CURRICULUM COMMITTEE CHECKLIST

NAME OF PROGRAM: Computer Integrated Machining

Step 1  Reviewed change at division meeting.

Step 2  Presented as informational item at Division Chair Meeting(s) and checked if it affects other departments. Like programs must meet with Division Chairs on all affected campuses (North Mankato and Faribault).

Division Chair’s signature

Step 3  Instructional Dean reviewed and indicated need for Curriculum Committee approval.

Instructional Dean’s signature

Step 4  Advisory Committee approval indicated in meeting minutes if necessary. Minutes provided to Curriculum Committee.

Step 5  Curriculum Committee made recommendations (changes, additional approvals, etc.). If no, skip to Step 7.

Step 6  Committee’s recommendations completed. (Skip if not applicable.)

Step 7  Curriculum Committee approved.

Curriculum Committee Chair’s signature

Step 8  Minutes and necessary materials provided to VP of Academic Affairs.

Step 9  Vice President of Academic Affairs approved.

Vice President of Academic Affairs’ signature

Step 10  New Course Maximum Enrollment to Shared Governance.

Step 11  President’s approval for all changes requiring MnSCU approval.

President’s signature

Date: March 2, 2012
Appendix B

New Course or Course Change Proposal Form

Date of Proposal: February 22, 2012

Author: Doug Laven

Proposal Type: New Course  *Modify Course  Delete Course

Contact for the Course: Jon Morgan  Doug Laven

Course Designator, Number and Title: CIM 1215: Quality Inspection II

Number of Credits: 3

Prerequisites: CIM1115: Measurement, Materials, and Safety

Course Description: This course is a continuation of the skills obtained in CIM 1115: Measurement, Materials, and Safety. New topics include standard and digital height gauges along with the Rockwell hardness tester and the basics of Statistical Process Control. Prerequisite: CIM1115: Measurement, Materials, and Safety.

Grading Method:  *Grade  Pass/Fail

Scheduling:  *Fall  Spring  Summer  Alternate Years  Variable  On Demand

Instructional Type: Lecture: 1  Lab: 2  Lecture/Lab:  Internship  Seminar

*Class Maximum: (For New Courses Only) / All Unlimited faculty members of a program or discipline must sign.

Faculty Name  Faculty Signature  Class Max  Date

Dean's Name  Dean's Signature  Date

If there is not enough space provided, please use the back of this form for additional signatures or click on a row with the right button of the mouse, select insert and then select insert rows below to add rows to the table.

Is this Course Proposed as a Liberal Arts Course:  Yes  *No

If Yes, Which MnTC Area/Areas Will it Fulfill (http://www.mntransfer.org)?

Is This Course a Requirement/Elective for a Specific Program or Programs:  *Yes  No

If Yes, Which Program(s) CIM

Describe What is Changing/Being Added, and the Rationale: This course increased from 2 credits to 3 credits to include NIMS credentialing content. The course name and number also changed from CIM 1230: Quality Assurance II to CIM1215: Quality Inspection II.

What Impact Will This New Course or Change Have on Other Programs or Areas? These changes will enhance the CIM program by allowing the students to achieve NIMS credentialing.

Other than additional lecture/lab requirement in room A-133, none.

* Attach Common Course Outline to this Form.
Quality Inspection II
Course Outcome Summary

Course Information
Organization: South Central College
Developers: Jon Morgan/Doug Laven
Development Date: 2/27/2012
Course Number: CIM1215
Potential Hours of Instruction: 80
Total Credits: 3

Description
This course is a continuation of the skills obtained in CIM 1115: Measurement, Materials, and Safety. New topics include standard and digital height gauges along with the Rockwell hardness tester and the basics of Statistical Process Control. Prerequisite: CIM1115: Measurement, Materials, and Safety

Types of Instruction
Instruction Type | Contact Hours | Credits
--- | --- | ---
Lecture | 16 | 1
Lab | 64 | 2

Prerequisites
CIM1115: Measurement, Materials, and Safety

Exit Learning Outcomes
Core Abilities
A. Intercultural knowledge and competence
B. Foundations and skills for lifelong learning
C. Teamwork and problem-solving
D. Analysis and inquiry
E. Critical and creative thinking
F. Written and oral communication

Competencies
1. Review gauge blocks
   Learning Objectives
   a. Explain gauge block ringing
   b. Perform gauge block ringing
2. Identify gauge types
   Learning Objectives
   a. Calculate gauge block stack
   b. Describe preventative gauge block maintenance
3. Identify surface plate
   Learning Objectives
   a. Explain surface plate upkeep
   b. Describe surface plate uses

