**MAC 250- Advanced Inspection Techniques**

This abbreviated syllabus must be read together with the material within the Institutional Policies Module of the class D2L shell. Combined, these documents constitute the entire syllabus required for this course.

Credits: 3

## Instructor Information:

Name:

Email:

Telephone:

Voicemail:

Fax:

Center Name: Center for Career and Technical Education; Auraria; Cherry Creek, 201; 1111 W. Colfax Avenue, Denver, CO 80204

Office Location: Advanced Manufacturing Center (AMC) 2570 31st Street, Denver CO 80216

Office Hours:

**Semester and Year:** Fall 2017

## Class Meeting Location: Advanced Manufacturing Center (AMC) 2570 31st Street, Denver CO 80216

**Start Date:** 8/21/17

**End Date:** 10/11/17

**Last date to drop with a refund:**

**Last date to withdraw:**

## Pre/Co-requisites:

## 

## Required Course Materials:

## Calculator, Safety shoes, safety glasses.

## Textbooks and/or Resources:

## Course Description:

## Exposes the student to the principles of dimensional metrology. Students will learn how to use common measuring instruments relating to state-of-the-art manufacturing environments. Students will also learn the importance of Quality Control, TQM, and SPC processes as they relate to manufacturing environments. Use of a coordinate measuring machine will be delivered.

## Competencies:

## I. Demonstrate hands on use of geometric dimensioning & tolerancing metrology methods.

## II. Use common measuring tools found in manufacturing.

## III. Operate a coordinate-measuring machine.

## IV. Perform calibration activities on various measuring instruments.

## V. Collect and record data for SPC documentation.

## VI. Verify accuracy of machined parts.

## VII. List ISO standards and requirements.

## VIII. Interpret and report measurement data on databases.

## IX. Describe other quality standards required in manufacturing.

## Topical Outline:

## I. Measurement and Metrology

## A. Explain and understand the history of measurement

## B. Identify the uses of measurement

## C. Explain the act, application, and codification of measurement

## D. Explain the true meaning of tolerance

## E. Discuss GD&T methodology

## II. Measurement and Metrology

## A. Explain and understand the history of measurement

## B. Identify the uses of measurement

## C. Explain the act, application, and codification of measurement

## D. Explain the true meaning of tolerance

## E. Discuss GD&T methodology

## III. Statistics and Metrology

## A. Discuss and identify the relationship between measurement and statistics

## B. Discuss and identify the relationship between measurement and probability

## IV. Systems of Measurement

## A. Identify how big, how far, and from end to end

## B. Discuss accuracy, precision, and reliability

## C. Discuss the origin of the metric system

## D. Discuss the decimal inch system

## V. Measuring Instruments

## A. Identify and demonstrate the use of a steel rule

## B. Identify and demonstrate the use of vernier instruments

## C. Identify and demonstrate the use of micrometer instruments

## D. Identify and demonstrate the use of modern gauge blocks

## E. Identify and demonstrate the use of dial indicators

## VI. Angle Measurements

## A. Identify and discuss basic geometry

## B. Identify and demonstrate the use of the level, protractor, sine bars, and plates

## C. Discuss and use trigonometric functions

## VII. Optical Metrology

## A. Explain the applications of the Optical Comparator

## B. Demonstrate use and accuracy of the Optical Comparator

## VIII. Coordinate Measuring Machines

## A. Discuss the role of a Coordinate Measuring Machine

## B. Describe the types of Coordinate Measuring Machines

## C. Demonstrate the use of a Coordinate Measuring Machine

## College Wide Policies and Procedures:

### **Institutional Outcomes:**

Graduates of the Community College of Denver are prepared to be successful on a personal, professional and global level. They are personally responsible, globally aware, complex thinkers who are skilled communicators, numerical thinkers, and effective and ethical users of technology. For a fuller description of these institutional outcomes, please see Institutional Policies module on this courses D2L shell.

