compound rest angles.
The student will be able to calculate tailstock for taper turning operations.
The student will be able to calculate direct and indirect indexing solutions.
The student will be able to calculate hole locations for patterning.
The student will be able to calculate RPM, SFPM.

ASSESSMENT OF LEARNER OUTCOMES:
Student progress is evaluated by means that include, but are not limited to, exams, written assignments, and class participation.

SPECIAL NOTES:
This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student’s progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

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