Final

DIPLOMA CURRICULUM OF MECHANICAL ENGINEERING (THIRD YEAR)
(6th Semester)

(To be implemented from 2026-27)

Prepared by;

National Institute of Technical Teachers' Training & Research Kolkata
Block – FC, Sector – III, Salt Lake City, Kolkata – 700106

Vetted by:
Domain experts from Polytechnics of Odisha

State Council for Technical Education & Vocational Training
Near Raj Bhawan, Unit-VIII, Bhubaneswar, Odisha

Table of Contents

	Contents	Page No.
1	Curriculum Structure for Third year (Semester VI)	3
2	Content details of Semester VI	4 - 32

PROGRAMME TITLE: MECHANICAL ENGINEERING

SEMESTER - VI

SL No	Category of Course	Code No	Course Title	Study Scheme				Evaluation Scheme				Total Marks	Credits
				Pre-requisite	Contact Hours/ week			Theory		Practical			
					L	T	P	End Exam	Progressive Assessment	End Exam	Progressive Assessment		
1	**Programme core**	MEPC30 2 TH:1	Automobile Engineering and Hybrid Vehicles		3	0	0	70	30	-	-	100	3
2		MEPC30 4 PR:1	Automobile Engineering and Hybrid Vehicles Lab		0	0	4	-	-	15	35	50	2
3	**Humanities and Social Science**	HS30 2 TH:2	Entrepreneurship and start ups		4	0	0	70	30	-	-	100	4
4	**Open Elective**	OE302 (Any one) TH:3	(A)Project Management (B)Disaster Management (C)Artificial Intelligence (D)Soft Computing Techniques		3	0	0	70	30	-	-	100	3
5		OE304 (Any one) TH:4	(A) Engg. Economics & Accountancy (B) IoT (C) Sustainable Development (D) Robotics		3	0	0	70	30	-	-	100	3
6	**Mandatory**	AU302 TH:5	INDIAN CONSTITUTION		2	0	0	0	0	0	0	0	0
7	**Major Project**	PR302 PR:2	MAJOR PROJECT		0	0	6	-	-	100	100	200	3
8	**Seminar**	SE302	SEMINAR		0	0	2	-	-	30	70	100	1
TOTAL					**15**	**0**	**12**	**280**	**120**	**135**	**205**	**750**	**19**

All Audit (mandatory) courses will have assessment, but will have no credit.

***The best of 2 IA conducted in a subject out of 20 marks to be considered. Assignment/ quiz etc. of 10 marks to be treated as part of IA. Besides this, Monthly Test to be conducted for each subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester. Club/Innovation/ Idea Tinkering Activities etc. shall be encouraged to be performed by students beyond the above stipulated hours.**

SEMESTER-VI

TH:1- Automobile Engineering and Hybrid Vehicles

L	T	P		
3	0	0		**Course Code: MEPC302**
Total Contact Hours				**Theory Assessment**
Theory		: 45Hrs		End Term Exam 70
			Total Marks: 100	Progressive Assessment 30
Pre Requisite		**: Nil**		
Credit		**3**		Category of Course : PC

RATIONALE: The course provides foundational knowledge of automobile engineering, focusing on engine components, vehicle systems, and hybrid technologies. It aims to equip students with the skills to understand, design, and maintain modern automotive systems, including emerging hybrid vehicle technologies.

LEARNING OUTCOMES:

After the completion of the course, the student shall be able to

- Describe basic automobile components and their functions.
- Learn about cooling, lubrication, fuel, and ignition systems.
- Explore transmission, steering, suspension, and braking systems.
- Explain hybrid vehicle technology and energy systems.
- Discuss future trends in vehicles, including electric and autonomous cars.

DETAILED COURSE CONTENTS

Unit	Topic/Subtopic	Hours
I	**Fundamentals of Automobiles:** Overview and classification of automobiles, Layout of an automobile and basic structure, IC engine components: Cylinder, piston, crankshaft, camshaft, connecting rod, valves, flywheel, Engine types and configurations (inline, V- type, etc.), Working principles: 4-stroke and 2-stroke petrol/diesel engines, Recent trends in engine design and light weighting	7
II	**Automobile Subsystems** (Cooling, Lubrication, Fuel & Ignition Systems): Cooling Systems: Necessity, types (air and water cooling). Thermo siphon and pump circulation, Lubrication Systems: Purpose, types (petrol and high-pressure), SAE rating of oils, Fuel Supply System: Fuel types, carburetors, fuel injection (SPFI, MPFI), pumps and filters, Ignition System: Battery ignition, magneto ignition, electronic ignition, Starting and Charging Systems: Battery types, starter motor, alternator, lighting system	8
III	**Transmission and Control Systems:** Clutch: Single plate, multi-plate, centrifugal clutches, Gearboxes: Sliding mesh, constant mesh, synchromesh, automatic transmission, Drive Systems: Propeller shaft, universal joints, differential, rear axle types, Steering System: Requirements, caster, camber, kingpin, Rack and pinion, power steering, Braking Systems: Disc and drum brakes, ABS (introductory), regenerative braking	8
	Suspension, Special Vehicles and Vehicle Body: Suspension: Leaf spring, coil spring, torsion bar, shock absorbers, independent	

