COMPUTER AIDED MANUFACTURING

Course Code: 15ME2111   **L P C**
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Course Outcomes: At the end of the course, the student will be able to
CO1: Explain NC, CNC and DNC machines
CO2: Discuss the different features of NC machine tools
CO3: Develop NC part program for various machining operations
CO4: Develop APT part program for various machining operations
CO5: Describe the application of adaptive control in CNC machine and quality control

UNIT-I   (10-Lectures)
Introduction: Basic concepts in manufacturing systems, coordinate systems, advantages of NC systems, classification of NC systems, point to point and contouring system, incremental and absolute system, open loop and closed system, CNC, DNC, feedback devices

UNIT-II   (10-Lectures)
Features of NC machine tools: fundamentals of machining, design considerations of NC machine tools, methods of improving machine accuracy, increasing productivity with NC machines, machining center, turning center, mode selection, cutter radius compensation, tool length compensation

UNIT-III   (10-Lectures)
NC part programming: Part program instruction formats, Information codes: Preparatory function, Miscellaneous functions, Tool code and tool length offset, Interpolations, Canned cycles. Manual part programming for drilling, milling and turning operations, Programming examples

UNIT-IV   (10-Lectures)

APT programming: APT language structure, APT geometry: Definition of point, line, circle, plane, patterns and matrices. APT motion commands: point-to-point motion commands, continuous path motion commands. Post processor commands, Macro subroutines, programming examples.

UNIT-V   (10-Lectures)

Adaptive control systems: Introduction, sources of variability in machining, benefits of adaptive control, adaptive control with optimization for a milling machine, adaptive control with constraints for lathe
Computer aided quality control: Terminology in quality control, computer in QC, contact inspection methods, noncontact inspection methods

TEXT BOOKS:

1. Yoram Koren, "*Computer control of Manufacturing Systems*", 6e, TMH, 2012.
2. Mikell P.Groover, "*Automation, Production systems and computer Integrated manufacturing*" 8e, PHI, 2008.

REFERENCES:

1. P.N. Rao, "*CAD/CAM*", 2e, TMH, 2005.
2. D S N Murthy, "*CNC Applications & Programming Techniques*", 1e, Goutam publications, 2003.