

**MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION,  
MUMBAI -51**

1	Name of Syllabus	<b>C. C. In CAD-CAM OPERATOR (303127)</b>																																															
2	Max. No of Student	25 Students																																															
3	Duration	6 Month																																															
4	Type	Part Time																																															
5	No Of Days / Week	6 Days																																															
6	No Of Hours /Days	4 Hrs																																															
7	Space Required	Practical Lab = 200 Sq feet <u>Class Room = 200 Sq feet</u> TOTAL = 400 Sq feet																																															
8	Entry Qualification	S.S.C. Pass																																															
9	Objective Of Syllabus/ introduction	To make available CAD-CAM operators with the capability of handling CNC machines efficiently.																																															
10	Employment Opportunity	A successful candidate can complete the job as follows : a. Designing drafting and printing new drawings, b. Digitizing of old drawing c. Operation and programming on CNC machines. To work in CNC environment.																																															
11	Teacher’s Qualification	Teacher should be graduate / diploma in any engineering stream with in-depth knowledge of higher end CAD software and technology with minimum 2 years experience.																																															
12	Training System	<table><tr><th colspan="4">Training System Per Week</th></tr><tr><td>Theory</td><td>Practical</td><td colspan="2">Total</td><td colspan="2"></td></tr><tr><td>06 Hours</td><td>18 Hours</td><td colspan="2">24 Hours</td><td colspan="2"></td></tr></table>						Training System Per Week				Theory	Practical	Total				06 Hours	18 Hours	24 Hours																													
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13	Exam. System	<table><tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/PR</th><th>Hours</th><th>Max. Marks</th><th>Min. Marks</th></tr><tr><td>1</td><td><b>30312711</b></td><td>COMPUTER AIDED DRAFTING AND DESIGN</td><td>TH-I</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>2</td><td><b>30312712</b></td><td>COMPUTER AIDED MANUFACTURING</td><td>TH-II</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>3</td><td><b>30312721</b></td><td>COMPUTER AIDED DRAFTING AND DESIGN</td><td>PR-I</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>4</td><td><b>30312722</b></td><td>COMPUTER AIDED MANUFACTURING</td><td>PR-II</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td><b>400</b></td><td><b>170</b></td></tr></table>						Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Min. Marks	1	<b>30312711</b>	COMPUTER AIDED DRAFTING AND DESIGN	TH-I	3 hrs.	100	35	2	<b>30312712</b>	COMPUTER AIDED MANUFACTURING	TH-II	3 hrs.	100	35	3	<b>30312721</b>	COMPUTER AIDED DRAFTING AND DESIGN	PR-I	3 hrs.	100	50	4	<b>30312722</b>	COMPUTER AIDED MANUFACTURING	PR-II	3 hrs.	100	50						<b>400</b>	<b>170</b>
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**2 D Drafting for Modeling –**

Lines, Circles Arcs Dimensioning, Fillet, Make corner, trim extend, divide at, merge curves, scale, and move, rotate, drag, modify, delete, offset.

**3 D Solid Modeling –**

Sketch in place, reference plane, extrusion, revolve, reflect patterning, rectangular and circular, fillet, chamfer, shell, draft, Boolean Operation, cut join, intersect, plane cut, partition material side, history access, align, display filters, appearance, properties, manage bins, viewing, bin-put away get modify reference point measure.

**Basic 3 D Surface Modeling –**

Basic loft, sweep by boundary.

**Advance 3 D Surface Modeling –**

Co-ordinate systems, extract, cross-section, build section, 3 D Line, 3 D Arcs, 3 D circles, 3 D splines, points on curve, trim at curve divide edge, surface extension, surface intersection, ISO curve, blend fillet, variation sweep, mesh of curves, clean surface or curves, surface explosion, project curve, properties,

**Assembly –**

Create parts, name parts, create assemble, add parts to assemble, select parts, dimensioning and containing instances assemble exploding Browse Relations, configurations sequences, animation, suppressing and unsurprising, interference checking.

## **THEORY PAPER – II - COMPUTER AIDED MANUFACTURING ( CAM)**

### **Introduction Generative Machining**

Milling Operations

- a) Volume Clear Operation
- b) Copy Mill Operations
- c) Profile Operations
- d) Following Operations
- e) Manual Operations

### **Turning Operations**

- a) Facing Semi-finish / Finish Operations
- b) Turning Semi-finish / Finish Operations
- c) Groove Cutting Operations
- d) Thread Cutting Operations

### **Machine Technology**

#### **Metal Cutting Process:-**

Types of machines used for metal cutting. Automation and its stages measures. To increase manufacturing efficiency in metal cutting. Conventional machine operations.

## **PRACTICAL I, \_COMPUTER AIDED DRAFTING & DESIGNING (CAD)**

### **2 D Drafting for Modeling –**

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Create parts, name parts, create assemble, add parts to assemble, select parts, dimensioning and containing instances assemble exploding Browse Relations, configurations sequences, animation, suppressing and unsurprising, interference checking.

## **PRACTICAL II , COMPUTER AIDED MANUFACTURING ( CAM)**

### **Introduction Generative Machining**

Milling Operations

f) Volume Clear Operation

g) Copy Mill Operations

h) Profile Operations

i) Following Operations

j) Manual Operations

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### **LIST OF TOOLS / EQUIPMENTS/SOFTWARE**

Sr. No.	Description of Tools/Equipment/Software	Nos. Required
1	Pentium based processor having minimum configuration <ul style="list-style-type: none"><li>• Min 3.00 GHZ Dual core Mother board</li><li>• 350 GB HDD</li><li>• 2 GB RAM</li><li>• DVD WRITTER DRIVE</li><li>• LCD 17"</li></ul>	Four
2	Lathe Machine	One
3	Milling Machine	One
4	Dot Matrix Printer	One
5	Desk / Ink Jet Printer or Plotter	One
6	Windows XP or higher version CAD-CAM Software, Graphics Simulation Package.	As Required
7	256 KBPS External Modem	One

### **Reference Books:**

1.	Computer Numerical Control	Aurthur Gill
2.	Numerical Control	Roger Macrill
3.	CAD-CAM an Automation	Rachayya R.A.
4.	CNC Training	Satish Joshi

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