

COMPUTER AIDED NUMERICAL CONTROL LABORATORY

VII Semester: ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AME115	Core	L	T	P	C	CIA	SEE	Total
		-	-	3	2	30	70	100
Contact Classes: 45		Tutorial Classes: 15		Practical Classes: Nil		Total Classes: 36		
<p>OBJECTIVES: The course should enable the students to:</p> <ol style="list-style-type: none"> 1. Understand the features and specifications of CNC and 3D printing machines. 2. Develop the process planning sheets and tool layouts. 3. Use the CAM software and prepare CNC part programs. 4. Execute the part program and machine the component as per the production drawing <p>COURSE LEARNING OUTCOMES (CLOs):</p> <ol style="list-style-type: none"> 1. Understand the concept of numerical control and advantages of CNC machine tools. 2. Know the various types of CNC machine tools and CNC machining centers. 3. Understand Basic fundamentals of CNC milling and familiarization of machine control panel. 4. Understand Fundamentals of CNC programming, Part programming and interpolation techniques 5. Performance of Machining practice on CNC milling 6. Generation of part programming through CAM software. 7. Generation of CAM-CNC programming and execution. 8. Understand various Work piece setting methods and tool setting methods 9. Practice on CNC turning and exercises on machine. 10. Understand CNC programming and execution on milling and turning machines. 11. Prepare simple prototype models using 3D Printing. 12. Perform Practice session at industry 								
Week - 1	INTRODUCTION TO COMPUTER NUMERICAL CONTROL							
Numerical control, functions of a machine tool, concept of numerical control, historical development, definition, advantages of CNC machine tools.								
Week - 2	INTRODUCTION TO COMPUTER NUMERICAL CONTROL							
Evolution of CNC, advantages of CNC, limitations of CNC, features of CNC, machine control unit (MCU) for CNC, classification of CNC machine tools; CNC machining centers: classification, features of CNC machining centers								
Week - 3	CNC MILLING							
Basic fundamentals of CNC milling, familiarization of machine control panel.								
Week - 4	CNC MILLING							
Fundamentals of CNC programming, Part programming and interpolation techniques.								

Week - 5	CNC MILLING
Machining practice on CNC milling.	
Week - 6	CAM SOFTWARE
Generation of part programming through CAM software package.	
Week - 7	CAM SOFTWARE
CAM-CNC programming and execution.	
Week - 8	CNC TURNING
Work piece setting methods, tool setting methods.	
Week - 9	CNC TURNING
Practice on CNC turning and exercises on machine.	
Week - 10	CAM SOFTWARE
Generation of part programming through the CAM software package, CAM-CNC programming and execution on milling and turning machines.	
Week - 11	3D PRINTING
Prepare simple prototype models.	
Week - 12	INDUSTRY–INSTITUTE INTERACTION
Practice session at industry	
Text Books:	
<ol style="list-style-type: none"> 1. Kundra T. K., Rao P. N. and Tewari M. K., —Numerical Control and Computer Aided Manufacturing, Tata McGraw-Hill, 1st Edition, 1999 2. Groover M.P., —Automation, Production Systems & Computer Integrated Manufacturing., Prentice Hall, 1st Edition, 1989 3. Elanchezhian C, Selwyn Sunder T, Shanmuga Sundar G., —Computer Aided Manufacturing, Laxmi Publications, New Delhi, 1st Edition, 2006 4. Rao P N., —CAD/CAM Principles and Applications, Tata McGraw-Hill, 1st Edition, 2006. 	
Reference Books:	
<ol style="list-style-type: none"> 1. FANUC and SIEMENS part programming manuals. 2. 3D printing manual – ULTIMAKE 	