IV	suspension, Vehicle Types: Passenger cars, commercial vehicles, off-road vehicles, Special Purpose Vehicles: Tractors, dumpers, excavators, graders, Vehicle Body and Safety: Chassis types, crash worthiness, airbags, crumple zones (basic intro)	6
V	**Introduction to Hybrid and Electric Vehicles**: Overview of Electric Vehicles (EVs): History, need, advantages, EV architecture, Hybrid Vehicles: Series, parallel, series- parallel hybrids, comparison with IC engine vehicles, Energy Storage Systems: Battery types (Lead Acid, Li-ion), battery management basics, Motors and Controllers: BLDC, induction motors, motor control fundamentals, Charging Infrastructure: On-board/off- board chargers, levels of charging, safety aspects, Modern Mobility Trends: Digital technologies, IoT in vehicles, SCADA in EVs	8
VI	**Policy, Sustainability and Future Trends**: Government Initiatives and Policies: FAME, Bharat EV policy overview, Environmental Impact: Emissions, sustainability, carbon footprint, Smart and Connected Vehicles: ADAS, IoT in mobility, connected vehicle concepts, Digital Twin, AI and Data analytic in Mobility Systems, Introduction to Autonomous Vehicles (brief overview)	8

REFERENCES:

1. Kirpal Singh – Automobile Engineering Vol I & II, Standard Publishers
2. R.B. Gupta – Automobile Engineering, Satya Prakashan
3. James E. Duffy – Modern Automotive Technology, Goodheart-Willcox Pub
4. Iqbal Husain – Electric and Hybrid Vehicles: Design Fundamentals, CRC Press
5. James Larminie and John Lowry – Electric Vehicle Technology Explained, Wiley
6. M.L. Mathur & R.P. Sharma – Internal Combustion Engines, Dhanpat Rai Publications
7. https://archive.nptel.ac.in/courses/107/106/107106088/

PR:1- Automobile Engineering and Hybrid Vehicles Lab

L	T	P		
0	0	4		**Course Code: MEPC304**
Total Contact Hours				**Practical Assessment**
Practical		: 60Hrs	**Total Marks: 50**	End Term Exam 15
				Progressive Assessment 35
Pre Requisite		**: Nil**		
Credit		**2**		Category of Course : PC

RATIONALE: This laboratory course introduces students to fundamental concepts in automobile engineering, with a specific focus on hybrid vehicle technologies. It provides hands-on experience in understanding the components, systems, and operations of both conventional and hybrid vehicles, promoting practical learning and industry relevance.

LEARNING OUTCOMES:

After the completion of the course, the student shall be able to

- Identify key components in both conventional and hybrid vehicle power trains.
- Demonstrate the working principles of cooling, lubrication, and fuel systems in automobiles.
- Compare different ignition, clutch, and braking systems.
- Apply basic testing and maintenance procedures to hybrid vehicle battery and power train systems.
- Explain the working principle of integration of electric and combustion systems in hybrid vehicles.

DETAILED COURSE CONTENTS

Sl. No.	List of Experiments
1.	Study and identification of various engine components (Cylinder block, Piston, Crankshaft, etc.).
2.	Study of the working and components of the cooling system (Air and Water cooling systems).
3.	Study of different types of lubrication systems and their functioning.
4.	Study and testing of fuel feed systems (Carburetors, Fuel Injection Systems).
5.	Study of ignition systems (Battery ignition, Magneto ignition, Electronic Ignition).
6.	Study of the working of various types of clutches (e.g. Single Plate, Multi-Plate, Centrifugal).
7.	Study and analysis of different types of gearboxes (e.g. Sliding Mesh, Constant Mesh).
8.	Study of the steering and suspension systems (e.g. Rack and Pinion, Power Steering, Shock Absorbers).
9.	Study of braking systems (e.g. Internal Expanding Brake, Disc Brakes).
10.	Study of hybrid vehicle systems and components (e.g. Battery Management Systems, Regenerative Braking).
11.	Performance testing of a conventional and hybrid vehicle.
12.	Study of electric vehicle drive systems (e.g. electric motors, controllers, battery packs).
13.	Study of the working and testing of a hybrid powertrain system.
14.	Testing and calibration of emission control systems in automobiles.

REFERENCES:

1. Kirpal Singh – Automobile Engineering Vol I & II, Standard Publishers
2. R.B. Gupta – Automobile Engineering, Satya Prakashan
3. James E. Duffy – Modern Automotive Technology, Goodheart-Willcox Pub
4. Iqbal Husain – Electric and Hybrid Vehicles: Design Fundamentals, CRC Press
5. James Larminie and John Lowry – Electric Vehicle Technology Explained, Wiley
6. M.L. Mathur & R.P. Sharma – Internal Combustion Engines, Dhanpat Rai Publications
7. https://archive.nptel.ac.in/courses/107/106/107106088/

TH:2-Entrepreneurship and start ups

L	T	P		
4	0	0		**Course Code: HS302**
Total Contact Hours				**Theory Assessment**
Theory		: 60Hrs		End Term Exam 70
			Total Marks: 100	Progressive Assessment 30
Pre Requisite		**: Nil**		
Credit		**4**		Category of Course : HSS

RATIONALE:

Entrepreneurship and Startups are introduced in curriculum to develop the entrepreneurship traits among the students before they enter into the professional life exposing themselves to and interacting with entrepreneurship and startup eco-system, student will develop and entrepreneurial mind set. It is important because they can help the students to develop the skills and knowledge needed to start and grow businesses and understand how to turn their ideas into successful ventures.

LEARNING OUTCOMES:

After the completion of the course, the student shall be able to

- Develop Entrepreneurial spirit and resourcefulness.
- Familiar with various uses of human resources for earning dignified means of living.
- Explain the concept and process of entrepreneurship - its contribution and role in the growth and development of individuals and the nation.
- Define entrepreneurial quality, competency, and motivation.
- Learn the process and skills of creation and management of entrepreneurial ventures.

