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
Theory Course								
1902ME701	Automation in Manufacturing	3	0	0	3	40	60	100
	PC Elective III	3	0	0	3	40	60	100
	HSS Elective II	3	0	0	3	40	60	100
	HSS Elective III	3	0	0	3	40	60	100
	Open Elective II	3	0	0	3	40	60	100
1901MGX07	Universal Human Values and Ethics	3	0	0	3	40	60	100
Laboratory Course								
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

1902ME701	AUTOMATION IN MANUFACTURING	L	T	P	C
		3	0	0	3

MODULE 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 recalculating ball screw, working of 3 axis and 5 axis CNC machines

MODULE 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

MODULE 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.

MODULE IV	AUTOMATED MATERIAL HANDLING AND INSPECTION	9 Hours

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

MODULE 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

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Explain the role of automation in manufacturing and robotics industry.
CO2:	Develop CNC programs and apply in industry for manufacturing.
CO3:	Assess the Components of mechatronics system, Sensor
CO4:	Understand the concept automated guided vehicle and automated storage system in material handling, and inspection.
CO5:	Describe the group technology and flexible manufacturing techniques in the automated production line and manufacturing system.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	3	3	2									
CO3	3	3	3									
CO4	3	2	3	3								
CO5	3											

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1		2	
CO2		3	
CO3		3	
CO4	3	3	
CO5		3	

REFERENCES:

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, NewDelhi, 2008.
3. M. M. M . Sarcar, Computer Aided Design and Manufacturing , Prentice Hall of India, New Delhi, 2008.
4. HMT, Mechatronics, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi, 2010.

1903ME010	INDUSTRIAL ROBOTICS (PC ELECTIVE III)	L	T	P	C
		3	0	0	3

MODULE I	FUNDAMENTAL OF ROBOTICS	6 Hours

Robot -Definition -scope of industrial robot - Robotics and Automation - Law of robotics -Robot Anatomy - Co-ordinate Systems, Work Envelope, classification - Specifications - Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load - Need for Robots.

MODULE II	ROBOT DRIVE SYSTEM AND END EFFECTORS	9 Hours

Pneumatic Drives, Hydraulic Drive, Mechanical Drives and Electrical Drives. End Effectors – Grippers- Pneumatic gripper, Hydraulic Grippers, Magnetic Grippers, Vacuum Grippers, and Mechanical Grippers - Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers.

MODULE III	SENSORS AND MACHINE VISION SYSTEMS	12 Hours

Sensors - types - tactile sensors, proximity and range sensors, contact and non contact sensors, velocity sensors, touch and slip sensors, force and torque sensors. Robotic vision systems, imaging components, image representation, picture coding, object recognition and categorization, visual inspection.

MODULE IV	ROBOT KINEMATICS AND ROBOT PROGRAMMING	12 Hours

Forward Kinematics, Inverse Kinematics and Differences; Forward Kinematics and Reverse Kinematics of Manipulators with Two, Three Degrees of Freedom (In 2 Dimensional), Four Degrees of Freedom (In 3 Dimensional) – Derivations. Teach Pendant Programming, Lead through programming, Robot programming Languages - VAL Programming - Motion Commands, Sensor Commands, End effecter commands, and Simple programs.

MODULE V	IMPLEMENTATION AND APPLICATION	6 Hours

Implementation of Robots in Industries - Various Steps- Application of robots in machining - Welding - Assembly - Material handling - Loading and unloading - hostile and remote environments. Inspection and future application-safety, training, maintenance and quality.

TOTAL: 45 HOURS

FOR FURTHER READING – SEMINAR

Recent trends and developments in the field of robotics (Evolutionary robots, swarm robots, nano robots, micro robots, medical robots, space robots, wearable robots, intelligent robots, autonomous robots, medical robots, space robots, wearable robots, etc.)