### **Student Code of Conduct:**

CCD values involvement, integrity, lifelong learning and excellence. In the spirit of these values, we have the expectation that students adhere to a Code of Conduct, which is reflective of the values of the College.

**MISSION STATEMENT:** The Office of Student Conduct believes that student learning takes place outside the classroom as well as inside the classroom. Our goal is to use the conduct process as a tool for educating the student on personal conduct, ethical reasoning and community responsibility. We will treat each case individually and each student with respect. We will involve the entire community in a culture of conversation, where reporting is a natural byproduct of a sincere commitment to the safety, security and learning environment of the campus.

[The Code of Conduct for the Community College of Denver](https://www.ccd.edu/administration/non-academic-departments/office-student-conduct/student-code-conduct) coincides with The Colorado Community College System policy on Student Disciplinary Procedure. According to CCCS policy SP 4-30, students are expected to adhere to the Student Code of Conduct and policies and procedures of the college.

### **CCD Institutional Outcomes Addressed in this Course**

| **Outcome Objectives** | **Application in this Course** |
| --- | --- |
| Complex thinker |  |
| Effective & ethical user of technology |  |
| Effective communicator |  |
| Globally aware |  |
| Personally responsible |  |
| Numeric thinker |  |

### **ADA Statement:**

The Community College of Denver (CCD) is committed to providing equal access for persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA) Amendments Act of 2010 and Section 504 of the Rehabilitation Act of 1973 along with Section 508. In support of its commitment to provide equal access to all students, CCD offers reasonable accommodations and support through the Accessibility Center (AC). To learn more about this, check our [Disability Statement and Guidelines](https://www.ccd.edu/administration/non-academic-departments/accessibility-center/disability-statement), and visit our [Accessibility Center Website](https://www.ccd.edu/org/accessibility-center) to learn about all of the resources available for faculty and students.

### **Academic Integrity:**

### Students at Community College of Denver are expected to behave as responsible members of the college community and to be honest and ethical in their academic work. CCD strives to provide students with the knowledge, skills, judgment and critical thinking needed to function in society. To falsify or fabricate the results of one’s research; to present the words, ideas, data, or work of another as one’s own; or to cheat on an examination corrupts the essential process of higher education and is a disservice to the student, faculty, and staff community. All members of Community College of Denver community share the responsibility and authority to challenge and report acts of academic dishonesty. Guidelines for Academic Integrity students assume full responsibility for the content and integrity of the coursework they submit. For more information please visit our [Academic Integrity Form & Policy](https://www.ccd.edu/docs/academic-integrity-form-policy) page. Issues related to Academic Dishonesty are reported to the Provost.

**Early Alert:**

CCD uses an Early Alert System to enable faculty and advisors to provide timely, appropriate, and effective interventions for students needing academic assistance or other College-sponsored support to help them succeed in attaining their educational goals and objectives. This procedure applies to all College faculty and advisors. For more information please visit our [Early Alert System](https://www.ccd.edu/docs/early-alert-system) page.

## Course Policies:

**Attendance Policy**

### Attendance will be taken daily and will be calculated into your final grade. A student’s grade is subject to drop one grade level for every 10% of class and or lab time missed. Any student whose final attendance is below 75% of class hours (see section for incomplete grade) will receive a final grade of 'F'.  In addition, Students may be subject to the attendance policy listed on the CCD website under your student responsibilities at:

<https://www.ccd.edu/administration/non-academic-departments/office-student-conduct/expectation-of-a-student>

### Only excused absences will qualify to make up time missed. Excused absences must be approved by the instructor and are granted on an emergency basis. These will include medical accommodations documented by CCD (Accessibility Center), a note from a medical doctor stating what time is to be missed, or time missed due to a documented family emergency. A police report, hospital report, letter documenting a court appearance, obituary stating you as a relative, or a letter from your child’s school counselor will qualify for documentation of an emergency.