DETAILED COURSE CONTENTS

Unit	Topic/Subtopic	Hours
I	Introduction to Entrepreneurship and Start- Ups: Definitions, Traits of an entrepreneur, Intrapreneurship, Motivation; Types of Business Structures, Similarities/differences between entrepreneurs and managers.	12
II	Business Ideas and their implementation: Discovering ideas and visualizing the business, Activity map, Business Plan.	08
III	Idea to Start-up: Market Analysis- Identifying the target market, Competition evaluation and Strategy Development, Marketing and accounting, Risk analysis.	10
IV	Management: Company's Organization Structure, Recruitment and management of talent, financial organization and management.	12
V	Financing and Protection of Ideas: Financing methods available for start-ups in India, Communication of Ideas to potential investors – Investor Pitch, Patenting and Licenses	10

VI	Exit strategies for entrepreneurs, bankruptcy, and succession and harvesting strategy.	8
Total		60

REFERENCES:

1. The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company, Steve Blank and Bob Dorf K & S Ranch, ISBN – 978-0984999392.

2. The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses, Eric Ries, Penguin UK, ISBN – 978-0670921607.

3. Demand: Creating What People Love Before They Know They Want It, Adrian J. Slywotzky with Karl Weber, Headline Book Publishing, ISBN – 978-0755388974.

4. The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business, Clayton M. Christensen, Harvard business ISBN: 978-142219602.

Websites:

1. https://www.fundable.com/learn/resources/guides/startup

2. https://corporatefinanceinstitute.com/resources/knowledge/finance/corporate-structure/

3. https://www.finder.com/small-business-finance-tips

4. https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/

TH:3(a)- PROJECT MANAGEMENT

L	T	P		
3	0	0		**Course Code: OE302(a)**
Total Contact Hours				**Theory Assessment**
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam : 70
Tutorial		: 0		Progressive Assessment : 30
Pre Requisite		**: Nil**		
Credit		**: 3**		Category of Course : OE

RATIONALE

The aim of this course is to develop the idea of project plan, from defining and confirming the project goals and objectives, identifying tasks and how to achieve the goals. The students will develop an understanding of key project management skills and strategies.

LEARNING OUTCOMES

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

5. List out the importance of projects and its phases.
6. Define projects from marketing, operational and financial perspectives.
7. Analyze projects based on discount and non-discount methods.
8. Construct network diagrams for planning and execution of a given project.
9. Apply crashing procedures for time and cost optimization.

DETAILED COURSE CONTENT

UNIT	TOPIC/SUB-TOPIC	HRS.
I.	**CONCEPT OF A PROJECT**: Classification of projects- importance of project management- The project life cycle- establishing project priorities (scope-cost-time) project priority matrix- work break down structure.	**9**
II.	**CAPITAL BUDGETING PROCESS:** Planning- Analysis-Selection-Financing-Implementation-Review. Generation and screening of project ideas- market and demand analysis- Demand forecasting techniques. Market planning and marketing research process- Technical analysis	**9**
III.	**FINANCIAL ESTIMATES AND PROJECTIONS:** Cost of projects-means of financing-estimates of sales and production-cost of production-working capital requirement and its financing-profitability projected cash flow statement and balance sheet. Break-even analysis.	**9**
IV.	**BASIC TECHNIQUES IN CAPITAL BUDGETING**:	**9**

	Non discounting and discounting methods- payback period- Accounting rate of return- net present value-Benefit cost ratio-internal rate of return. Project risk. Social cost benefit analysis and economic rate of return. Non-financial justification of projects**.**	
V.	**PROJECT ADMINISTRATION**: Progress payments, expenditure planning, project scheduling and network planning, use of Critical Path Method (CPM), schedule of payments and physical progress, time-cost trade off. Concepts and uses of PERT cost as a function of time, Project Evaluation and Review Techniques/cost mechanisms. Determination of least cost duration. Post project evaluation. Introduction to various Project management soft wares.	**9**

REFERENCES:

- Project planning, analysis, selection, implementation and review – Prasannachandra – Tata McGraw Hill
- Project Management – the Managerial Process – Clifford F. Gray & Erik W. Larson - McGraw Hill
- Project management - David I Cleland - Mcgraw Hill International Edition, 1999
- Project Management – Gopala krishnan – Mcmillan India Ltd.
- Project Management-Harry-Maylor-Peason Publication

TH:3(b)- DISASTER MANAGEMENT

L	T	P		
3	0	0		**Course Code: OE302(b)**
Total Contact Hours				**Theory Assessment**
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam : 70
Tutorial		: 0		Progressive Assessment : 30
Pre Requisite		**: Nil**		
Credit		**: 3**		Category of Course : OE

RATIONALE

Disasters can be caused by both natural and man-made factors. They cannot be anticipated, and once they do, they must be handled with maturity, subtlety, and responsibility. Numerous immediate decisions must be made, and relief efforts must be planned and managed. Thus this course provides to the civil engineers, a proper knowledge regarding the disasters along with how they affect the environment and living things.