4. Identify dial indicators
   Learning Objectives
   a. Explain types of dial indicators
   b. Demonstrate uses of dial indicators

5. Explain data
   Learning Objectives
   a. Define control limits
   b. Define standard deviation

6. Illustrate precision height gauge measurements
   Learning Objectives
   a. Identify precision height gauge
   b. Identify digital height gauge

7. Define Basic Terms
   Learning Objectives
   a. Calculate Mean
   b. Develop Histogram
   c. Show Standard Deviation

8. Explain Control
   Learning Objectives
   a. Acquire Test Sample
   b. Explain Sample Population
   c. Define Types of Errors

9. Define Types of Errors
   Learning Objectives
   a. Explain Random Errors
   b. Describe Systematic Errors
   c. Identify Causes of Errors

10. Keep Quality Records
    Learning Objectives
    a. Develop Quality Records
    b. Investigate Continuous Improvement Concepts
    c. Manage Quality Assurance Program
**Appendix B**

**New Course or Course Change Proposal Form**

<table>
<thead>
<tr>
<th>Date of Proposal:</th>
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<td>Author:</td>
<td>Doug Laven</td>
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<th>Jon Morgan \ Doug Laven</th>
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<th>Course Designator, Number and Title:</th>
<th>CIM 1225 Technical Design II</th>
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<th>Prerequisites:</th>
<th>CIM1135: CNC Milling Level 1 and CIM1145: CNC Turning Level 1.</th>
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Course Description: This course builds on the skills obtained in CIM1115 Measurement, Materials, and Safety and CIM1125: Job Planning, Benchwork and Layout. Included in this course are advanced G&M code programming, canned cycles, interpolation, and cutter compensation. Set ups and manual and CNC machine operations will also be covered in this course. Prerequisites: CIM1145: CNC Milling Level 1 and CIM1135: CNC Turning Level 1.

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*If there is not enough space provided, please use the back of this form for additional signatures or click on a row with the right button of the mouse, select insert and then select insert rows below to add rows to the table.*

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<th>Is this Course Proposed as a Liberal Arts Course:</th>
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<th>If Yes, Which MnTC Area/Areas Will it Fulfill (<a href="http://www.mntransfer.org">http://www.mntransfer.org</a>)?</th>
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<th>Is This Course a Requirement/Elective for a Specific Program or Programs?</th>
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<th>If Yes, Which Program(s)? CIM</th>
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Describe What is Changing/Being Added, and the Rationale: This course name and number changed from CIM 1210: Concept Engineering II to CIM1225: Technical Design II.

What Impact Will This New Course or Change Have on Other Programs or Areas? These changes will enhance the CIM program by allowing the students to achieve NIMS credentialing.

Other than additional lecture/lab requirement in room A-133, none.

➢ Attach Common Course Outline to this Form.
Technical Design II
Common Course Outline

Course Information
Organization South Central College
Developers Jon Morgan/Doug Laven
Development Date 2/21/2012
Course Number CIM1225
Potential Hours of Instruction 96
Total Credits 4

Description
This course builds on the skills obtained in CIM115 Measurement, Materials, and Safety and CIM1125: Job Planning, Benchwork and Layout. Included in this course are advanced G&M code programming, canned cycles, interpolation, and cutter compensation. Set ups and manual and CNC machine operations will also be covered in this course. Prerequisites: CIM1135: CNC Milling Level 1 and CIM1145: CNC Turning Level 1.

Types of Instruction

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<td>Lab</td>
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Prerequisites
CIM1135: CNC Milling Level 1
CIM1145: CNC Turning Level 1

Exit Learning Outcomes
Institutional Core Competencies
A. Intercultural knowledge and competence
B. Foundations and skills for lifelong learning
C. Teamwork and problem-solving
D. Analysis and inquiry
E. Critical and creative thinking
F. Written and oral communication

Competencies
1. Identify horizontal milling machine components
   Learning Objectives
   a. Locate power feed levers
   b. Locate speed and feed dials

2. Describe tooling for stock removal
   Learning Objectives
a. Identify lathe cutting tools
b. Identify milling machine cutters

3. Describe vice alignment procedures on the horizontal mill
   Learning Objectives
   a. Explain squaring the vice
   b. Explain putting vice at an angle

4. Identify heat treating procedures
   Learning Objectives
   a. Select proper heat range and time in oven
   b. Identify quenching mediums

