

DE ANZA COLLEGE
APPLIED TECHNOLOGY DIVISION
COURSE OUTLINE

Degree applicable

MANUFACTURING & CNC TECHNOLOGY 76F-J

Effective Winter 2004

(Students may receive credit for one Manufacturing and CNC 76 course with a F through J designation).

I. Catalog Information

MCNC 76 F-J	Advanced CAD/CAM Based Computer Numerical Control Programming Using Mastercam	4 1/2 Units
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Prerequisite: MCNC 76A-E

Nine hours lecture/lab

Advanced programming procedures using wireframe, surface and solid models. Editing, post-processing, verifying and running programs on CNC machines.

II. Course Objectives

The student will:

- A. Construct wire frame models using geometry commands.
- B. Create parts using the surfaces module
- C. Generate 3D cutting tool paths using roughing and finishing functions.
- D. Edit 3D tool paths.
- E. Select cutting tools and plan for proper programming sequences.
- F. Create objects using the solids module.
- G. Verify the accuracy of the programmed cutter path on a CNC machine.
- H. Transport computer-aided drafting models (CAD) for programming.

III. Essential Student Materials

None

IV. Essential College Facilities

A laboratory/classroom equipped with computers, CNC lathe and milling machine, and accessories.

V. Expanded Description: Content and Form

- A. Wire frame models
 - 1. Features of wireframe models and surface models.
 - 2. Basic elements of surface and edge profiles.
 - 3. Construct wireframe models using geometry commands.
- B. Surfaces modeling for creating parts.
 - 1. Surfaces and their applications.

3. Surface types and uses.
 4. Using surface modules.
 - a. Procedures and shortcuts in creating parts using surfaces.
 - b. Loft, coons, ruled, sweep.
 5. Use to create derived surfaces from existing surfaces.
 6. Create composite surface models
- C. 3D Cutting Tool paths
1. Methods of generating tool paths to cut surfaces.
 2. Using modules to generate tool paths from wireframe models.
 3. Applying 3D tool path modules
 - a. Features of seven surface roughing functions.
 - b. Features of eight surface finishing functions.
 - c. Common parameters used in surfacing tool path functions.
 - d. Surface tool path functions to generate NC programs for machining surfaces.
 4. Post processing
 - a. Post files and interpretation
 - b. Universal post editing
- D. 3D Tool path Editing
1. Tool path editing functions (project and trim) to modify tool paths
 2. Tool path editing features and applications
- E. Cutting tool selection and programmed path sequence planning.
1. Tool path generation procedures for 3D surfaces.
 2. Plan for most productive sequence for machining features and surfaces.
 3. Select proper tooling and machining parameters.
- F. Constructing parts using the solids module.
1. Wire frame transfer or development.
 2. Modeling commands.
 - a. Extruding
 - b. Fillets & rounds
 - c. Shell
 - d. Holes, bosses, & pockets.
 - e. Chain commands
- G. Verifying program on a CNC machine.
1. Download program from PC or Microfloppy
 2. Review basic controller functions.
 3. Locate part zero with spindle using jog functions.
 4. Run tool tryout.

VI. Assignments

- A. Write Numerical Control Programs for mills and lathes.
- B. Take home worksheets involving calculations.
- C. Reading from textbooks, references, and trade journals.

VII. Methods of Evaluating Objectives

- A. Examinations covering lecture material and lab demonstrations.
- B. Completion of take home worksheets

D. A comprehensive, objective, problem solving final exam

VIII. Texts and Supporting References

A. Texts:

1. CNC Software Inc., Mastercam Reference Manual, Tolland, CT: CNC Software Inc., 2002.

B. References:

1. Puztai, Joseph and Michael Sava, Computer Numerical Control, Reston, Virginia: Reston, 2002.