LEARNING OUTCOMES

After completion of the course, the students will be able to

- Use of basic information on various types of disasters to control the disaster
- Take the precautions during various disasters
- Decide first action to be taken under various disasters
- Communicate with others in India which are dealing with disasters
- Select IT tools to help in disaster management

DETAILED COURSE CONTENT

UNIT NO.	CONTENT	TIME ALLOTTED (HOURS)
UNIT-I	**Understanding Disaster** • Understanding the Concepts and definitions of Disaster, Hazard, • Vulnerability, Risk, Capacity • Disaster and Development, and disaster management	**05**
UNIT-II	**Types, Trends, Causes, Consequences and Control of Disasters** • Geological Disasters (earthquakes, landslides, tsunami, • mining); Hydro-Meteorological Disasters (floods, • cyclones, lightning, thunder-storms, hail storms, • Avalanches, droughts, cold and heat waves) Biological (3rd yr)/First Draft/May, 2023. Disasters (epidemics, pest attacks, forest fire); • Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.	**10**

UNIT-III	**Disaster Management Cycle and Framework**	**10**
	• Disaster Management Cycle – Paradigm Shift in Disaster Management. • Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Microzonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness. • During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation – • Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Frame-work of Action	
UNIT-VI	**Disaster Management in India** • Disaster Profile of India – Mega Disasters of India and Lessons Learnt. • Disaster Management Act 2005 – Institutional and Financial Mechanism, • National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national),Non- Government and Inter Governmental Agencies	**10**
UNIT-V	**Applications of Science and Technology for Disaster Management** • Geo-informatics in Disaster Management (RS, GIS, GPS and RS). • Disaster Communication System (Early Warning and Its Dissemination). • Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non Structural Mitigation of Disasters • Institutions for Disaster Management in India	**10**
	TOTAL	**45**

REFERENCES:

- Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management
- Bhandani, R. K., An overview on natural & man-made disasters and their reduction, CSIR, New Delhi
- Srivastava, H. N., and Gupta G. D., Management of Natural Disasters in developing countries, Daya Publishers, Delhi
- 4. Alexander, David, Natural Disasters, Kluwer Academic London
- Ghosh, G. K., Disaster Management, A P H Publishing Corporation
- Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

TH:3(c)- ARTIFICIAL INTELLIGENCE

L	T	P		
3	0	0		**Course Code: OE302(c)**
Total Contact Hours				**Theory Assessment**
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam : 70
Tutorial		: 0		Progressive Assessment : 30
Pre Requisite		**: Nil**		
Credit		**: 3**		Category of Course : OE

RATIONALE:

Artificial Intelligence (AI) empowers machines to mimic human intelligence, enabling tasks such as decision-making, problem-solving, and learning. It drives innovation across industries, from healthcare to robotics, by automating complex processes and uncovering insights from data. Learning AI equips students with cutting-edge skills to build intelligent systems and shape the future of technology.

LEARNING OUTCOMES:

After completion of the course, the students will be able to

- Explain key concepts in Artificial Intelligence such as intelligent agents, search algorithms (uninformed, informed, local), and neural network architectures.
- Explain the principles of decision-making models, including Markov Decision Processes and reinforcement learning, and their applications in AI.
- Implement search algorithms, logic-based agents, and neural network architectures (feed forward, CNN, RNN) to solve AI-related problems.
- Analyze the performance of different neural network architectures and optimization techniques (e.g., gradient descent, Adam) to improve model accuracy and efficiency.
- Develop intelligent agents and neural network models for real-world applications, applying advanced learning techniques and optimization methods.

DETAILED COURSE CONTENT:

Unit No.	Topic/Sub-Topic	Allotted Time (Hours)
I	**Fundamentals of Artificial Intelligence:** Introduction: History and foundations of AI Intelligent Agents, Uninformed Search; informed Search; Local Search; Adversarial Search, Constraint Satisfaction Problems	6
II	**AI:** Logic, Planning, and Knowledge Representation, Logical Agents, First Order Logic and its Inference, Classical Planning, Knowledge Representation	6
III	**Bayesian Network:** Introduction to Probability, Conditional Probability, Conditional Independence, Bayesian Network, Representation Approximate Inference in Bayesian Networks, Learning in Bayesian Network.	6
IV	**Decision Making:** Decision Theory, Markov Decision Processes, Reinforcement Learning	6
V	**Neural Networks:** Neural Networks: Biological neurons vs. artificial neurons; History and development of neural networks, Neurons, weights, biases, Activation functions (Sigmoid, ReLU, Tanh, Softmax).	7
VI	**Neural Network Architectures:** Feedforward Neural Networks (Single-layer and	7

	multilayer architectures), Convolutional Neural Networks (CNNs, Filters, pooling, and feature maps), Recurrent Neural Networks (RNNs, Long Short-Term Memory (LSTM)), Learning and Training - Perceptron and its limitations; Multilayer perceptron (MLP) and Backpropagation; Overfitting and regularization	
VII	**Optimization Techniques:** Gradient Descent and its Variants (Stochastic Gradient Descent (SGD), Momentum-based optimization, Adam optimizer), Learning Rate and Convergence - Impact of learning rate on training.	7

REFERENCES:

1.	Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2nd Edition, Pearson/Prentice Hall, New Jersey, 2003.
2.	M.C. Trivedi, A Classical Approach to Artificial Intelligence, 1st Edition, Khanna Publishing House, New Delhi, 2018.
3.	V.K. Jain, Machine Learning, 1st Edition, Khanna Publishing House, New Delhi, 2018.
4.	Ethem Alpaydin, Introduction to Machine Learning, 2nd Edition, MIT Press, Cambridge, 2014.
5.	Vinod Chandra S.S. and Anand Hareendran S., Artificial Intelligence and Machine Learning, PHI Learning, New Delhi, 2014.