5. Identify heat treatable materials
   Learning Objectives
   a. Classify heat treatable materials
   b. Discuss work hardening when machining

6. Select file extensions
   Learning Objectives
   a. Explain DXF, IGES, DWG
   b. Describe proper extension for importing

7. Explain sketches
   Learning Objectives
   a. Explain cuts
   b. Explain extrudes

8. Explain design tree
   Learning Objectives
   a. Describe planes of orientation
   b. Discuss edit sketch or feature

9. Organize operations
   Learning Objectives
   a. Construct layers
   b. Construct boundaries

10. Create tool paths
    Learning Objectives
    a. Set up UV cut
    b. Set up Slice cut

11. Describe engraving
    Learning Objectives
    a. Explain projection
    b. Explain 3-D engraving

12. Discuss tool selection process
    Learning Objectives
    a. Explain tool operation menu
    b. Explain tool selection menu
Appendix B

New Course or Course Change Proposal Form

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<tr>
<th>Date of Proposal:</th>
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<td>Doug Laven</td>
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<td>*Modify Course</td>
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<tr>
<td>Contact for the Course:</td>
<td>Jon Morgan \ Doug Laven</td>
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<tr>
<td>Course Designator, Number and Title:</td>
<td>CIM 1235 CNC Programming II</td>
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<tr>
<td>Number of Credits:</td>
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<td>Prerequisites:</td>
<td>CIM1115: Measurement, Materials, and Safety and CIM1125: Job Planning, Benchwork and Layout</td>
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<td>Course Description:</td>
<td>This course builds on the skills obtained in CIM1145: CNC Milling Level 1 and CIM1135: CNC Turning Level 1. The topics include intermediate level part design and manufacturing techniques. Prerequisites: CIM1115: Measurement, Material, and Safety and CIM1125: Job Planning, Benchwork and Layout</td>
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Is this Course Proposed as a Liberal Arts Course:       Yes | *No

If Yes, Which MnTC Area/ Areas Will it Fulfill (http://www.mntransfer.org)?

Is This Course a Requirement/ Elective for a Specific Program or Programs? *Yes No

If Yes, Which Program(s)? CIM

Describe What is Changing/ Being Added, and the Rationale: This course name and number changed from CIM 1220: Computer Control Programming II to CIM1235: CNC Programming II.

What Impact Will This New Course or Change Have on Other Programs or Areas? These changes will enhance the CIM program by allowing the students to achieve NIMS credentialing.

Other than additional lecture/lab requirement in room A-133, none.

Attach Common Course Outline to this Form.
CNC Programming II
Common Course Outline

Course Information
Organization: South Central College
Developers: Jon Morgan/Doug Laven
Development Date: 2/21/2012
Course Number: CIM1235
Potential Hours of Instruction: 80
Total Credits: 3

Description
This course builds on the skills obtained in CIM1145: CNC Milling Level 1 and CIM1135: CNC Turning Level 1. The topics include intermediate level part design and manufacturing techniques. Prerequisites: CIM1115: Measurement, Materials, and Safety and CIM1125: Job Planning, Benchwork and Layout

Types of Instruction

<table>
<thead>
<tr>
<th>Instruction Type</th>
<th>Contact Hours</th>
<th>Credits</th>
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<td>Lecture</td>
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<td>1</td>
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<tr>
<td>Lab</td>
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Prerequisites
CIM1115: Measurement, Materials, and Safety
CIM1125: Job Planning, Benchwork and Layout

Exit Learning Outcomes

Institutional Core Competencies
A. Intercultural knowledge and competence
B. Foundations and skills for lifelong learning
C. Teamwork and problem-solving
D. Analysis and inquiry
E. Critical and creative thinking
F. Written and oral communication

Competencies
1. Explain advanced canned cycles
   Learning Objectives
   a. Describe the boring cycle
   b. Describe the tapping cycle