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Explain the basics of robots.
CO2:	Make use of end effectors and actuators of robots.
CO3:	Experiment with sensors and machine vision system of robots.
CO4:	Prepare kinematics and programming of robots.
CO5:	Describe safety aspects and implementation of robot project, and applications of robots in industries and other fields.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1				2		3				1
CO2	3	2	1	3		3			3		3	1
CO3	3	2	1	3		3			3		3	1
CO4	3	2	1	3	2	3			3		3	1
CO5	2	1				2		3				1

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1		2	
CO2		3	
CO3		3	
CO4		3	
CO5		2	

REFERENCES:

1. M. P. Groover, Industrial Robotics Technology, Programming and Applications, Tata McGraw Hill Publishing Company Pvt. Ltd., New Delhi, 2001.
2. D. Richard, Klafter, A. Thomas, Chmielewski and Michael Negin, Robotics Engineering, An Integrated Approach, Prentice Hall of India, New Delhi, 2001.
3. K. S. Fu, R. C. Gonzalez and C. S. G. Lee, Robotics Control, Sensing, Vision and Intelligence, Tata McGraw Hill Publishing Company Pvt. Ltd., New Delhi, 2003
4. Yoram Koren, Robotics for Engineers, Tata McGraw Hill Publishing Company Pvt. Ltd., New Delhi, 2004.
5. Subir Kumar Saha, Introduction to Robotics, Tata McGraw Hill Publishing Company Pvt. Ltd., New Delhi, 2008.
6. http://nptel.ac.in/courses/112101099/ (Introduction to robotics)

1901HS002	INTELLECTUAL PROPERTY RIGHTS FOR ENGINEERS (HSS ELECTIVE II)	L	T	P	C
		3	0	0	3

MODULE I	INTRODUCTION	9 Hours

Overview of IP, Copyright, Trademarks, Geographical Indicators, Industrial Designs, Patents, Unfair competition, Enforcement of IP Rights, Emerging Issues in IP & IP Management.

MODULE II	COPYRIGHTS &TRADEMARKS	6 Hours

The concept, Case Study, Historical background, Principles, Notion of Work, Rights and Limitations, Formats & Filing Procedures.

MODULE III	GEOGRAPHICAL INDICATORS & INDUSTRIAL DESIGNS	6 Hours

The concept, Case Study, Historical background, Principles, Notion of Work, Rights and Limitations, Formats & Filing Procedures.

MODULE IV	PATENTS	15 Hours

The Macro-Economic Impact of the Patent System, The Patent Application Process, The Different Layers of the International Patent System and Regional Patent Protection Mechanisms, Kinds of Intellectual Property Protection Based on Types of Inventions, Legal Issues of the Patenting Process, Enforcement, New Issues, Important Cases and Discussions, IP and Development - Flexibilities and Public Domain under Patents, Patent Search.

MODULE V	PATENT COOPERATION TREATY	9 Hours

What is PCT? Use of PCT, Preparing a PCT Application, PCT Services, Patent Agent and Common Representatives, International Search, International Examination.

TOTAL: 45 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Identifying various types of IPRs specific to Engineering domain with its basics
CO2:	Concepts such as Copyrights, Trademarks, GIs and Industrial designs can be elaborately understood by the students
CO3:	Be familiar with the filling, examination, opposition and final report procedure for Copyrights, Trademarks, GIs and Industrial designs
CO4:	Concept of Patent Search followed by various methods to draft and file the patent in effective means can be achieved
CO5:	Develop a sample PCT Application and examination procedures for the grant of patents can be understood

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1							
CO2	3	2	2	1	1							
CO3	3	2	1	1	1							
CO4	3	2	1	1		1	2					
CO5	3	2	1	1		1	2					

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			
CO2			2
CO3			3
CO4			3
CO5			3

REFERENCES:

1. Law relating to IPR by Dr MK Bandarai, Central Law Publication, 2014
2. Introduction to Intellectual Property Rights, H.S. Chawla, Oxfors& IBH Publishing, 2020
3. Introduction to IPR by JP Mishra, Central Law Publications
4. https://patents.google.comIntroduction to IPR books

1901HS005	SOCIAL ENTREPRENEURSHIP (HSS ELECTIVE III)	L	T	P	C
		3	0	0	3

MODULE I	INTRODUCTION TO SOCIAL ENTREPRENEURSHIP	12 Hours

Social Entrepreneurship – Introduction to Donors Choose, Samasource, Aravind Eyecare, Transformative change, Starting with a Crazy Idea, Activity : Life Map, Identify Mission – Identify a social problem, Understand problem, Understand Customer, Activity : Passion Skill Problem.