TH:3(d)- SOFT COMPUTING TECHNIQUES

L	T	P		
3	0	0		**Course Code: OE301/302/304**
Total Contact Hours				**Theory Assessment**
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam : 70
Tutorial		: 0		Progressive Assessment : 30
Pre Requisite		**: Nil**		
Credit		**: 3**		Category of Course : OE

RATIONALE:

The Soft Computing Techniques course is designed to equip with the knowledge and skills required to solve complex real-world problems using intelligent, flexible, and approximate reasoning methods. In contrast to traditional "hard computing" approaches that demand exact solutions, soft computing embraces uncertainty, imprecision, and partial truth-making it ideal for solving practical problems in engineering, data science, and decision-making.

LEARNING OUTCOMES:

After completion of the course, the students will be able to

- Explain the Core Concepts of soft computing, including its need, scope, and its difference from traditional hard computing.
- Design Basic Neural Networks for classification, prediction, and pattern recognition tasks.
- Design Fuzzy Inference Systems using fuzzy sets, membership functions, and fuzzy rules.
- Apply Defuzzification Methods to convert fuzzy outputs into actionable results.
- Apply Genetic Operators like selection, crossover, and mutation to solve optimization and search problems.
- Apply Hybrid Models in fields like control systems, image processing, and decision-making.

DETAILED COURSE CONTENT:

Unit No.	Topic/Sub-Topic	Allotted Time (Hours)
I	**Introduction to Soft Computing -** Overview of Soft Computing - Definition and importance of soft computing, Comparison between hard computing and soft computing, Applications of soft computing in various engineering fields, Components of Soft Computing - Introduction to Artificial Neural Networks (ANNs), Basics of Fuzzy Logic Systems (FLS), Overview of Genetic Algorithms (GAs).	8
II	**Artificial Neural Networks (ANNs) -** Fundamentals of ANNs, Biological inspiration and neural models, Types of activation functions, Architecture of neural networks: single-layer and multi-layer perceptrons, Learning Processes in ANNs - Supervised, unsupervised, and reinforcement learning, Backpropagation algorithm and its applications, Training, validation, and testing of neural networks, Applications of ANNs - Pattern recognition and classification, Function approximation and prediction, Case studies in engineering applications.	10
III	**Fuzzy Logic Systems (FLS) -** Introduction to Fuzzy Logic, Classical sets vs. fuzzy	10

	sets, Membership functions and their types, Fuzzy set operations, Fuzzy Rule-Based Systems - Linguistic variables and hedges, Formation of fuzzy if-then rules, Inference mechanisms and defuzzification techniques, Applications of Fuzzy Logic, Fuzzy control systems, Decision-making in uncertain environments, Engineering case studies utilizing fuzzy logic.	
IV	**Genetic Algorithms (GAs) -** Basics of Genetic Algorithms - Evolutionary principles and natural selection, Chromosome representation and initialization, Fitness functions and selection mechanisms, Genetic Operators - Crossover techniques and their significance, Mutation operations and rates, Elitism and generational replacement strategies, Applications of Genetic Algorithms, Optimization problems in engineering, Scheduling and routing problems, Real-world case studies employing GAs.	10
V	**Hybrid Systems and Applications -** Integration of Soft Computing Techniques, Concept of hybrid systems combining ANNs, FLS, and Gas, Neuro-fuzzy systems: architecture and learning, Genetic-fuzzy systems and their applications, Practical Implementations - Designing hybrid models for complex problem-solving, Simulation and analysis of hybrid systems, Case studies demonstrating the effectiveness of hybrid approaches.	7

REFERENCES:

1.	Soft Computing: Fundamentals and Applications by D. K. Pratihar
2.	Soft Computing and Its Applications by Rafik Aziz Aliev and Rashad Rafik Aliev
3.	Soft Computing: Integrating Evolutionary, Neural, and Fuzzy Systems by Tettamanzi Andrea G. B. and Tomassini Marco
4.	Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence by Jyh-Shing Roger Jang et al.
5.	Neural Network, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications by S. Rajasekaran and G. A. Vijayalakshmi Pai

TH:4(a)- ENGINEERING ECONOMICS AND ACCOUNTANCY

L	T	P		
3	0	0		**Course Code: OE304(a)**
Total Contact Hours				**Theory Assessment**
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam : 70
Tutorial		: 0		Progressive Assessment : 30
Pre Requisite		**: Nil**		
Credit		**: 3**		Category of Course : OE

RATIONALE

Engineering Economics and Accountancy plays crucial role in the economic aspects of engineering. This course ensures that the budding engineers to facilitate the process of economic decision making and also to acquaint knowledge on basic financial management aspects. Also, they will be able to develop the skills to analyze financial statements.

LEARNING OUTCOMES

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

- Identify various aspects of managerial economics
- Describe the mechanism of demand and supply
- Interpret various concepts of production and cost analysis
- Explain the different components of pricing
- Distinguish the details of financial accounting

DETAILED COURSE CONTENT

UNIT	TOPIC/SUB-TOPIC	ALLOTTED TIME (HRS.)
I.	**INTRODUCTION:** Managerial Economics; Relationship with other disciplines; Firms: Types, objectives and goals; Managerial decisions; Decision analysis.	**8**
II.	**DEMAND & SUPPLY ANALYSIS:** Demand; Types of demand; Determinants of demand; Demand function; Demand elasticity; Demand forecasting; Supply; Determinants of supply; Supply function; Supply elasticity.	**12**
III.	**PRODUCTION AND COST ANALYSIS:** Production function; Returns to scale; Production optimization; Least cost input; Isoquants; Managerial uses of production function; Cost Concepts; Cost function; Types of Cost; Determinants of cost; Short run and Long run cost curves; Cost Output Decision; Estimation of Cost.	**10**
IV.	**PRICING:**	**7**

