

PRODUCT AUTOMATION & CNC TECHNOLOGY
Semester I (Production Engineering) SUB CODE: MEPR104
Teaching Scheme (Credits and Hours)

Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
4	0	2	6	5	3	70	30	20	30	150

LEARNING OBJECTIVES:

The objective of this course is

- To learn various concepts related CNC Technology
- To have practical purview of manual part programming

LESSON PLANNING

SR.NO	CHAPTER NO	DATE/WEEK	%WEIGTAGE
1	1,2	1 st 2 nd 3 rd	20
2	3	4 th 5 th 6 th	20
3	4,5	7 th 8 th 9 th	20
4	6	10 th 11 th 12 th	20
5	7	13 th 14 th 15 th	20

Total hours (Theory): 60, Total hours (Practical):30, Total hours: 90

DETAILED SYLLABUS

Chap . No.	Topic
1	Concept and scope of industrial automation: Automation strategies, devices, drives and control circuits in automation - Semi-automats, Automats and transfer lines.
2	Mechanical, electrical, hydraulic, pneumatic, electronic & hybrid automation system. Comparative evaluation of automation system.
3	Concepts, features, fundamentals, advantages and classification of NC systems, input media. Design consideration of NC machine tools - machining centre – MCU functions.
4	Controls and System devices: Control loops of NC system – CNC Concepts, reference pulse and sampled data techniques – microprocessor and CNC adaptive control – ACO and ACC systems.
5	Graphical Numerical Control - part programming - design of post Processor
6	Manual part programming: Computer aided part programming – post processor, APT programming, Programming for CNC turning center, Machining center and CNC EDM and wire cut EDM
7	Computer Aided Process Planning: Introduction, Manual process planning vs. Computer aided process planning, Basics of variant and generative process planning methods, Examples of automated process planning systems. Computer Integrated Manufacturing: Introduction, features and applications of CIM, key elements, advantages and disadvantages of CIM

LIST OF PRACTICALS

Sr. No.	Practical Content
1	PROGRAMMING USING G CODE & M CODE IN CNC MACHINES.
2	ANALYSIS OF VARIOUS COMPONENTS OF CNC MACHINES
3	ELECTRICAL AND MECHATRONICS COMPONENTS OF CNC MACHINES.
4	MANUAL PART PROGRAMMING AND EXPERIMENTAL CASE STUDY.
5	PART PROGRAMMING USING AUTOMATICALLY PROGRAMMED TOOLS (APT).
6	ANALYSIS OF ADAPTIVE CONTROL SYSTEM.
7	ANALYSIS OF MANUFACTURING AUTOMATION SYSTEM FOR A GIVEN APPLICATION
8	ANALYSIS OF INTERPOLATORS & CONTROLLER FOR VARIOUS CNC MACHINES
9	PART CODING OF A GIVEN COMPONENT USING CAPP
10	CASE STUDY CIM APPLICATION FOR INDUSTRIAL AUTOMATION

INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all units while conducting teaching & examination.
- Attendance is compulsory in lectures and Tutorial.
- Viva Voce will be conducted at the end of the semester of 30 Marks.
- One internal exam of 30 marks is conducted as a part of Mid semester evaluation.

STUDENTS LEARNING OUTCOMES:

At the end of the course

- The students will gain an experience in the implementation of manual part programming as a part of industrial automation

Reference Books:

1. Scrope Kalpakjian, "Manufacturing processes for Engineering Materials", Addison Wesley, 1997.
2. Radhakrishnan, P., "Computer Numerical Control Machines", New Central Book Agencies, 1997.
3. Yoram Korem., "Computer control of Manufacturing systems", Mc Graw Hill, 1986.
4. Engineering automation by Solomo