CURRICULUM COMMITTEE CHECKLIST

NAME OF PROGRAM: Mechatronics

Date: March 2, 2012

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

Signature

YES  NO
Appendix B

New Course or Course Change Proposal Form

Date of Proposal: March 27, 2012
Author: Doug Laven / David Ewel

<table>
<thead>
<tr>
<th>Proposal Type:</th>
<th>New Course</th>
<th>Modify Course</th>
<th>Delete Course</th>
</tr>
</thead>
</table>

Contact for the Course: David Ewel

<table>
<thead>
<tr>
<th>Course Designator, Number and Title: MECA 1140: Intro to Geometric Dimensioning &amp; Tolerancing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Credits: 1</td>
</tr>
</tbody>
</table>

Prerequisites: None

Course Description: Students receive step-by-step instruction in Geometric Dimensioning & Tolerancing (GD&T) fundamentals with detailed explanations of each topic, GD&T symbols and definitions. Practice exercises are used throughout the instruction to provide additional discussion and learning opportunities. Students also learn to apply GD&T to industry-standard drawings. Prerequisites: None.

<table>
<thead>
<tr>
<th>Grading Method:</th>
<th>Grade</th>
<th>Pass/Fail</th>
</tr>
</thead>
</table>

Scheduling: | Fall | Spring | Summer | Alternate Years | Variable | On Demand |
|-------------|------|--------|--------|----------------|----------|-----------|

Instructional Type: | Lecture: 1 | Lab: | Lecture/Lab: | Internship | Seminar |
|-------------------|-------------|------|-------------|------------|----------|

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

<table>
<thead>
<tr>
<th>Faculty Name</th>
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<th>Class Max</th>
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<tbody>
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<td>Doug Laven</td>
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<td>David Ewel</td>
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<td>April 26, 2012</td>
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Dean's Name: Dr. Suzanne Nordblom

<table>
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<th>Date</th>
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<tr>
<td></td>
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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.

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)? Mechatronics Engineering Technology

Describe What is Changing/Being Added, and the Rationale: This course is being added to give students the ability to read and understand mechanical prints made using industry standard ASME Y14.5M – 2009.

What Impact Will This New Course or Change Have on Other Programs or Areas? The course may be applicable for Computer Integrated Machining students as well as Mechatronics Engineering Technology students.

* Attach Common Course Outline to this Form.
Introduction to Geometric Dimensioning & Tolerancing
Course Outcome Summary

Course Information
Organization South Central College
Developers David Ewel
Development Date 3/23/2012
Course Number MECA1140
Potential Hours of Instruction 16
Total Credits 1

Description
Students receive step-by-step instruction in Geometric Dimensioning & Tolerancing (GD&T) fundamentals with detailed explanations of each topic, GD&T symbols and definitions. Practice exercises are used throughout the instruction to provide additional discussion and learning opportunities. Students also learn to apply GD&T to industry-standard drawings.

Types of Instruction

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<thead>
<tr>
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<tr>
<td>Lecture</td>
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Prerequisites
None

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

Competencies
1. Understand the benefits of GD&T.
   Learning Objectives
   a. Examine engineering prints.
   b. Demonstrate an understanding of dimensioning fundamental rules.
   c. Explain the shortcomings of coordinate tolerancing.
   d. Identify the differences between GD&T and coordinate tolerancing.
2. Show understanding of GD&T symbols and their use.
3. **Show understanding of GD&T rules and concepts**

   **Learning Objectives**
   
a. Obtain knowledge of GD&T rules.
b. Demonstrate an understanding of Basic dimensions.
c. Identify a Virtual Condition.
d. Demonstrate ability to properly interpret inner and outer boundaries.
e. Explain the benefits of Bonus Tolerance.

4. **Interpret mechanical engineering drawings that use GD&T.**

   **Learning Objectives**
   
a. Explain how inspection equipment is used to determine if manufactured part meets the print requirements.
b. Demonstrate ability to properly interpret prints that incorporate GD&T.
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 / David Ewel</td>
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<tr>
<td>Contact for the Course:</td>
<td>David Ewel</td>
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<tr>
<td>Course Designator, Number and Title:</td>
<td>MECA 2115 SolidWorks II</td>
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<tr>
<td>Number of Credits:</td>
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<td>Prerequisites:</td>
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**Course Description:** Student will advance their SolidWorks skills beyond core concepts of parts, assemblies and drawings. Learning outcomes are designed to prepare students in the more advanced concepts evaluated in the Certified SolidWorks Associate Exam in areas such as: Advanced Parts, Advanced Assemblies, Advanced Surfacing, Sheet Metal, Routing and Simulation. Prerequisite: MECA 1210 Modeling & Simulation.

