

| 5039 C. NUMERICAL CONTROL MACHINES | | | | | | | | | |
|------------------------------------|-----------|--------|------------------------|----|------------------------------|------|---------------|-------|----------|
| Teaching Schedule Per Week | | | Progressive Assessment | | Examination Schedule (Marks) | | | | |
| Lectures | Practical | Credit | | | Theory | | Practical Ex. | Total | |
| 3 | 2 | 5 | 25 | 25 | | | 100 | 25 | 175 |
| Pre-requisite | | Source | | | Theory | Test | Total | TW | PR |
| | | MEC | Semester | | | | | | Gr Total |

Rationale:- This subject is classified as a core technology. It is intended to teach students facts, concept, principles and procedure of Computerised Numerical Machines, so that he can Super-ise and operate CNC Machines.

| COURSE CONTENTS | | hrs | mks |
|---|--|-----|-----|
| 1. INTRODUCTION | | 02 | 04 |
| 1.1 Automation in Mfg. Industry, Automation in M/C Tools. | | | |
| 2. NUMERICAL CONTROL M/C TOOLS | | 06 | 12 |
| NC & CNC Machines; Direct Numerical Control; Advantages & disadvantages of CNC; Parts suitable for CNC Machines; Environmental Control for CNC Machines. | | | |
| 3. CLASSIFICATION OF NUMERICAL CONTROL SYSTEMS | | 09 | 20 |
| Classification based on feed back control; Classification based on control system feature; Methods of listing co-ordinates of points in CNC- Absolute Co-ordinate system, Incremental Co-ordinates System; Axis Identification in CNC Machines; Linear axis; Rotary axis. | | | |
| 4. FUNDAMENTALS OF PART PROGRAMMING | | 15 | 32 |
| Introduction of part programming; Manual part programming; Computerised part programming; Procedure for developing. Manual part programming; G Words; Programming Formats; G and M Codes; Part programming for straight line; Part programming for machining straight line; Part programming for machining along curved surfaces; Part programming for Lathe operations; Part programming for milling. Machine operation. | | | |
| 5. PART PROGRAMMING USING SUB-ROUTINES | | 10 | 20 |
| part programming using sub. routines, do loops & fixed cycles Use of subroutines for writing part programmes: Use of Do Loops for writing part programmes; Use of fixed Cycles for writing part programmes. | | | |
| 6. TOOLING FOR CNC MACHINES | | 06 | 12 |
| 1.1 Spindle tooling for Machine Centres; Tooling for CNC turning Machine; Tool pre-setting equipment; Flexible tooling system. | | | |
| TOTAL | | | |

Practical

1. Numerical Control System used.
2. Exercise on entering part programme and editing.
3. Tooling for CNC M/C.
4. Develop a part programme for following lathe operation and make. Plain Turning & facing operation. Taper Turning operation. Thread cutting operation.
5. Develop a part programme for following milling operation & make the job on CNC milling M/C. Plain milling operation. Slot milling. Rocket milling.

Reference Books

1. Numerical Control & Computer aided Manufacturing, Kundra, Raop & Tewari, Tata McGraw Hill. N.D.
2. CNC Machines – programming & Applications. – Adithan, M. & Pabplay B.S. – Wiley Eastern Ltd.,
3. Numerical Control of Manufacturing Rev. System. – Korem, Y. & J.B. Uri – London : McGraw Hill.