### Call or e-mail your instructor if you are going to be late or absent for class that day.

**Grading Policy**

**Grading Scale**

|  |  |  |
| --- | --- | --- |
| **A** | 90-100% | Superior mastery or achievement. |
| **B** | 80-89% | Better than average mastery or achievement. |
| **C** | 70-79% | Acceptable mastery or achievement. |
| **D** | 60-69% | Less than acceptable mastery or achievement. |
| **F** | Below 60% | Fails to demonstrate achievement of course objectives. |

**Grade Weight**

**Assignment Weight**

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**Exam Make Up**

A make-up Exam will be graded at a possible maximum of a grade of 'C'. Exams not made up or turned in will receive a grade of zero.

Only an excused absence will qualify for a consideration to take a make-up Exam. See the attendance policy for excused absences. Make-up Exams must be taken the following school day.

**Grade of Incomplete**

Incomplete:  An "I" indicates that the course objectives are not yet fulfilled.  It is the responsibility of the student to request, if needed, the assignment of an incomplete grade.  The instructor's decision to authorize or not authorize an incomplete grade is final.  The student must have completed 75% of the class with a C or better, and must complete the rest of the work with the same instructor. Arrangement for the completion of the course must be made with the instructor prior to the assignment of the "I" grade.  This agreement must be written on a Contract for Incomplete Grade Form.  The instructor may allow up to one full semester for the student to complete missing requirements.  "I" grades not changed by the end of the following semester will automatically become failing grades (F).

**Cheating/Plagiarism**

Plagiarism is grounds for failing an assignment or course and/or disciplinary action from CCD.  DO NOT PLAGIARIZE.  Plagiarism means copying passages directly from the text of study guide or any other source, without quotation marks and citations. Summarize or paraphrase the information.  If you paraphrase by rearranging the order of a sentence or words, then give credit for the source.  No credit will be given for plagiarized papers

Having someone else complete work for you or not performing work in the manner prescribed by the instructor is also considered cheating.

**Online tests**

Feedback will be provided with answers. 100% score required. Tests can be taken more than once.

### **Late work**

Late assignments, tests, and quizzes will be graded at a possible maximum of a grade of 'C'. Assignments and work not made up or turned in will receive a grade of zero.

Only an excused absence will qualify for a late consideration of work. See the attendance policy for excused absences. Late work must be received the following school day.

### **Cell phone policy**

No talking or texting on your cell phone during class. No talking or texting on cell phones in the welding or manufacturing areas. Cell phones in the classroom must be kept on vibrate. You may leave the classroom in order to speak on your cell phone. You may speak on your cell phone outside or in the student break area located between the welding and manufacturing facilities provided there is no one studying or taking a test in that area. Please keep your cell phone usage to a minimum during class time. You are responsible to protect your cell phone. This is a shop / lab environment. CCD is not responsible for damage or loss of cell phones.

### **Method of Instruction**

The instruction will be based on combination of reading, lecture, practical hands-on drawing, shop application, and may include a field trip to an off-site manufacturing facility. Given the nature of the coursework, this class will rely heavily on class interaction and discussion, reading, and written assignments. Active participation is crucial to the success of the students in this class. Respect for differing opinions, the ability to make relevant contributions, and a thorough understanding of the assigned material will be necessary and will contribute to your final grade.

### **Changes to the syllabus**

The instructor reserves the right to change the syllabus in any way. Specific information about assignments may be handed out at a later date. The student is responsible for all changes to the syllabus, including due dates, whether or not that student was present when those changes were made. Changes to the syllabus will be on the home page of the internet site or e-mailed to the student.

### **Classroom and homework assignments**

Assignments which are designed to be completed in the classroom may not be completed at home, your workplace, or anywhere else. These assignments must be completed at the AMC facility in a classroom as directed by the instructor. Homework assignments may not be done in class and are due at the beginning of the class on the date which they are scheduled to be turned in. Refer also to the *Academic Integrity*section of this policy and the CCD Academic Integrity Policy: <https://www.ccd.edu/docs/academic-integrity-form-policy>.