**Grading Method:** | *Grade | Pass/Fail |
|------------------|---------|----------|

**Scheduling:** | *Fall | Spring | Summer | Alternate Years | Variable | On Demand |
**Instructional Type:** | Lecture: 3 | Lab: Lecture/Lab: | Internship | Seminar |

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

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**Dean's Name** | Dean's Signature | Date |
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<tr>
<td>Dr. Suzanne Nordblom</td>
<td></td>
<td>5/2/12</td>
</tr>
</tbody>
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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.

If 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)? Mechatronics Engineering Technology

Describe What is Changing/Being Added, and the Rationale: This course is being added to provide students with advanced knowledge and abilities in computer aided design (CAD).

What Impact Will This New Course or Change Have on Other Programs or Areas? The course may be applicable for Computer Integrated Machining students as well as Mechatronics Engineering Technology students.

➢ Attach Common Course Outline to this Form.
SolidWorks II
Course Outcome Summary

Course Information
Organization: South Central College
Developers: David Ewel
Development Date: 3/23/2012
Course Number: MECA 2115
Potential Hours of Instruction: 48
Total Credits: 3

Description
Student will advance their SolidWorks skills beyond core concepts of parts, assemblies and drawings. Learning outcomes are designed to prepare students in the more advanced concepts evaluated in the Certified SolidWorks Associate Exam in areas such as: Advanced Parts, Advanced Assemblies, Advanced Surfacing, Sheet Metal, Routing and Simulation. (Prerequisite: MECA 1270 Modeling and Simulation)

Types of Instruction
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Prerequisites
MECA 1270 Modeling & Simulation

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. Demonstrate ability to create advanced parts features using SolidWorks.

   Learning Objectives
   a. Demonstrate the ability to understand and use advanced sketching features such as polygon, ellipse, parabola, helixes and spirals.
   b. Demonstrate the ability to understand and use advanced fillets features.
   c. Demonstrate the ability to understand and use advanced sweeps features.
   d. Demonstrate the ability to understand and use advanced surfacing features.
   e. Demonstrate the ability to understand and use fastening features.
2. Demonstrate ability to create advanced assemblies using SolidWorks.
   **Learning Objectives**
   a. Demonstrate the ability to understand SolidWorks assembly structure.
   b. Demonstrate the ability to understand SolidWorks file management system.
   c. Demonstrate the ability to understand and use advanced assembly features.
   d. Demonstrate the ability to understand and use advanced component patterns.
   e. Demonstrate the ability to understand and use advanced mates types.

3. Demonstrate ability to create sheet metal parts features using SolidWorks.
   **Learning Objectives**
   a. Demonstrate the ability to understand and use bend tables.
   b. Demonstrate the ability to understand and use sheet metal cuts.
   c. Demonstrate the ability to understand and use SolidWorks forming tools feature.

4. Demonstrate ability to create advanced surfacing features using SolidWorks.
   **Learning Objectives**
   a. Demonstrate the ability to understand and use splines.
   b. Demonstrate the ability to understand and control curvature of a surface.
   c. Demonstrate the ability to understand and control the thickness of a surface.

5. Demonstrate ability to use the photoview features in SolidWorks.
   **Learning Objectives**
   a. Demonstrate the ability to understand and use the rendering wizard.
   b. Demonstrate the ability to understand and control the appearance of a solid model.
   c. Demonstrate the ability to understand and use the scene manager.
   d. Demonstrate the ability to understand and control lighting.

6. Demonstrate ability to create tubing and piping routes using SolidWorks.
   **Learning Objectives**
   a. Demonstrate the ability to understand and use tube routes.
   b. Demonstrate the ability to understand and use piping routes.
   c. Demonstrate the ability to understand and use electrical routes.
   d. Demonstrate the ability to understand and use electrical conduits.

