Semester and year: 
Course Number: MFG-228 
Meeting Times and Locations: 

Instructor: 
Office Location: 
Phone: 
Office Hours: 
Email Address: 

COURSE DESCRIPTION: 

MFG-228 CNC Programming II expands the students’ knowledge of programming Computer Numerical Control Equipment with the concentration on CNC turning and machining centers and the introduction of CAM programming software. Included in this course will be the study of advanced programming techniques, NC code generation using MasterCAM software and advanced investigation of CNC programming problems. Students will receive hands on programming experience using industry preferred software and controllers. 
2 lecture, 2 lab, 3 credits 
Prerequisites: MFG 128 CNC Programming I 
Co-requisites: None 

STUDENT LEARNING OBJECTIVES: 
As a result of meeting the requirements in this course, students will be able to: 

<table>
<thead>
<tr>
<th>Student performance on these objectives will be measured by:</th>
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<tbody>
<tr>
<td>1. Write and store an advanced CNC program on a computer and use DNC to upload and download programs.</td>
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<tr>
<td>2. Troubleshoot a program which contains errors and provide solutions to effect proper operation.</td>
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<td>3. Demonstrate the ability to setup the tooling and work piece; qualify the work piece as required; qualify the tools to the control and establish the initial tool values or offsets.</td>
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<td>4. Demonstrate the ability to diagnose and repair CNC programs.</td>
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<td>5. Write alternative programs for special CNC applications</td>
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COURSE CONTENT:

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Main Program and Subprograms Part 1</td>
</tr>
<tr>
<td>2.</td>
<td>Main Program and Subprograms Part 1</td>
</tr>
<tr>
<td>3.</td>
<td>Review of Operational procedures and safety guidelines</td>
</tr>
<tr>
<td>5.</td>
<td>Subprogram Functions Pt. 1</td>
</tr>
<tr>
<td>6.</td>
<td>Subprogram Functions Pt. 2</td>
</tr>
<tr>
<td>10.</td>
<td>Subprogram Development Pt. 1</td>
</tr>
<tr>
<td>11.</td>
<td>Subprogram Development Pt. 2</td>
</tr>
<tr>
<td>12.</td>
<td>Toolpath Geometry Development Pt. 1</td>
</tr>
<tr>
<td>13.</td>
<td>Toolpath Geometry Development Pt. 2</td>
</tr>
<tr>
<td>15.</td>
<td>Axis Programming</td>
</tr>
<tr>
<td>16.</td>
<td>Program Verifications</td>
</tr>
<tr>
<td>17.</td>
<td>Detection Errors</td>
</tr>
</tbody>
</table>

Handouts:  
Post Processors  
Intro To MasterCAM Software  
Live Tooling Concepts and Applications

All machining courses will include instruction on safe operation of equipment, handling and storage of materials.

TEXTBOOK:  

Supplementary Reading:  
Peter Smid, Fanuc CNC Custom Macros, Practical Resources for Fanuc Custom Macro B Users, Industrial Press Inc., ISBN (0-8311-3157-8

EVALUATION:  
A. Projects ..................... 70 %
B. Final Examination ............. 20 %
C. Class Participation .......... 10%
TOTAL ......................... 100%

Assignments will have specific due dates. Assignments submitted after that date will be lowered one full letter grade per class meeting that they are late.

ATTENDANCE POLICY:

If a student is absent from the lecture portion of the class, it will be recorded as an absence for the entire class period. If a student is absent from the laboratory portion of the class, it will be recorded as an absence from that portion of the class only.

A letter grade will be deducted from the class participation portion of your final grade for each absence beyond three absences from either portion of a class period.

SPECIAL NOTES:  
A final grade cannot be assigned for the course until all projects and examinations for the course have been completed.

Make-up examinations will be administered in accordance with the
instructor’s and division’s policy.

**FACULTY ABSENCE PROCEDURE:** Please note well.

A daily listing will appear in the glass case located in the main hall A bldg. which will indicate all classes which are cancelled. Students can consult this case before going to class. If students find a class cancelled which has not been listed, they should report this to the divisional dean’s office (A325) or to the evening/Saturday office (L113).

**CALENDAR:**

<table>
<thead>
<tr>
<th>Class Meeting</th>
<th>Date</th>
<th>Topic</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>_____</td>
<td>Review CNC Basics</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>_____</td>
<td>Intro to Sub Programs and Macro’s</td>
<td>1,2,5,6</td>
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<tr>
<td>3.</td>
<td>_____</td>
<td>Macro Development</td>
<td>5,6</td>
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<tr>
<td>4.</td>
<td>_____</td>
<td>Variables in Macro Programming</td>
<td>10, 11</td>
</tr>
<tr>
<td>5.</td>
<td>_____</td>
<td><strong>EXAM 1</strong> Variables in Macro Programming</td>
<td>12,13</td>
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<tr>
<td>6.</td>
<td>_____</td>
<td>Axis Programming</td>
<td>15</td>
</tr>
<tr>
<td>7.</td>
<td>_____</td>
<td>Troubleshooting Macro’s</td>
<td>14,16,17</td>
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<tr>
<td>8.</td>
<td>_____</td>
<td>Variables and Similar Parts</td>
<td>20</td>
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<tr>
<td>9.</td>
<td>_____</td>
<td>Basic Macro Development</td>
<td>20</td>
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<tr>
<td>10.</td>
<td>_____</td>
<td><strong>EXAM 2</strong> Basic Macro Development</td>
<td>20</td>
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<tr>
<td>11.</td>
<td>_____</td>
<td>DNC Communication and Upload</td>
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<tr>
<td>12.</td>
<td>_____</td>
<td>Program Macro Verification</td>
<td>14,17</td>
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<tr>
<td>13.</td>
<td>_____</td>
<td>Project Development Using Macro’s</td>
<td>20,</td>
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<tr>
<td>14.</td>
<td>_____</td>
<td>Project Verification</td>
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<tr>
<td>15.</td>
<td>_____</td>
<td><strong>FINAL EXAM</strong> Project Verification</td>
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All BCC students enrolled in credit courses are entitled to a WebAdvisor account. With WebAdvisor, you may register online, check your schedule, room assignments, GPA, and find out what courses you need to take. To find out more about WebAdvisor or to sign up online, visit [http://go.bergen.edu](http://go.bergen.edu)! While there, please make sure you give us your preferred email address. You'll find directions how to do this at [http://go.bergen.edu/email](http://go.bergen.edu/email).