COURSE OUTLINE : CAM 220
D Credit – Degree Applicable
COURSE ID 001370
Cyclical Review: SEPTEMBER 2020
Revision: APRIL 2021

COURSE DISCIPLINE : CAM

COURSE NUMBER : 220

COURSE TITLE (FULL) : Computer Aided Manufacturing, Basic Lathe

COURSE TITLE (SHORT) : Comp Aided Manuf Basic Lath

ACADEMIC SENATE DISCIPLINE: Machine Tool Technology

CATALOG DESCRIPTION

CAM 220 introduces the use of computers in programming numerical control lathe machines. Students write and edit programming code for computer numerical control (CNC) lathes and learn the fundamentals of the lathe process through hands-on machining practice.

Total Lecture Units:1.00

Total Laboratory Units: 2.00

Total Course Units: 3.00

Total Lecture Hours:18.00

Total Laboratory Hours: 108.00

Total Laboratory Hours To Be Arranged: 0.00

Total Contact Hours: 126.00

Total Out-of-Class Hours: 36.00

Recommended Preparation: ENGL 100 or ESL 141.

ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1	ENGL	100	Writing Workshop	read, analyze, and evaluate contemporary articles and stories for the comprehension of difficult content and the identification of main ideas and (topic-based) evidence;	Yes
2	ESL	141	Grammar and Writing IV	Compose a 400 to 450-word thesis-based essay which: (a) summarizes and cites appropriately a reading passage provided as a prompt, (b) includes a clear thesis statement, (c) uses evidence to support the thesis, (d) shows clear organization into an introduction, body, and conclusion, and (e) uses appropriate rhetorical modes such as comparison/contrast, cause/effect, and persuasion in order to support a thesis.	Yes

EXIT STANDARDS

1 perform basic interpretation of geometric shapes and translate them into the proper
2 numeric format. explain the safety measures employed during the operation of a Computer Numerical Control (CNC) lathe.
3 perform basic cutting procedures using a CNC lathe.
4 identify the basic principles required to successfully complete a simple project.
5 differentiate between absolute and incremental positioning.
6 explain and identify the work offset (part zero).

STUDENT LEARNING OUTCOMES

1 demonstrate machine control panel keystroke commands for each program.
2 describe the proper applications, methods, and procedures for each program.
3 perform CNC lathe machining programs with precision and accuracy using a range of techniques.
4 demonstrate the design process from drawing to execution of a project.

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COURSE CONTENT WITH INSTRUCTIONAL HOURS

	Description	Lecture	Lab	Total Hours
1	General Introduction • Scope of curriculum • Course requirements • Grading standards • Methods of preparation	2	0	2
2	Familiarization • Overview of workbook requirements • Introduction to program • Introduction to computer • Demonstration of computer operation • Demonstration of Mastercam program	2	2	4
3	Introduction to Computer Numerical Control (CNC) programming • History or CNC programming and machining • Review of machine basics • Basic overview of cutting tools • CNC lathe safety	2	8	10
4	CNC lathe basic programming system • Coordinate system • Absolute and incremental positioning • Program format • Machine defaults • Programming with codes	2	18	20
5	Overview of program structure • Coding structure • G-codes, M-codes (Geometric code, Miscellaneous code) • Machine CNC lathe cycles • Parameter set-up • Machine commands	2	18	20
6	G-code programming • Computer code entry • Program name format • Code structure • Order of operations	2	18	20
7	Haas simulator operation • Initializing the simulator • Manually inputting data • Loading a program • Saving a program • Verifying tool path	3	20	23

8	Haas CNC lathe operation • Setup work holding for lathe • CNC lathe controller panel • Indicate the part • Load tool holders & tools • Find part zero • Set up tools • Verify and run CNC lathe	3	24	27
				126

OUT OF CLASS ASSIGNMENTS

1 homework (e.g. calculation of lathe speed);
2 written assignments (e.g. part programming assignments).

METHODS OF EVALUATION

1 quizzes;
2 project evaluation (e.g. lathe shaft project);
3 final examination.

METHODS OF INSTRUCTION

- [x] Lecture
- [x] Laboratory
- [ ] Studio
- [x] Discussion
- [x] Multimedia
- [ ] Tutorial
- [ ] Independent Study
- [x] Collaboratory Learning
- [x] Demonstration
- [ ] Field Activities (Trips)
- [ ] Guest Speakers
- [ ] Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	IBSN	Date
Haas CNC Lathe Programming Manual	Required	Haas Automation					2015