

19ME503	CAD/CAM AND AUTOMATION				L	T	P	J	C
V SEM					2	0	2	0	3
UNIT I	COMPUTER AIDED DESIGN AND GEOMETRIC MODELING						6+3		
Theory: Introduction – CAD definition – design process – CAD activities – benefits and scope of CAD. Transformations: Scaling, Rotation, Pan, Redraw, Regenerate-Geometric modelling techniques: wire frame, surface, solid modelling.									
Practical: To learn and obtain the knowledge in creating a model by utilizing the software.									
<ol style="list-style-type: none"> 1. Flange Coupling & Plummer Block 2. Screw Jack & Universal Joint 									
UNIT II	CNC MACHINE TOOLS AND COMPONENTS						6+3		
Theory: Numerical control – development of NC – DNC – CNC and adaptive control systems – CNC EDM machine – Coordinate measuring machines: construction, working principles and specifications – maintenance of CNC machines- CNC lathe									
Practical: To learn and develop the skill in creating a component by utilizing the Automated Machines.									
MANUAL PART PROGRAMMING (Using G and M Codes) in CNC lathe									
<ol style="list-style-type: none"> 1. Part programming for Linear and Circular interpolation. 2. Part programming using standard canned cycles for Turning 									
UNIT III	CNC CONTROL SYSTEM AND PART PROGRAMMING						6+3		
Theory: Open loop and closed loop control system - feedback devices: encoders – linear and rotary transducers. NC dimensioning –reference points – machine zero, work zero, tool zero and tool offsets - Coordinate system – types of motion control: point-to-point, paraxial and contouring – Types of NC part programming – G and M codes - turning and milling part programming examples.									
Practical: To learn and develop the skill in creating a component by utilizing the Automated Machines.									
MANUAL PART PROGRAMMING (using G and M codes) in CNC milling									
<ol style="list-style-type: none"> 1. Part programming for Linear and Circular interpolation and Contour motions 2. Part programming involving canned cycles for Drilling, Peck drilling, and Boring 									
UNIT IV	AUTOMATION AND FMS						6+3		
Theory: Introduction, Automation strategies, Types of Automation - Hard and Soft Automation, AGVs-Group Technology: Introduction, Coding Methods-FMS - Components of FMS - Types - FMS workstation -Material handling and storage systems- FMS layout -Application and benefits.									
Practical:									
<ol style="list-style-type: none"> 1. To Study on Part Coding and Group Technology 2. To introduce FMS as modern systems of flexible manufacturing 									
UNIT V	ROBOTICS						6+3		
Theory: RIA definition of Robot, Laws of robotics - Classification of robots- robot anatomy, Point to point and continuous path robotic systems, Joints, End Effectors, Grippers - Mechanical, Magnetic and Pneumatic, Applications									
Practical:									
<ol style="list-style-type: none"> 1. Assignment on Introduction to Robot configuration and programming. 2. Demonstration of Robot with 2 DOF, 3 DOF, 4 DOF 									

L:30 T:0 P:15 TOTAL: 45 PERIODS

TEXT BOOKS

1.	Mikell.P.Groover "Automation, Production Systems and Computer Integrated Manufacturing", Pearson India Education Services India Ltd., 2016 (Unit I, II, III, IV, V).
2.	Radhakrishnan P, Subramanyan.SandRaju V., "CAD/CAM/CIM", New Age International (P) Ltd, New Delhi,2nd Edition, 2013 (Unit II, III, V)

REFERENCES

1.	Ibrahim Zeid, Mastering CAD/CAM, Special Indian Edition 2009, Tata McGraw-Hill Publishing Company Ltd. (Unit III,IV,V)
2.	P.N.Rao, CAD/CAM Principles and Applications, 2010, Tata McGraw Hill Publishing Company Ltd. (Unit I,II).
3.	Rajput R.K., "Robotics and Industrial Automation", S.Chand and Company, 2010 (Unit IV &, V)

WEB RESOURCES

1.	https://www.cadcim.com/
2.	https://eduinformer.com/cad-cam-cim-radhakrishnan-subramanyan-raju/
3.	http://learnaboutrobots.com/

COURSE OUTCOME

At the end of the course the students will be able to

CO-1	Describe the principles of CAD, geometric modelling techniques and practice drawings in CAD
CO-2	Identify CNC machine tools, its components and to write CNC part program.
CO-3	Learn about CNC control systems and to write part programming for CNC milling.
CO-4	Understand the use of computers in Automation and study of FMS,part programming and Group Technology
CO-5	Write the robot programming and application of robots