MODULE II	CHANGE & SUSTAINABILITY	12 Hours

Understand a theory of change, Framework for measuring impact, Measurement approach, Impact approach for your own enterprise, Activity : Develop a theory of change; Sustainability – Planning for impact, Achieving financial sustainability, Building financial sustainability, Social Enterprises Revenue Engine, Activity : Solutions Map.

MODULE III	BRING AN IDEA TO SCALE	5 Hours

Think about Scale, Scaling impact, Tips to scale smart, Ways to scale, Activity : Build a launch plan, Reflection.

MODULE IV	LEAN STARTUP PRINCIPLES FOR SOCIAL SECTOR	8 Hours

Lean mindset, Lean startup principles, Build-Measure-Learn loop, Doing Lean, Lean Principles for Social Sector, Activity : Develop your value proposition, Hypothesis Generation.

MODULE V	BUSINESS MODELS FOR SOCIAL ENTERPRISE	8 Hours

Introduction to Business model canvas, Integrating Impact model and business model, Types of business models, Innovations in social entrepreneurship model, Activity : Business model canvas sprints.

TOTAL: 45 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Solve social problems with passion and skills for positive change
CO2:	Develop a theory of change, measure it, plan for financial sustainability, and build a revenue engine for social enterprise
CO3:	Learn smart scaling tips, explore strategies, and create a launch plan for sustainable growth. Reflect on your journey.
CO4:	Apply startup principles, develop a value proposition, and generate impactful hypotheses
CO5:	Explore Canvas, integrate impact, and innovate with social entrepreneurship models

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2					3		1				2
CO2	2					3		1				2
CO3	2					3	2	1				2
CO4	2					3		1				2
CO5	2					3		1				2

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			
CO2			
CO3			
CO4			
CO5			

REFERENCES:

1. Social Entrepreneur's Playbook: Pressure Test, Plan, Launch and Scale Your Social Enterprise Book by Ian C MacMillan and James D. Thompson
2. Social Entrepreneurship in India: Quarter Idealism and a Pound of Pragmatism Book by MadhukarShukla
3. Getting Beyond Better: How Social Entrepreneurship Works Book by Roger Martin and Sally R. Osberg
4. Lean Startups for Social Change: The Revolutionary Path to Big Impact Book by Michel Gelobter

1901MGX07	UNIVERSAL HUMAN VALUES & ETHICS	L	T	P	C
		3	0	0	3

MODULE I	COURSE INTRODUCTION - NEED, BASIC GUIDELINES, CONTENT AND PROCESS FOR VALUE EDUCATION	9 Hours

Understanding the need, basic guidelines, content and process for Value Education - Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration - Continuous Happiness and Prosperity- A look at basic Human Aspirations - Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority - Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario - Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

MODULE II	UNDERSTANDING HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF	9 Hours

Understanding human being as a co-existence of the sentient 'I' and the material 'Body' - Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha - Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) - Understanding the characteristics and activities of 'I' and harmony in 'I' - Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail - Programs to ensure Sanyam and Swasthya

MODULE III	UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY- HARMONY IN HUMAN-HUMAN RELATIONSHIP	9 Hours

Understanding harmony in the Family- the basic unit of human interaction - Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship - Understanding the meaning of Vishwas; Difference between intention and competence - Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha)- from family to world family!

MODULE IV	UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE – WHOLE EXISTENCE AS CO-EXISTENCE	9 Hours

Understanding the harmony in the Nature - Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space - Holistic perception of harmony at all levels of existence.

MODULE V	IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS	9 Hours

Natural acceptance of human values - Definitiveness of Ethical Human Conduct - Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order - Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, - b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models - Case studies of typical holistic technologies, management models and production systems - Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers - b) At the level of society: as mutually enriching institutions and organizations.

