**CHAMP Course Map**

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| **Course Name:** MAC 101 – Intro to Machine Shop | |
| **Instructor Name:** | **Date:** |
| **Institution:** Community College of Denver | |
| **Course Competencies:**   1. Demonstrate effective shop safety skills. 2. Perform basic shop measurements. 3. Explain the operation of shop measuring equipment. 4. Discuss layout tools and procedures. 5. Explain the purpose and operation of hand and bench tools. 6. Demonstrate knowledge and understanding of cutter geometry and purpose of cutting fluids. 7. Explain the purpose, use, and operation of metal cutting saws. 8. Explain the purpose, use, and operation of drilling machines. 9. Demonstrate the process for sharpening drills. 10. Explain the purpose, use, and operation of lathes. 11. Demonstrate the process for sharpening a lathe tool bit. 12. Explain the purpose, use, and operation of milling machines. 13. Calculate speeds and feeds for the lathe and milling machines.   **Topical Outline:**   |  |  | | --- | --- | | * 1. **Shop Safety**       1. Purpose of Shop Safety      2. Shop Safety Requirements   2. **Measurement**       1. Basic Measurement      2. Squares & Surface Plates      3. Micrometers      4. Vernier Calipers      5. Inside, Depth, & Height Measuring Instruments      6. Gages & Gage Blocks      7. Angular Measurement      8. Comparison Measurement      9. Coordinate Measuring System      10. Surface Finish Measurement   3. **Layout Tools & Procedures**       1. Layout Materials, Tools, & Accessories      2. Semi precision Layout      3. Precision Layout   4. **Hand Tools & Bench Work**       1. Holding, Striking, & Assembling Tools      2. Hand-Type Cutting Tools      3. Thread-Cutting Tools & Procedures      4. Reaming, Broaching, & Lapping Tools | * 1. **Metal-Cutting Technology**       1. Physics of Metal Cutting      2. Machinability of Metals      3. Cutting Tools      4. Cutting Fluids   2. **Metal-Cutting Saws**       1. Types of Metal Saws      2. Bandsaw Parts, Accessories, & Operations   3. **Drilling Machines**       1. Drill Presses      2. Drilling Operations      3. Cutting Speeds & Feeds   4. **Lathes**       1. Lathe Safety      2. Engine Lathe Parts & Accessories      3. Engine Lathe Operations   5. **Milling Machines**       1. Milling Machine Safety      2. Milling Machine Parts & Accessories      3. Milling Machine Operations | | |