7. Demonstrate ability to create simulations using SolidWorks.
   **Learning Objectives**
   a. Explain the reasons to use simulation.
   b. Demonstrate the ability to understand and create a static analysis of a part.
   c. Demonstrate the ability to understand and use meshing of a solid model.

8. Demonstrate ability to create motion analysis using SolidWorks.
   **Learning Objectives**
   a. Identify the different types of motion analysis used in SolidWorks.
   b. Demonstrate the ability to understand and use large displacement analysis.
   c. Demonstrate the ability to understand and use external loads.
   d. Demonstrate the ability to understand and use different types of connectors to constrain the motion.

9. Demonstrate ability to import and export various file types using SolidWorks.
   **Learning Objectives**
   a. Identify various industry standard file types.
b. Demonstrate the ability to import industry standard file types into SolidWorks.
c. Demonstrate the ability to export industry standard file types out of SolidWorks.
Appendix B

New Course or Course Change Proposal Form

Date of Proposal: March 2, 2012

Author: Doug Laven

Proposal Type:  *New Course  Modify Course  Delete Course

Contact for the Course: Doug Laven

Course Designator, Number and Title: MECA 2250: Mechatronics Systems Operations III

Number of Credits: 3

Prerequisites: MECA 2150: Mechatronics Systems Operations II

Course Description This course will focus on advanced principals of Programmable Logic Controllers (PLC). The student will become familiar with interfacing input and output with automation motion control systems used in manufacturing. Introduction of PLC networking, Supervisory Control and Data Acquisition (SCADA), Proportional - Integral - Derivative (PID) Control and the use of Human Machine Interface (HMI) in a Control System. Troubleshooting exercises, technical writing assignments and safety procedures will be implemented throughout the course. Prerequisites: MECA 2150: Mechatronics Systems Operations II.

Grading Method: *Grade  Pass/Fail

Scheduling: Fall  *Spring  Summer  Alternate Years  Variable  On Demand

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

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

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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)? Mechatronics

Describe What is Changing/Being Added, and the Rationale: The course will introduce the student to Programmable Logic Controllers (PLC), networking and supervisory control systems found in the industry we serve.

What Impact Will This New Course or Change Have on Other Programs or Areas? These changes will enhance the Mechatronics program by allowing the students to have a better understanding PLC and Networking.

➢  Attach Common Course Outline to this Form.
MECHATRONICS SYSTEMS OPERATIONS III
Course Outcome Summary

Course Information
Organization: South Central College
Developers: Doug Laven
Development Date: 4/2/2012
Course Number: MECA 2250
Potential Hours of Instruction: 64
Total Credits: 3

Description
This course will focus on advanced principals of Programmable Logic Controllers (PLC). The student will become familiar with interfacing input and output with automation motion control systems used in manufacturing. Introduction of PLC networking, Supervisory Control and Data Acquisition (SCADA), Proportional - Integral - Derivative (PID) Control and the use of Human Machine Interface (HMI) in a Control System. Troubleshooting exercises, technical writing assignments and safety procedures will be implemented throughout the course. Prerequisites: MECA 2150: Mechatronics Systems Operations II.

Types of Instruction
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<th>Instruction Type</th>
<th>Contact Hours</th>
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<tr>
<td>Lab</td>
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Prerequisites
MECA 2150 MECHATRONICS SYSTEM OPERATION 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. Review Program Control Instructions
   Learning Objectives
   a. Discuss Control Background
   b. Recognize Principles of Operation
   c. Analyze Functions of Subroutines
2. **Design a Control System**
   **Learning Objectives**
   a. Identify Safety Practices
   b. Develop a Control System Incorporating a PLC, PID Device and HMI
   c. Document Control System
   d. Interpret Control System Results

3. **Use Function Blocks**
   **Learning Objectives**
   a. Explain Function Blocks
   b. Develop Function Block Diagram
   c. Demonstrate Function Block Programming

4. **Explain SCADA Systems**
   **Learning Objectives**
   a. Define SCADA systems
   b. Demonstrate the Operation of a SCADA system
   c. Explain the SCADA system on the FMS 200