### **Testing out of a class**

Currently there are no procedures for testing out of any of the classes in the Welding or Machining programs

### **Housekeeping**

Students will clean their work areas thoroughly after each class. Poor housekeeping may result in points off your grade. The final day of class will include a complete cleaning of the shop. Your participation is mandatory in this event.

### **Safety**

Safety Glasses are to be worn upon entering the Machining or Welding lab. Safety glasses are to be worn immediately upon entering each lab – whether or not you are involved in work or see an immediate danger.

All safety procedures must be followed at all times. Not following safety procedures may result in points off your grade.

### **Breaks**

No loitering or breaks will be allowed in the Welding area or Machining areas. These areas are for working students. Breaks can be taken outside or in the student break area between the labs.

A 10 minute break is considered acceptable for every hour of productive lab time. Excessive breaks will result in a drop in your grade.

### **Student website information reminder**

Students will be held to the Student Code of Conduct, The Student Handbook, and “Expectations of a CCD student” on the Student website at <https://www.ccd.edu/administration/non-academic-departments/office-student-conduct/expectations-ccd-student>

### **Academic Integrity Policy**

The Community College of Denver does not tolerate academic dishonesty in any form. A student who engages in academic dishonesty in any of their machining or welding classes will fail their class. Further disciplinary action may be imposed as per the CCD Academic Integrity policy: <https://www.ccd.edu/docs/academic-integrity-form-policy>. Refer also to the *Classroom and homework assignments*section of this policy. Having someone else complete work for you or not performing work in the manner prescribed by the instructor is also considered under the heading of Academic Integrity.

### **Computer lab policy at the AMC**

The computer lab at the AMC is open:

1. Monday through Thursday: 8:00AM to 8:30PM on regular school days.
2. Fridays: 8:00AM to 4:30PM based on instructor availability at the AMC – check with AMC personnel before attending on Friday.
3. Saturday: 7:00AM to 12:00PM during regular semester dates – Check with AMC personnel to make sure scheduled classes are not canceled for any reason.

Computers are also available near the student lounge area (under the mezzanine near the virtual welders)

### **Books and supplies**

We cannot loan books or supplies. Not having your books and supplies will affect your grade and may result in a grade of “F”. You must have your books and supplies by the end of the first week of class or you must consider dropping the class or failure.

### **Classroom and personal projects**

Projects are restricted to those assigned by your instructor. For special projects classes, nothing firearms or weapons related is to be worked on or brought into the facility. An item does not have to be active to be firearms or weapons related. Spent or partial casings, stocks, mechanisms, or components related to personal firearms or other grades of weaponry are restricted from the premises. Knives, stars, spears etc. are also restricted from being worked on.

Some in-house projects relate to toy making (miniature cannons). These projects are to be made to print and are not to be modified to accept any type of explosive powder, projectiles, or fuses.

### **Communication Methods**

The student may ask questions during class period. The student may schedule additional help during the instructor’s office hours. If the student needs to contact the instructor outside of class hours, the student may call the voice mail or office number listed on the syllabus or may send the instructor email noted on the syllabus. Phone calls will generally be returned the first class meeting day following receipt of a voicemail. All emails communication will be done through the college email system and college email addresses. Emails will generally be returned the first class meeting day following receipt of the email.

### **Participation Standards**

Proficiency in machining and welding is acquired through consistent application of effort. Attendance, active participation, and reflection on progress during lab hours are vital to developing your hands-on skillset. The more a student works during class, the more the student progresses during class.

### **Other Information**

Microwave ovens are provided for use by all students. You are responsible to clean the microwave after you use it. Due to potential fire hazard NO MICROWAVE POPCORN IS ALLOWED!

\*Check your student e-mail every morning to make sure that there are no delays in classroom start time or class cancellations. Other class pertinent information will also be communicated through your student email!!!

**Calendar /Assignments**

|  |  |
| --- | --- |
| Weeks | Topics/Assignments |
| Week 1 |  |
| Week 2 |  |
| Week 3 |  |
| Week 4 |  |
| Week 5 |  |
| Week 6/12 |  |
| Week 13/16 |  |