2. Describe CNC machine types
   Learning Objectives
   a. Identify lathe and mill
b. Identify wire EDM

3. **Create CNC program**
   
   **Learning Objectives**
   
   a. Write lathe program
   b. Write mill program

4. **Describe programming process**
   
   **Learning Objectives**
   
   a. Use absolute positioning
   b. Use incremental positioning

5. **Discuss machine movements**
   
   **Learning Objectives**
   
   a. Describe machine home axis
   b. Describe 2, 3, 4, and 5 axis cutting

6. **Use machine controls**
   
   **Learning Objectives**
   
   a. Demonstrate offset adjustments
   b. Demonstrate entering tool diameters

7. **Demonstrate program uploading**
   
   **Learning Objectives**
   
   a. Choose DNC program
   b. Choose load program in the CNC control

8. **Describe electrode mounting methods**
   
   **Learning Objectives**
   
   a. Describe flushing techniques
   b. Describe electrode materials

9. **Use CNC control**
   
   **Learning Objectives**
   
   a. Fine tune tool length offsets
   b. Describe the control memory
Appendix B

New Course or Course Change Proposal Form

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<td>Doug Laven</td>
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<tr>
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<tr>
<td>Contact for the Course:</td>
<td>Jon Morgan \ Doug Laven</td>
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<tr>
<td>Course Designator, Number and Title:</td>
<td>CIM 1245: Applications II</td>
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<tr>
<td>Number of Credits:</td>
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<td>Prerequisites:</td>
<td>Prerequisites CIM1135: CNC Milling Level 1 and CIM1145: CNC Turning Level 1</td>
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This course is a continuation of the skills obtained in CIM 1125: Job Planning, Benchwork and Layout. New topics include machining with carbide, producing heat treated parts and basic surface grinding. Prerequisites CIM1135: CNC Milling Level 1 and CIM1145: CNC Turning Level 1

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<th>Grading Method:</th>
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Dean’s Name

Dean’s Signature

Date

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Is this Course Proposed as a Liberal Arts Course: Yes *No

If Yes, Which MnTC Area/Areas Will it Fulfill (http://www.mntc.org)?

Is This Course a Requirement/Elective for a Specific Program or Programs? *Yes No

If Yes, Which Program(s)? CIM

Describe What is Changing/ Being Added, and the Rationale: This course was previously 3 credits and is now 4 credits to include NIMS credentialing content. In addition, this course name and number changed from CIM 1240: Applications II to CIM1245: Applications II.

What Impact Will This New Course or Change Have on Other Programs or Areas? These changes will enhance the CIM program by allowing the students to achieve NIMS credentialing.

Other than additional lecture/lab requirement in room A-133, none.

Attach Common Course Outline to this Form.
Applications II
Common Course Outline

Course Information
Organization South Central College
Developers Jon Morgan\Doug Laven
Development Date 2/22/2012
Course Number CIM1245
Potential Hours of Instruction 112
Total Credits 4

Description
This course is a continuation of the skills obtained in CIM 1125: Job Planning, Benchwork and Layout. New topics include machining with carbide, producing heat treated parts and basic surface grinding. Prerequisites CIM1145: CNC Milling Level 1 and CIM1135: CNC Turning Level 1

Types of Instruction

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<tr>
<th>Instruction Type</th>
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Prerequisites
CIM1145: CNC Milling Level 1
CIM1135: CNC Turning Level 1

Exit Learning Outcomes

Institutional Core Competencies
A. Intercultural knowledge and competence
B. Foundations and skills for lifelong learning
C. Teamwork and problem-solving
D. Analysis and inquiry
E. Critical and creative thinking
F. Written and oral communication

Competencies
1. Apply heat treat methods
   Learning Objectives
   a. Explain hardening work piece
   b. Explain tempering work piece
2. Grind perpendicular to +or- .0005
   Learning Objectives
   a. Grind feature to print
b. Use precision vice

