

# E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM – 611 002



## B.E MECHANICAL ENGINEERING

Fourth Year – Seventh Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
<b>Theory Course</b>								
1902ME701	Automation in Manufacturing	3	0	0	3	40	60	100
	PC Elective III	3	0	0	3	40	60	100
	HSS Elective 2	3	0	0	3	40	60	100
	Open Elective II	3	0	0	3	40	60	100
	HSS Elective 3	3	0	0	3	40	60	100
1901MGX07	Universal Human Values and Ethics	3	0	0	3	40	60	100
<b>Laboratory Course</b>								
1902ME751	CAM & Automation Laboratory	0	0	2	1	50	50	100
1904GE751	Life Skills: Comprehensive Viva	2	0	0	2	100	-	100
1904ME752	Inplant training/ Internship Presentation	0	0	0	1	100	-	100

L – Lecture | T – Tutorial | P – Practical | CA – Continuous Assessment | ES – End Semester

**UNIT I Introduction and Structure of CNC Machine Tools****9 Hours**

Introduction to Automation, definition, types, reasons for automating, and types of production. Development of CNC Technology, principles, features, advantages, economic benefits, applications, CNC, DNC concept, classification of CNC Machine, types of control, CNC Machine building, guide ways and its types, ball Screws and recirculating ball screw, working of 3 axis and 5 axis CNC machines

**UNIT II CNC Programming and Tooling****9 Hours**

Coordinate system, structure of a part program, G & M Codes, Manual part programming for Fan uc, APT part programming using CAD/CAM, and simple Examples. Selection of CNC cutting tools Cutting tool materials, carbide inserts classification, tooling system for Machining centre and Turning centre;(work holding devices), Tool magazines - ATC, APC

**UNIT III SENSORS****9 Hours**

Components of mechatronics system, Sensor - terminology and Mathematical equation - Potentiometer, Linear Variable differential transformer, strain gauge, Piezoelectric sensor, Optical encoder, Hall effect sensor, Thermistor, Thermo-couple, Light sensor.

**UNIT IV Automated Material Handling and Inspection****9 Hours**

Introduction to Automated Guided Vehicle (AGV) Systems and Automated Storage and retrieval system (AS/RS) - basic components, types and its application. Automated inspection principles - Off line & on line inspection, distributed inspection & final inspection

**UNIT V Computer Aided Manufacturing and Group Technology****9 Hours**

Introduction to CAM- Manufacturing planning, manufacturing control- Computer integrated manufacturing, Flexible manufacturing systems -Components, Types of systems, FMS layout and FMS benefits. Computer aided process planning: Retrieval CAPP systems and generative CAPP systems, benefits of CAPP. Group Technology

**Total: 45 Hours****Reference(s)**

1. Mikell P. Groover, *Automation, Production System and Computer Integrated Manufacturing*, Prentice Hall of India, New Delhi, 2008.
2. P. Radhakrishnan, S. Subramanyan and V. Raja, *CAD/CAM/CIM*, New Age International Private Ltd, New Delhi, 2008.
3. Mikell P. Groover, Mitchell Weiss and Roger N. Nagel G Odrey, *Industrial Robotics*, Tata McGraw Hill Publishing Company Pvt Ltd. New Delhi, 2007.
4. M. M. M. Sarcar, *Computer Aided Design and Manufacturing*, Prentice Hall of India, New Delhi, 2008.
5. P. Radhakrishnan, *Computer Numerical Control Machines*, New Central Book Agency, 2004.
6. HMT, *Mechatronics*, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi, 2010.

<b>EXPERIMENT 1</b>		<b>4 Hours</b>
To impart part programming for a pocketing operation using CNC milling software.		
<b>EXPERIMENT 2</b>		<b>4Hours</b>
To impart part programming for a contouring operation using CNC milling software.		
<b>EXPERIMENT 3</b>		<b>4Hours</b>
To impart part programming for a drilling operations using CNC milling software.		
<b>EXPERIMENT 4</b>		<b>4 Hours</b>
To impart part programming for a turning operation using CNC turning software.		
<b>EXPERIMENT 5</b>		<b>4 Hours</b>
To impart part programming for a taper turning operation using CNC turning software.		
<b>EXPERIMENT 6</b>		<b>4Hours</b>
To impart part programming for a undercut operation using CNC turning software.		
<b>EXPERIMENT 7</b>		<b>4Hours</b>
Speed control of Stepper Motor using Microcontroller Interface Board		
<b>EXPERIMENT 8</b>		<b>4Hours</b>
Study and simulation of various pneumatic components using AUTOSIM software		
<b>EXPERIMENT 9</b>		<b>4Hours</b>
Assembly language programming of 8085 – Addition – Subtraction – Multiplication – Division.		
<b>EXPERIMENT 10</b>		<b>3Hours</b>
Study of hydraulic, pneumatic and electro-pneumatic circuits		
<b>EXPERIMENT 11</b>		<b>3Hours</b>
Study of hydraulic, pneumatic and electro-pneumatic circuits		
<b>EXPERIMENT 12</b>		<b>3Hours</b>
Run the stepper motor to forward and reverse rotation using 8051 Stepper motor interface		

**Total: 45Hrs**

SL.NO	NAME OF THE EQUIPMENT	QUANTITY
1.	Computer system	30 Nos
2.	CAM software	15 Nos
3.	CNC lathe	1 No
4.	CNC milling	1 No
5.	Laser printer	1 No
6.	Electro Pneumatic Kit	1 No
7.	Hydraulic Kit	1 No
8.	Autosim 200 Software	1 No
9.	8051 Microcontroller With Stepper Motor	1 No

**Reference(s)**

1. Automation, Production system & Computer Integrated manufacturing, M. P. Groover Person India, 2007 2nd edition.
2. Principles of Computer Integrated Manufacturing, S. Kant Vajpayee, Prentice Hall India.

*Course Objective*

**After successful completion of the Internship Training, the students should be able to**

- To acquire knowledge of the industry in which the internship is done.
- To apply knowledge and skills learned in the classroom in a work setting.
- To develop a greater understanding about career options while more clearly defining personal career goals.
- To experience the activities and functions of business professionals.
- To gain practical experience within the business environment.
- To Develop and refine oral and written communication skills.
- To identify areas for future knowledge and skill development.

**GUIDELINE FOR REVIEW AND EVALUATION**

The students may be grouped or single person work under a project in industry for minimum one month. The student's consultation with the HOD. The internship students prepare the report submitted to department at the end of training. The Committee constituted by the Head of the Department at the end of the semester examination.

**ASSESSMENT METHOD:**

- Pre-Internship Review
- College Acceptance Letter
- Industry Acceptance Letter
- Parents Acceptance Letter
- Intermediate -Internship Review
- Internship Time Verification
- Internship Experience Report
- Evaluations
- Final Presentation