	Determinants of Price; Pricing under different objectives and different market structures; Price discrimination; Pricing methods in practice; Role of Government in pricing control.	
V.	**FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):** Balance sheet and related concepts; Profit & Loss Statement and related concepts; Financial Ratio Analysis; Cash flow analysis; Funds flow analysis; Comparative financial statements; Analysis & Interpretation of financial statements; Investments; Risks and return evaluation of investment decision; Average rate of return; Payback Period; Net Present Value; Internal rate of return,	**8**

REFERENCES:

1. Premvir Kapoor, Sociology & Economics for Engineers, Khanna Publishing House, New Delhi, 2018
2. McGuigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
3. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition, 2005.
4. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
5. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi, 2007.
6. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson South Western, 4th Edition, 2001.

TH:4(b)- INTERNET OF THINGS

L	T	P		Course Code: OE304(b)	
3	0	0			
Total Contact Hours				**Theory Assessment**	
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam	: 70
Tutorial		: 0		Progressive Assessment	: 30
Pre Requisite		**: Nil**			
Credit		**: 3**		Category of Course : OE	

RATIONALE:

The Internet of Things (IoT) is revolutionizing the way devices communicate, interact, and function, creating a connected world that bridges physical and digital spaces. With industries embracing smart solutions in areas like healthcare, agriculture, manufacturing, transportation, and home automation, there is a growing demand for skilled professionals who can design, implement, and manage IoT systems.

LEARNING OUTCOMES:

After the completion of this course, the students will be able to

- Explain Core IoT Concepts, including architecture, components, and communication models.
- Identify IoT Ecosystem Elements, such as sensors, actuators, microcontrollers, communication protocols, and cloud platforms.
- Integrate identified Hardware Components like Arduino, Raspberry Pi, sensors, and actuators for IoT projects.
- Analyze Sensor Data from IoT devices.
- Identify Common Security Threats in IoT ecosystems, including data breaches, device hijacking, and network vulnerabilities.

DETAILED COURSE CONTENT:

Unit No.	Topic/Sub-Topic	Allotted Time (Hours)
I	**Introduction to Internet of Things (IoT) -** Overview of IoT - Definition and significance of IoT, Historical evolution and future prospects, Applications across various industries, IoT Architecture and Components, Basic architecture - sensors, actuators, connectivity, and data processing, Hardware components: microcontrollers (e.g., Arduino, Raspberry Pi), Software components: operating systems and middleware.	8
II	**Sensors, Actuators, and Data Acquisition:** Sensors and Actuators, Types of sensors: temperature, humidity, motion, etc., Actuators: motors, relays, and control	10
	mechanisms, Interfacing sensors and actuators with microcontrollers, Data	

	Acquisition and Processing - Analog and digital data acquisition methods, Signal conditioning and filtering techniques, Introduction to data processing and storage.	
III	**Communication Protocols and Networking -** IoT Communication Protocols, Overview of protocols: MQTT, CoAP, HTTP, etc., Wireless communication: Wi- Fi, Bluetooth, Zigbee, LoRaWAN., Wired communication: Ethernet, Serial communication, Networking Fundamentals - IP addressing and subnetting, Network topologies and architectures, Introduction to IPv6 and its relevance to IoT.	10
IV	**IoT Platforms and Cloud Integration -** IoT Platforms, Overview of popular IoT platforms (e.g., AWS IoT, Google Cloud IoT), Data analytics and visualization tools, Edge computing concepts, Cloud Computing for IoT, Introduction to cloud services: IaaS, PaaS, SaaS, Integration of IoT devices with cloud platforms, Data storage, processing, and management in the cloud.	10
V	**IoT Security and Privacy -** Security Challenges in IoT, Common vulnerabilities and threats, Authentication and authorization mechanisms, Data encryption and secure communication, Privacy Considerations - Data privacy laws and regulations, User consent and data ownership, Best practices for ensuring privacy in IoT applications.	7

REFERENCES:

1.	Internet of Things by Jeeva Jose
2.	Internet of Things by Raj Kamal
3.	Internet of Things (IoT) by Dr. Kamlesh Lakhwani, Dr. Hemant Kumar Gainey, Joseph Kofi Wireko, and Kamal Kant Hiran
4.	Internet of Things: From research and innovation to market deployment by Dr. Ovidiu Vermesan and Dr. Peter Friess
5.	The Internet of Things in the Cloud: A Middleware Perspective by Honbo Zhou
6.	Internet of Things: Architectures, Protocols and Standards by Simone Cirani, Gianluigi Ferrari, Marco Picone, and Luca Veltri
7.	Internet of Things (IoT): Concepts and Applications edited by Dr. Jamil Y. Khan and Dr. Mehmet R. Yuce

TH:4(c)- SUSTAINABLE DEVELOPMENT

L	T	P		
3	0	0		**Course Code: OE304(c)**
Total Contact Hours				**Theory Assessment**
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam : 70
Tutorial		: 0		Progressive Assessment : 30
Pre Requisite		**: Nil**		
Credit		**: 3**		Category of Course : OE

RATIONALE:

The aim of this course is to develop an action mindset for sustainable development by imparting knowledge on environmental, social and economic dimensions of sustainability and related principles.