3. **Demonstrate grinding procedures**
   
   **Learning Objectives**
   
   a. Use angle plate
   
   b. Use honing stones

4. **Demonstrate the ability to meet deadlines**
   
   **Learning Objectives**
   
   a. Illustrate employable attendance habits
   
   b. Illustrate employable punctuality habits

5. **Identify general purpose turning tools**
   
   **Learning Objectives**
   
   a. Use high speed tooling
   
   b. Use carbide insert tooling

6. **Explain milling process and procedures**
   
   **Learning Objectives**
   
   a. Describe milling steps to + or - .005
   
   b. Describe milling angles to + or - 1 degree

7. **Explain lathe processes and procedures**
   
   **Learning Objectives**
   
   a. Describe boring internal diameters to + or - .0005
   
   b. Describe turning between centers to + or - .003

8. **Exhibit lab safety**
   
   **Learning Objectives**
   
   a. Illustrate proper dress code and eye glasses
   
   b. Demonstrate shop clean-up

9. **Describe quench mediums**
   
   **Learning Objectives**
   
   a. Use oil quenching material
   
   b. Use air hardening material

10. **Demonstrate Layout**
    
    **Learning Objectives**
    
    a. Setup Basic Semiprecision Layout
    
    b. Setup Basic Precision Layout
    
    c. Demonstrate Layout Procedure

11. **Use Measurement Tools**
    
    **Learning Objectives**
    
    a. Demonstrate the use of Surface Plates
    
    b. Use Scribers and Dividers
    
    c. Demonstrate Layout with Center Punch

12. **Describe Mechanical Hardware**
    
    **Learning Objectives**
    
    a. Identify Threads and Threaded Fasteners
    
    b. Demonstrate the Application of Common Mechanical Hardware
    
    c. Explain Metric and English Thread Format
13. Acquire NIMS Credentials
   Learning Objectives
   a. Study for NIMS Credential Exam
   b. Pass NIMS Credential Exam
## Appendix B

### New Course or Course Change Proposal Form

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<td><strong>Prerequisites:</strong></td>
<td>CIM 1215 Quality Inspection II</td>
</tr>
<tr>
<td><strong>Course Description:</strong></td>
<td>This course is a continuation of CIM 1215: Quality Inspection II. New topics include alternative measuring techniques and Statistical Process Control. Prerequisite: CIM 1215: Quality Inspection II.</td>
</tr>
<tr>
<td><strong>Grading Method:</strong></td>
<td>*Grade</td>
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<td></td>
<td>Pass/Fail</td>
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<td>Alternate Years</td>
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<td>Lecture: 1</td>
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<td></td>
<td>Lab: 2</td>
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<td></td>
<td>Lecture/Lab:</td>
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<tr>
<td></td>
<td>Internship</td>
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<td></td>
<td>Seminar</td>
</tr>
<tr>
<td>*Class Maximum: (For New Courses Only) / All Unlimited faculty members of a program or discipline must sign.</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th><strong>Faculty Name</strong></th>
<th><strong>Faculty Signature</strong></th>
<th><strong>Class Max</strong></th>
<th><strong>Date</strong></th>
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<table>
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<tr>
<th><strong>Dean's Name</strong></th>
<th><strong>Dean's Signature</strong></th>
<th><strong>Date</strong></th>
</tr>
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*If there is not enough space provided, please use the back of this form for additional signatures or click on a row with the right button of the mouse, select Insert and then select Insert rows below to add rows to the table.*

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<thead>
<tr>
<th><strong>Is this Course Proposed as a Liberal Arts Course:</strong></th>
<th>Yes</th>
<th>*No</th>
</tr>
</thead>
<tbody>
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<td><strong>If Yes, Which MnTC Area/Areas Will it Fulfill (<a href="http://www.mntransfer.org">http://www.mntransfer.org</a>)?</strong></td>
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<td><strong>If Yes, Which Program(s)? CIM</strong></td>
<td></td>
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<tr>
<td><strong>Describe What is Changing/Being Added, and the Rationale:</strong></td>
<td>The course name and number changed from CIM 2130: Quality Assurance III to CIM 2115: Quality Inspection III.</td>
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<tr>
<td><strong>What Impact Will This New Course or Change Have on Other Programs or Areas?</strong></td>
<td>These changes will enhance the CIM program by allowing the students to achieve NIMS credentialing.</td>
<td></td>
</tr>
<tr>
<td><strong>Other than additional lecture/lab requirement in room A-133, none.</strong></td>
<td></td>
<td></td>
</tr>
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</table>

> Attach Common Course Outline to this Form.
Quality Inspection III
Course Outcome Summary

Course Information
Organization: South Central College
Developers: Jon Morgan
Development Date: 9/2/2011
Course Number: CIM 2115
Potential Hours of Instruction: 80
Total Credits: 3

Description
This course is a continuation of CIM 1215: Quality Inspection II. New topics include alternative measuring techniques and Statistical Process Control. Prerequisite: CIM 1215: Quality Inspection II.