**Course Materials (Text, Edition and any other publisher items)**

**Textbooks and/or Resources:**

1. **Precision Machining Technology 2nd Edition**

Peter J. Hoffman, Eric S. Hopewell, Brian James

ISBN -10:1-2854-4454-X

1. **Precision Machining Technology Workbook and Projects Manual 2nd Edition**

David Lenzi, James Hillwig

ISBN – 10: 1-2854-4455-8

| **Module # and Title** | **CCNS Competencies** | **Content, Activities or Challenges**  **(Learner Interaction**  **& Engagement) FRCC** | **CCD MATERIALS** | **Assessments, Rubrics (Feedback) FRCC** | **Publish to OER** |
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| **Module 1:**  Safety Review | I. | 1. Welcome and Introductions 2. Play Scattergories game 3. View presentation: Safety Rules 4. Complete Do/Don’t activity 5. Discuss: One safety component that you should either (a) apply/remember at your workplace tomorrow or will (b) apply to your next job on the second day of work. | 1. [8 inch drill drift operations sheet Rev A](../../../../../Fall%202014/MAC-101/8%20inch%20drill%20drift%20operations%20sheet%20Rev%20A.xlsx) 2. [8 inch drill drift rev A](../../../../../Fall%202014/MAC-101/8%20inch%20drill%20drift%20rev%20A.PDF) 3. [Day 3 layout reading homework](../../../../../Fall%202014/MAC-101/Day%203%20layout%20reading%20homework.docx) 4. [Day 4 home work - measurement systems](../../../../../Fall%202014/MAC-101/Day%204%20home%20work%20-%20measure%20ment%20systems.docx) 5. [Drill Drift](../../../../../Fall%202014/MAC-101/Drill%20Drift.PDF) 6. [Instructor outline rev A](../../../../../Fall%202014/MAC-101/Instructor%20outline%20rev%20A.xlsx) 7. [MAC-101 sign in](../../../../../Fall%202014/MAC-101/MAC-101%20sign%20in.xlsx) 8. [MAC-101 syllabus test RevA](../../../../../Fall%202014/MAC-101/MAC-101%20syllabus%20test%20RevA.docx) 9. [MAC-101-1](../../../../../Fall%202014/MAC-101/MAC-101-1.PDF) 10. [MAC-101-3](../../../../../Fall%202014/MAC-101/MAC-101-3.PDF) 11. [Purpose of exercise](../../../../../Fall%202014/MAC-101/Purpose%20of%20exercise.docx) 12. [slotted rectangle ops sheet Rev A](../../../../../Fall%202014/MAC-101/slotted%20rectangle%20ops%20sheet%20Rev%20A.xlsx) 13. [Step Plug Process sheet REV C](../../../../../Fall%202014/MAC-101/Step%20Plug%20Process%20sheet%20REV%20C.xlsx) | 1. Complete Do/Don’t activity 2. Discussion |  |
| **Module 2:**  Measurement System | II.  III. | 1. Discuss: examples of when and how you will use measurements in your machining careers 2. View presentation: Measurement systems overview 3. Practice measuring in metric, fractional and decimal inch. 4. Complete Measuring quiz | 1. Discussion 2. Practice 3. Quiz |  |
| **Module 3:**  Measurement (Semi-Precision and Precision) | III. | 1. View presentation: Semi-Precision Measurement 2. View presentation: Basic Types of Vernier Measuring Tools 3. View presentation: Dial Calipers 4. View presentation: Micrometers. 5. Discussion M3SPA1 6. Practice M3SPA3 7. Semi-Precision Measuring Practice 8. Construct Straight Lines Using Steel rules Assignment. 9. Semi-precision measuring devices assignment. 10. Discussion M3SPA3 11. Discussion M3PMA1 12. Vernier Caliper practice 13. Dial Caliper practice 14. OD Mic practice 15. Depth Mic practice 16. Block project 17. Indicators and Height Gages practice. 18. Precision Measuring practice. | 1. Discussion in semi-precision 2. Practice in semi-precision measurement. 3. Discussion in precision 4. Practice in precision measurement 5. Vernier Caliper practice 6. Dial Caliper practice 7. OD Mic practice 8. Depth Mic practice 9. Block project 10. Indicators and Height Gages practice. 11. Precision Measuring practice. |  |
| **Module 4:**  Metal Composition and Classifications | VII. | 1. Discuss: Why is it important to understand metal composition and classifications? 2. View presentation: Metals 3. Complete the metal classification scavenger hunt | 1. Discussion 2. Metal classification scavenger hunt |  |
| **Module 5:**  Heat Treatment of Metals | VII. | 1. Discuss: What do you think happens if you neglect to follow proper heat treatment processes? 2. View presentation: Heat treatment of metals. | 1. Discussion |  |
| **Module 6:**  Maintenance, Lubrication and Cutting Fluid Overview | VI. | 1. Discuss: Why is a routine maintenance program important? What happens if maintenance is neglected? 2. View presentation: Cutting fluids, maintenance & lubrication. 3. Practice using a refractometer. 4. View lubrication points in the shop on each machine. | 1. Discussion 2. Practice with refractometer. 3. Practice in lubrication points. |  |
| **Module 7:**  Hand Tools, Job Planning, Benchwork, Layout | IV.  V. | 1. Discuss: What is the most common way of taking bar stock and turning it into pieces of usable length? 2. Discuss: Give examples of when hand tools would be used. 3. Discuss: Where are abrasive wheels commonly used in the machine shop? 4. View presentation: Hand Tools. 5. View presentation: Saws and Cutoff Machines. 6. View presentation: Offhand Grinding. 7. Complete Layout Part project. 8. Complete Benchwork Part lab | 1. Discussion 2. Layout part project |  |
| **Module 8:**  Intro to Drill Press | VIII. | 1. Discuss: What are the most common cutting tools in the machine shop? 2. View presentation: Introduction to the Drill Press. 3. Review parts of the drill press at the drill press at the drill press at the drill press including the control. 4. View presentation: Drill Press Safety. 5. Drill Press Safety Review activity. | 1. Discussion 2. Drill press safety activity |  |
| **Module 9:**  Tools, Toolholding, and Workholding for Drill Press | VIII. | 1. View presentation: Workholding devices used in Drill Press operations. 2. View presentation: Common Cutting Tools used on the Drill Press. 3. Complete Drill press part lab. 4. Grind drill bits in the machine shop. | 1. Drill press part project 2. Practice in grinding |  |
| **Module 10:**  Drill Press Operations | IX. | 1. View presentation: Operations performed on the drill press. 2. Complete Drill Press Part Project in the machine shop. | 1. Drill press part project |  |
| **Module 11:**  Milling Machines | XII.  XIII. | 1. View presentation: Introduction to Milling Machine. 2. Practice in the milling machine | 1. Practice with the Milling machine |  |
| **Module 12:**  Engine Lathe | X.  XI. | 1. View presentation: Introduction to Engine Lathe. 2. Practice in the engine lathe. | 1. Practice with the Engine lathe. |  |