LEARNING OUTCOMES:

After Completion of the course, student will be able to

- Explain current challenges to sustainability, including modern world social, environmental, and economic structures and crises.
- Identify the social environmental, and economic dimensions of sustainability in terms of UN Sustainable development goals
- Explain understanding of the social, economic and ecological linkage of Human well-being, production and consumption
- Discuss sustainability issues and solutions using a holistic approach that focuses on connections between complex human and natural systems.
- Integrate knowledge from multiple sources and perspectives to understand environmental limits governing human societies and economies and social justice dimensions of sustainability.

DETAILED COURSE CONTENT:

UNIT NO.	CONTENT	TIME ALLOTTED (HRS.)
I	**SUSTAINABILITY AND DEVELOPMENT CHALLEGES** Definition of sustainability – environmental, economical and social dimensions of sustainability – sustainable development models – strong and weak sustainability – defining development- millennium development goals – mindsets for sustainability: earthly, analytical, precautionary, action and collaborative– syndromes of global change: utilisation syndromes, development syndromes, and sink syndromes – core problems and cross cutting Issues of the 21 century – global, regional and local environmental issues – social insecurity – resource degradation –climate change – desertification.	**9**
II	**PRINCIPLES AND FRAME WORK** History and emergence of the concept of sustainable development – our common future – Stockholm to Rio plus 20– Rio Principles of sustainable development – Agenda 21 natural step- peoples earth charter – business charter for sustainable	**9**
	development –UN Global Compact – Role of civil society, business and government – United Nations' 2030 Agenda for sustainable development – 17	

	sustainable development goals and targets, indicators and intervention areas.	
III	**SUSTAINABLE DEVELOPMENT AND WELLBEING** The Unjust World and inequities – Quality of Life – Poverty, Population and Pollution – Combating Poverty – – Demographic dynamics of sustainability – Strategies to end Rural and Urban Poverty and Hunger – Sustainable Livelihood Framework- Health, Education and Empowerment of Women, Children, Youth, Indigenous People, Non-Governmental Organizations, Local Authorities and Industry for Prevention, Precaution , Preservation and Public participation.	**9**
IV	**SUSTAINABLE SOCIO-ECONOMIC SYSTEMS** Sustainable Development Goals and Linkage to Sustainable Consumption and Production – Investing in Natural Capital- Agriculture, Forests, Fisheries – Food security and nutrition and sustainable agriculture- Water and sanitation – Biodiversity conservation and Ecosystem integrity –Ecotourism – Sustainable Cities – Sustainable Habitats- Green Buildings – Sustainable Transportation — Sustainable Mining – Sustainable Energy– Climate Change –Mitigation and Adaptation – Safeguarding Marine Resources – Financial Resources and Mechanisms	**9**
V	**ASSESSING PROGRESS AND WAY FORWARD** Nature of sustainable development strategies and current practice- Sustainability in global, regional and national context –Approaches to measuring and analysing sustainability– limitations of GDP Ecological Footprint- Human Development Index- Human Development Report – National initiatives for Sustainable Development – Hurdles to Sustainability – Science and Technology for sustainable development –Performance indicators of sustainability and Assessment mechanism – Inclusive Green Growth and Green Economy – National Sustainable Development Strategy Planning and National Status of Sustainable Development Goals	**9**
		Total : 45

REFERENCE:

- Tom Theis and Jonathan Tomkin, Sustainability: A Comprehensive Foundation, Rice University, Houston, Texas, 2012
- A guide to SDG interactions: from science to implementation, International Council for Science, Paris,2017
- Karel Mulder, Sustainable Development for Engineers – A Handbook and Resource Guide, Rouledge Taylor and Francis, 2017.
- The New Global Frontier – Urbanization, Poverty and Environment in the 21st Century – George Martine, Gordon McGranahan,Mark Montgomery and Rogelio Fernández-Castilla, IIED and UNFPA, Earthscan, UK, 2008
- Nolberto Munier, Introduction to Sustainability: Road to a Better Future, Springer, 2006
- Barry Dalal Clayton and Stephen Bass, Sustainable Development Strategies- a resource book", Earthscan Publications Ltd, London, 2002.

TH:4(d)- ROBOTICS

L	T	P		
3	0	0		**Course Code: OE301/302/304**
Total Contact Hours				**Theory Assessment**
Theory		: 45 Hrs.	**Total Marks: 100**	End Term Exam : 70
Tutorial		: 0		Progressive Assessment : 30
Pre Requisite		**: Nil**		
Credit		**: 3**		Category of Course : OE

RATIONALE:

Robotics boosts skills that are the foundation of success, such as critical-thinking and problem-solving skills. When working on a robot, students are encouraged to use logic, engineering intuition, and critical thinking. Students can come up with problems in their everyday life that they think robots can fix. Allowing students to develop theories that can be tested in robotics projects will strengthen their ability to form hypotheses.

LEARNING OUTCOMES:

After the completion of the course, the students will be able to

- Explain basic concepts, parts of robots and types of robots.
- Describe drive systems for robot, sensors and programming of robots.
- Select the robots according to its usage.
- Apply robots with justification and implementation of project.
- Design automation applications of robots in various industries.