Types of Instruction

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<tr>
<th>Instruction Type</th>
<th>Contact Hours</th>
<th>Credits</th>
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<tr>
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<tr>
<td>Lab</td>
<td>64</td>
<td>2</td>
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Prerequisites
CIM1215: Quality Inspection II

Exit Learning Outcomes

Core Abilities
A. Intercultural knowledge and competence
B. Foundations and skills for lifelong learning
C. Teamwork and problem-solving
D. Analysis and inquiry
E. Critical and creative thinking
F. Written and oral communication

Competencies
1. Differentiate between heat treating methods
   Learning Objectives
   a. Define oil-quench tool steel
   b. Define water-quench tool steel
2. Choose proper heat treat temperatures
   Learning Objectives
   a. Look up material critical temp
   b. Look up material preheat temperature
3. Apply math skills
Learning Objectives
a. Solve sine function
b. Solve co-sine function

4. Illustrate different measuring techniques
   Learning Objectives
   a. Measure a "V" shape depth with a pin
   b. Measure a "V" shape location with a pin

5. Identify different material compositions
   Learning Objectives
   a. Define ferrous
   b. Define non-ferrous

6. Calculate the results of heat treating
   Learning Objectives
   a. Identify hardness tester
   b. Set-up hardness tester

7. Evaluate angular measurements
   Learning Objectives
   a. Demonstrate comparator angle measurement
   b. Demonstrate work holding methods on comparator

8. Explain material properties
   Learning Objectives
   a. Explain types of hardness
   b. Demonstrate Rockwell "C" hardness testing

9. Assess proper heat treating results
   Learning Objectives
   a. List causes of stress cracks
   b. Describe magna flux testing
Appendix B

New Course or Course Change Proposal Form

<table>
<thead>
<tr>
<th>Date of Proposal:</th>
<th>March 27, 2012</th>
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<tbody>
<tr>
<td>Author:</td>
<td>Doug Laven</td>
</tr>
<tr>
<td>Proposal Type:</td>
<td>New Course</td>
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<td></td>
<td>Modify Course</td>
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<td></td>
<td>Delete Course</td>
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<tr>
<td>Contact for the Course:</td>
<td>Jon Morgan \ Doug Laven</td>
</tr>
<tr>
<td>Course Designator, Number and Title:</td>
<td>CIM 2125: Technical Design III</td>
</tr>
<tr>
<td>Number of Credits:</td>
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<tr>
<td>Prerequisites:</td>
<td>CIM 1225 Technical Design II</td>
</tr>
<tr>
<td>Course Description: This course is a continuation of CIM 1225 Technical Design II. The topics include introduction to solid modeling and assembly drawings. Prerequisite: CIM 1225 Technical Design II.</td>
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➢ Attach Common Course Outline to this Form.
Technical Design III
Common Course Outline

Course Information
Organization South Central College
Developers Jon Morgan
Development Date 9/2/2010
Revised Date 3/30/2012
Course Number CIM2125
Potential Hours of Instruction 96
Total Credits 4

Description
This course is a continuation of CIM 1225 Technical Design II. The topics include introduction to solid modeling and assembly drawings. Prerequisite: CIM 1225 Technical Design.

Types of Instruction

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<tr>
<th>Instruction Type</th>
<th>Contact Hours</th>
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<tr>
<td>Lab</td>
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Prerequisites
CIM1225: Technical Design II

Exit Learning Outcomes
Institutional Core Competencies
A. Intercultural knowledge and competence
B. Foundations and skills for lifelong learning
C. Teamwork and problem-solving
D. Analysis and inquiry
E. Critical and creative thinking
F. Written and oral communication

Competencies
1. Explain planes
   Learning Objectives
   a. Identify sketch icon
   b. Use open a sketch icon
2. Explain view orientation
   Learning Objectives
   a. Identify isometric icon
   b. Identify 'normal to' function
3. Illustrate moving part  
   Learning Objectives  
   a. Use rotate view icon  
   b. Use pan icon  

4. Demonstrate repeating sketch skills  
   Learning Objectives  
   a. Use linear sketch step and repeat icon  
   b. Use circular sketch step and repeat icon  

5. Manipulate sketch  
   Learning Objectives  
   a. Use convert entity icon  
   b. Use sketch mirror icon  

6. Demonstrate zoom icon operation  
   Learning Objectives  
   a. Use zoom to fit icon  
   b. Use in/out icon  

7. Demonstrate feature views operation  
   Learning Objectives  
   a. Use wire frame icon  
   b. Use hidden line visible icon  

8. Explain relations  
   Learning Objectives  
   a. Use add relations icon  
   b. Use tangent icon  

9. Identify dies  
   Learning Objectives  
   a. Explain progressive dies  
   b. Explain compound dies  

10. Identify molding processes  
    Learning Objectives  
    a. Define compression molding  
    b. Define injection molding  

11. Describe mold features  
    Learning Objectives  
    a. Identify mold cores  
    b. Identify mold cavities  

12. Discuss die casting  
    Learning Objectives  
    a. Describe zinc die casting  
    b. Describe aluminum die casting