COURSE NUMBER AND TITLE: MCHT 2800-01 Computer Aided Manufacturing: SurfCam

SEMESTER/YEAR: Fall 2006

LECTURE HOURS: 2 Laboratory Hours: 1 Credits: 3

CLASS TIME: 6:00p.m.-9:00p.m. ROOM: EI 105

INSTRUCTOR’S NAME: Paul Brutsman

INSTRUCTOR’S CONTACT INFORMATION:
Phone (W) 237-5528 x3052 (H) 235-8174

COURSE DESCRIPTION: An introductory course in SurfCam 2-axis and 3-axis machining center programming. The course is structured so no prior experience with CNC mill programming is required.

STATEMENT OF PREREQUISITES: None

GOAL: To educate the student in basic SurfCam 2-axis and 3-axis machining center programming.

OUTCOMES: To educate the student in basic SurfCam 2-axis and 3-axis machining center programming. The student will import models from Solidworks, manipulate and machine the models using SurfCam. Model orientation, toolpath creation and verification will be explored.

EVALUATION CRITERIA: The course grade will be calculated as follows:
Projects 60%
Quiz 10%
Tests 10%
Lab 20%
A= 90-100%
B= 89-80%
C= 70-79%
D= 60-69%
F= <59%

Attendance Policy: Attendance is very important. It will be very difficult to make up missed class time. More than three unexcused absences and student will be dropped from class.

REQUIRED TEXT: None
References: SurfCam 2000, S.C.Jonathon Lin Ph. D.
Supplies: Pen/pencil, USB storage drive, notepad.

CLASS POLICIES:
Last Date To Change to Audit Status: Refer to Casper College Catalog.
Last Date to Or Withdraw with a W Grade: Refer to Casper College Catalog

STUDENT RIGHTS AND RESPONSIBILITIES: Please refer to Casper College Student Conduct and Judicial Code for information concerning your rights and responsibilities as a Casper College student.
Chain of Command: If you have any problems with this class, you should first contact the instructor in order to solve the problem. If you are not satisfied with the solution, offered by the instructor, you should then take your problem through the appropriate chain of command starting with the department head, then the division chair, and lastly the vice president for academic affairs.

Academic Dishonesty - Cheating and plagiarism: Casper College demands intellectual honesty. Proven plagiarism or any form of dishonesty associated with the academic process can result in the offender failing the course in which the offense was committed or expulsion from school. See the Casper College Student Code of Conduct.

ADA Accommodations Policy: It is the policy of Casper College to provide appropriate accommodations to any student with a documented disability. If you have a need for accommodations in this course, please make an appointment to see me at your earliest convenience.
COURSE OUTLINE

Week 1
- Course review
- Review syllabus
- Review computer lab rules

**Username and Passwords**
- Introduce optional text
- Machine axis
- Datums
- Lab exercises:
  - Import the following models and orient as follows:
    - Tubesheet.SLDPRT - Datum is top center of part.
    - WB04Ejector2.SLDPRT - Datum is center top of part
    - WB02-01.SLDPRT - Datum is upper back left corner of part
    - WB02-02.SLDPRT - Datum is upper back left corner of part.
  - Construction view orientation for model rotation
  - Change color of geometry elements
  - Masking elements
  - Analyze distance of elements
  - Rename layers to Wireframe and Surfaces
  - Pan and Zoom model
  - 7 standard views of model
  - Shade model

Week 2
- Review
  - Importing models
  - SurfCam Interface
  - Model orientation using C-View and transform
  - Edit color of element geometry
  - Masking elements
- Complete machining operations for an injection mold ejector plate
  - Import Solidworks file EjectorPlate2.sldprt
  - Model manipulation C-view
  - Layering
  - Masking
  - 2 axis drilling
  - 2 axis contouring
  - Arc in/ Arc out – Line in/Line out
  - Plunge/Peck
  - Plunge point selection
  - Cutter compensation
  - Graphically verify program
  - Post program
  - Create operator setup sheet

Week 3
- Complete machining operations for a tubesheet.
  - Import Solidworks file Tubesheet.sldprt
  - Model manipulation C-view
  - Layering
  - Masking
  - 2 axis drilling
  - 2 axis pocketing
    - Leadin/leadout moves
    - Arc in/ Arc out
    - Plunge point selection
  - Graphically verify program
  - Post program
  - Create setup sheet
  - Print setup sheet
**Week 4**
Complete machining operations for a scale and keychain
- Files W20016.SCEDU and weld2.SCEDU
- Create and machine text on a part
- Use layers for multiple setups
- Create front and back setup sections
- Graphically verify programs
- Create setup sheet
- Print setup sheet
- Post program

**Week 5**
Complete machining operations for an injection mold low E knife plate
- Import Solidworks file LOWEPLATE.SLDPR
- Position model
- Pocketing and contouring functions
- Ramp function on pockets
- Geometry selection (top or bottom),
- Geometry selection using colors/masking
- Finish allowances in X, Y and Z

**Week 6**
Complete CAM programming for dovetail template.SLDPR
- Contouring with multiple closed contours
- Multiple part setups
- Material boundary selection
- Part boundary selection
- Graphically verify program
- Post program
- Create operator setup sheet

**Week 7**
Class projects review

**Week 8**
CAM programming for brakepedal2.sldprt
- Import brakepedal2.sldprt
- Model manipulation C-view
- Wireframe and surface layers for top and bottom work
- Geometry creation for aluminum stock boundary
- 2-axis pocketing
- Surface creation using cross sections and drive curves
- Geometry creation for toolpath material boundary
- 3-axis Z rough
- 3 axis surface planar cut
- 2 axis contouring
- 3 axis contouring
- Projecting splines onto a planar surface
- 3 axis projecting of toolpaths onto a non-planar surface

**Week 9**
Continue CAM programming for brakepedal2.sldprt
Week 10
Holley Carburetor Spacer - Carb Spacer.SCEDU
Model spacer in SurfCam
Create wireframe geometry
Create surfaces
Layering Top and side work
2 axis pocketing
   ramp in
   pilot drill
2 axis contouring
   leadin/leadout move - Arc in/ Arc out
Graphically verify program
Stock definition
Fixture definition
Post program
Create setup sheet

Week 11
Blackened Emblem

Week 12
Continue Blackened Emblem

Week 13
Student Project - Key Chain
   Student to design their own key chain

Week 14
Continue Key Chain

Week 15
TBA

Week 16
TBA