5. **Incorporate Open and Closed Loop Systems**
   **Learning Objectives**
   a. Describe the Basic Operation of an Open-Loop System
   b. Describe the Basic Operation of an Closed-Loop System
   c. Demonstrate Set-Point Control

6. **Identify System Approach to Troubleshooting the FMS 200**
   **Learning Objectives**
   a. Identify System Components
   b. Demonstrate Component Level Troubleshooting
   c. Demonstrate System Approach to Troubleshooting

7. **Interpret PID Systems**
   **Learning Objectives**
   a. Discuss the Operation of PID Systems
   b. USE PID Systems with a PLC
   c. Outline the Functions of the Different Parts of a PID System

8. **Define PLC Networking**
   **Learning Objectives**
   a. Discuss How a Computer's Operating System is Designed to Function
   b. Explain How a Work Cell Functions in regards to the FMS 200
   c. Compare the Methods by Which Control Systems Communicate with Each Other

9. **Explore Human Machine Interface (HMI) use in a Control System**
   **Learning Objectives**
   a. Review the use of HMI systems
   b. Program HMI
   c. Integrate HMI into Control System
# Program Change Proposal Form

**Date of Proposal:** April 13, 2012  
**Author:** Doug Laven, David Ewel

<table>
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<th>Proposal Type:</th>
<th>New Program</th>
<th><em>Program Redesign</em></th>
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<th>Reinstat Program</th>
<th>Add Emphasis</th>
<th>Delete Emphasis</th>
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**Contact for the Program:** Jon Morgan

**Program Name:** Mechatronics Engineering Technology  
**CIP Code:**  
AAS – 15.040600  
Diploma – 15.040600  
Certificate – 15.040601

**Division in Which Program is Currently or Will Be Held:** Science, Technology, Engineering and Math

**Proposal Start (Term/Year):** Fall 2012

**Program Description:** Mechatronics is a new and rapidly growing field that integrates *mechanics* and *electronics*. In addition to studies in these two areas, students will gain knowledge and hands-on experience in electricity, fluid power, sensors, control systems, robotics and programmable controllers—components that are used in a wide variety of industrial automation systems, machines and equipment. Students are prepared to act professionally and gain knowledge in organizational issues such as quality, customer service and communications. This program is designed for people who are interested in plant maintenance, machine set up and installation, and troubleshooting of modern computer controlled machines. Mechatronics Engineering Technician jobs are found in the manufacturing, medical, electronics, agriculture, biotechnology, and automotive industries.

<table>
<thead>
<tr>
<th>Degrees Offered:</th>
<th>Certificate</th>
<th>Diploma</th>
<th>AAS</th>
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</table>

**Program Location:** North Mankato Campus

**Prerequisites:** None

**Number of Credits:** Certificate: 19, Diploma: 38, A.A.S.: 71

**If There is a Program Change, Summarize Changes to the Program:** Changes in the course content that affect the program include; prerequisite updates to various courses and course name changes to reflex a sequential semester flow as well as changes to Learning Objectives and Core Competencies. These courses are listed below;  
Removal of MECA 1260: Microprocessor Systems (3 credits)  
Removal of MECA 1230: Automated Process Measurement (1 credits)  
Addition of MECA 2250: Mechatronics Systems Operations III (3 credits)
Addition of MECA 1140: Introduction to GD&T (1 credit)
MECA 1100: Solidworks -to- MECA 2115 Applied Solidworks
MECA 1125: Electricity – Devices and Circuits II -to- MECA 1222: Electricity – Devices and Circuits II
ENGR 1005: Introduction to Engineering -to- MECA 1000: Introduction to Mechatronics
MECA 2230: Robotics -to- MECA 2235: Robotics
MECA 2210: Modeling and Simulation -to- MECA 1270: Modeling and Simulation

Rationale for Program Development or Program Change: This change was primarily driven by the MTEC Advisory Committee.

What Impact Will this New Program or Change Have on Other Programs or Areas? None.

Are There Articulations With Other Colleges? List College(s): Bemidji State & Moorhead.