TOTAL: 45 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Understand the significance of value inputs in a classroom and start applying them in their life and profession.
CO2:	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
CO3:	Understand the value of harmonious relationship based on trust and respect in their life and profession.
CO4:	Understand the role of a human being in ensuring harmony in society and nature.
CO5:	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		1	2				2	3	1			
CO2								2				
CO3							2			3		
CO4		1	1				3	3				
CO5		1	3				2	1	3			

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1			
CO2	2		2
CO3			
CO4	2		
CO5	1		2

REFERENCES:

1. A Nagraj, 1998, JeevanVidyaEkParichay, Divya Path Sansthan, Amarkantak.
2. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
3. A N Tripathy, 2003, Human Values, New Age International Publishers.
4. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA

1902ME751	CAM & AUTOMATION LABORATORY	L	T	P	C
		0	0	2	1

List of Experiments:

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

TOTAL: 45 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Develop CNC program to produce non cylindrical components using CNC Milling machine.
CO2:	Develop CNC program to produce non cylindrical components with drilling operation using CNC Milling machine.
CO3:	Develop CNC program to produce cylindrical components using CNC turning machine.
CO4:	Execute the actuation of the cylinder in both Hydraulic and electro pneumatic circuits.
CO5:	Do the Design of mechatronic system with the help of Microprocessor.
CO6:	Execute the hydraulic and pneumatic circuit using Autosim 2.0 software.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1			3		3			2
CO2	3	2	3	1			3		3			2
CO3	3	2	3	1			3		3			2
CO4	3	2	3	1			3		3			2
CO5	3	2	3	1			3		3			2
CO6	3	2	3	1			3		3			2

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1		3	3
CO2		3	3
CO3		3	3
CO4		3	3
CO5		3	3
CO6		3	3

REFERENCES:

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.

1904GE751	LIFE SKILLS: COMPREHENSIVE VIVA	L	T	P	C
		2	0	0	2

ENGINEERING MECHANICS: Free-body diagrams and equilibrium; friction and its applications including rolling friction & wedge. trusses and frames; kinematics and dynamics of rigid bodies in plane motion; impulse and momentum (linear and angular).

STRENGTH OF MATERIALS: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; testing of materials with universal testing machine; testing of hardness and impact strength.

FLUID MECHANICS: Fluid properties; fluid statics, forces on submerged bodies, stability of floating bodies; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; flow through pipes, head losses in pipes, bends and fittings; basics of compressible fluid flow.

THERMODYNAMICS: Thermodynamic systems and processes; properties of pure substances, behavior of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

CASTING, FORMING AND JOINING PROCESSES: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

METROLOGY AND INSPECTION: Limits, fits and tolerances; linear and angular measurements; comparators; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly; concepts of coordinate-measuring machine (CMM).

THEORY OF MACHINES: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

ENGINEERING MATERIALS: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.

MACHINE DESIGN: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

COMPUTER INTEGRATED MANUFACTURING: Basic concepts of CAD/CAM and their integration tools; additive manufacturing.

TOTAL: 30 HOURS

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Ability to understand and comprehend any given problem related to mechanical engineering field.
CO2:	Define, explain, evaluate, and interpret the fundamental knowledge pertaining to the field of Mechanical Engineering

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3							2	3
CO2	3	3	3	3	3	3	2	2	3	2	3	3

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3

REFERENCES:

1. GATE : Mechanical Engineering – Study Guide Published by GK Publications.

1904ME752	INPLANT TRAINING / INTERNSHIP PRESENTATION	L	T	P	C
		0	0	0	1

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.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Know the safety measures, standards, policy practice in industry
CO2:	Identify the concepts for the own area of interest
CO3:	Realize the Experience of the real time working in the industry
CO4:	Compare the theoretical concepts in the industry
CO5:	Explain the various industrial equipment, machinery
CO6:	Make a real time product use of some tools

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	2	2	2	2	1	1	1	2	1
CO2	2	2	2	1	2	1	2	2	2	2	2	3
CO3	2	3	2	2	2	3	2	2	1	1	3	3
CO4	1	3	3	3	2	3	2	2	2	2	3	3
CO5	2	2	2	2	2	1	1	1	2	1	2	2
CO6	1	3	2	2	2	2	3	3	1	1	3	3

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	2	3	2
CO2	3	2	2
CO3	2	2	3
CO4	3	3	3
CO5	2	2	2
CO6	3	3	3