- Attach Program Design to this Form. Below are Some Recommended Items:
  a. List of program requirements (i.e.: what the catalog page shows for each program).
  b. Cross walk from previous program curriculum to new (how students already started in the old program can finish after this new program begins).
  c. All required course numbers and titles.
  d. Additional supporting information, such as minutes documenting recommendation for proposal.
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<th>Semester</th>
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<td>MECA1122 Electricity - Devices and Circuits I</td>
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<td>MECA1131 Computer Applications</td>
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Additional Classes to be taken

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<td>COMM110 Public Speaking OR</td>
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<td><strong>PROGRAM TOTAL</strong></td>
<td><strong>71</strong></td>
<td><strong>38</strong></td>
<td><strong>19</strong></td>
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</tbody>
</table>
Appendix B

New Course or Course Change Proposal Form

Date of Proposal:  May 8, 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 2115: Quality Inspection III
Number of Credits:  3
Prerequisites:  CIM1115: Measurement, Materials, and Safety
Course Description:  This course covers topics which include alternative measuring techniques and Statistical Process Control. Prerequisite: CIM1115: Measurement, Materials, and Safety.

<table>
<thead>
<tr>
<th>Grading Method:</th>
<th>*Grade</th>
<th>Pass/Fail</th>
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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.

<table>
<thead>
<tr>
<th>Faculty Name</th>
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<table>
<thead>
<tr>
<th>Dean's Name</th>
<th>Dean's Signature</th>
<th>Date</th>
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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.

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:  The course name and number changed from CIM 2130: Quality Assurance III to CIM 2115: Quality Inspection III.

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 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 covers topics which include alternative measuring techniques and Statistical Process Control. Prerequisite: CIM1115: Measurement, Materials, and Safety.

Types of Instruction

<table>
<thead>
<tr>
<th>Instruction Type</th>
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<tr>
<td>Lab</td>
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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. 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

Date of Proposal: May 8, 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 2215: Quality Inspection IV

Number of Credits: 2

Prerequisites: CIM1115: Measurement, Materials, and Safety

Course Description: This course includes topics include more alternative measuring techniques and final inspection of advanced project. Prerequisites: CIM1115: Measurement, Materials, and Safety.

Grading Method: | *Grade | Pass/Fail

Scheduling: | Fall | *Spring | Summer | Alternate Years | Variable | On Demand

Instructional Type: | Lecture: 1 | Lab: 1 | 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: The course name and number changed from CIM 2230: Quality Assurance IV to CIM 2215: Quality Inspection IV. The credits also changed from 3 credits (1 lecture / 2 lab) to 2 credits (1 lecture / 1 lab)

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 IV
Course Outcome Summary

Course Information
Developers  Jon Morgan
Development Date  3/15/2010
Course Number  CIM 2215
Potential Hours of Instruction  48
Total Credits  2

Description
This course include more alternative measuring techniques and final inspection of advanced project.
Prerequisites: CIM1115: Measurement, Materials, and Safety

Types of Instruction

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<tr>
<th>Instruction Type</th>
<th>Contact Hours</th>
<th>Credits</th>
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</thead>
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<tr>
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<td>1</td>
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<tr>
<td>Lab</td>
<td>32</td>
<td>1</td>
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</table>

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.  Describe heat treat outcomes
   Learning Objectives
   a.  Describe destructive testing
   b.  Describe non-destructive testing
2.  Identify punch press
   Learning Objectives
   a.  Describe spring pressure
   b.  Describe die tonnage
3.  Analyze ejector pin height measurement
   Learning Objectives
a. Calculate ejector pin lengths
b. Calculate ejector pen height

4. **Describe centerline**
   **Learning Objectives**
   a. Explain centerline on welding fixture
   b. Explain centerline on advanced project

5. **Describe welding processes**
   **Learning Objectives**
   a. Review weld beads
   b. Explain weld penetration

6. **Demonstrate measuring fixtures**
   **Learning Objectives**
   a. Use a testing fixture
   b. Demonstrate weld fixture perpendicularly

7. **Describe mechanical testing of welds**
   **Learning Objectives**
   a. Explain x-ray examination of welds
   b. Explain mechanical testing of welds

8. **Explain work holding principles**
   **Learning Objectives**
   a. Identify jig and fixture hardware
   b. Identify jig and fixture classes

9. **Identify jigs and fixtures**
   **Learning Objectives**
   a. Explain template jigs
   b. Explain welding fixtures