DETAILED COURSE CONTENT

Unit	Topic/Sub Topic	Hours
I	**Fundamentals of Robotics:** Introduction; Definition; Robot anatomy (parts) and its working; Robot Components: Manipulator, End effectors; Construction of links, Types of joints; Classification of robots; Cartesian, Cylindrical, Spherical, SCARA, Vertical articulated; Structural Characteristics of robots; Mechanical rigidity; Effects of structure on control work envelope and work Volume; Robot work Volumes, comparison; Advantages and disadvantages of robots.	**9**
II	**Robotic Drive System and Controller:** Actuators; Hydraulic, Pneumatic and Electrical drives; Linear actuator; Rotary drives; AC servo motor; DC servo motors and Stepper motors; Conversion between linear and rotary motion; Feedback devices; Potentiometers; Optical encoders; DC tachometers; Robot controller; Level of Controller; Open loop and Closed loop controller; Microprocessor based control system; Robot path control: Point to point, Continuous path control and Sensor based path control; Controller programming.	**9**
III	**Sensors:** Requirements of a sensor; Principles and Applications of the following types of sensors: Position sensors (Encoders, Resolvers, Piezo Electric); Range	**9**
	sensors (Triangulation Principle, Structured lighting approach); Proximity	

	sensing; Force and torque sensing. Introduction to Machine Vision: Robot vision system (scanning and digitizing image data); Image processing and analysis; Cameras (Acquisition of images); Videocon camera (Working principle & construction); Applications of Robot vision system: Inspection, Identification, Navigation & serving	
IV	**Robot kinematics and Robot Programming:** Forward Kinematics; Inverse Kinematics and Differences; Forward Kinematics and Reverse Kinematics of Manipulators with Two Degrees of Freedom (In 2 Dimensional); Deviations and Problems. Robot programming Languages; VAL Programming; Motion Commands; Sensor Commands; End effecter commands; and Simple programs	**9**
V	**Automation:** Basic elements of automated system, advanced automation functions, levels of automation. Industrial Applications: Application of robots in machining; welding; assembly and material handling	**9**

REFERENCES:

- Introduction to Robotics: Analysis, Systems, Applications – Saeed B. Niku
- Industrial Robotics: Technology, Programming and Applications – M.P. Groover
- Robotics Control, Sensing, Vision and Intelligence – Fu.K.S. Gonzalz.R.C and Lee C.S.G,
- Robotics for Engineers – Yoram Koren
- A Text book on Industrial Robotics – Ganesh S. Hedge
- Robotics Technology and Flexible Automation – S.R. Deb & Sankha Deb
- Elements of Robotics Process Automation, Mukherjee

TH:5- INDIAN CONSTITUTION

L	T	P		
2	0	0		**Course Code: AU302**
Total Contact Hours				**Theory Assessment**
Theory		: 30Hrs		End Term Exam 0
			Total Marks: 0	Progressive Assessment 0
Pre Requisite		**: Nil**		
Credit		**0**		Category of Course : Mandatory

RATIONALE:

This course will focus on the basic structure and operative dimensions of Indian Constitution. It will explore various aspects of the Indian political and legal system from a historical perspective highlighting the various events that led to the making of the Indian Constitution. The document lays down the framework demarcating the fundamental political code, structure, procedures, powers, and sets out fundamental rights, directive principles, and the duties of citizens. In this course, student will make an effort to understand the history of our constitution, the Constituent Assembly, the drafting of the constitution, the preamble of the constitution that defines the destination that we want to reach through our constitution, the fundamental right constitution guarantees through the great rights revolution, the relationship between fundamental rights and fundamental duties, the futurist goals of the constitution as incorporated in directive principles and the relationship between fundamental rights and directive principles.

LEARNING OUTCOMES:

After the completion of the course, the student shall be able to

- Explain the emergence and evolution of Indian Constitution.
- Define the structure and composition of Indian Constitution
- Describe and analyze federalism in the Indian context.
- Analyze the Panchayati Raj institutions as a medium of decentralization
- Evaluate the Indian Political scenario amidst the emerging challenges.

DETAILED COURSE CONTENTS

Unit	Topic/Subtopic	Hours
I	The Constitution – Introduction: The History of the Making of the Indian Constitution, Preamble and the Basic Structure, and its interpretation, Fundamental Rights and Duties and their interpretation, State Policy Principles.	08
II	Union Government: Structure of the Indian Union, President – Role and Power, Prime Minister and Council of Ministers, Lok Sabha and Rajya Sabha.	07
III	State Government: Governor – Role and Power, Chief Minister and Council of Ministers, State Secretariat.	05
IV	Local Administration: District Administration, Municipal Corporation, Zila Panchayat.	05

V	Election Commission: Role and Functioning, Chief Election Commissioner, State Election Commission	05

REFERENCES:

1. Ethics and Politics of the Indian Constitution, Rajeev Bhargava, Oxford University Press, New Delhi, 2008.

2. The Constitution of India, B.L. Fadia, Sahitya Bhawan; New edition (2017).

3. Introduction to the Constitution of India, DD Basu, Lexis Nexis; Twenty-Third 2018

edition. Websites:

1. https://www.constitution.org/cons/india/const.html

2. http://www.legislative.gov.in/constitution-of-india

3. https://www.sci.gov.in/constitution

4. https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/

PR:2- MAJOR PROJECT

L	T	P		
0	0	6		**Course Code: ARPC301**
Total Contact Hours				**Theory Assessment**
Theory		: 90Hrs	**Total Marks: 100**	End Term Exam : 100
				Progressive Assessment : 100
Pre Requisite		**: Nil**		
Credit		**: 6**		Category of Course : Project

RATIONALE:

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of MECHATRONICS and practices in real life situations, so as to participate and manage a large organization and projects, in future.
Entire Project shall spread over 5th and 6th Semester. Part of the Project covered in 5th Semester shall be named as Project Decertation-I and the balance portion to be covered in 6th Semester shall be named as Project Decertation-II.

LEARNING OUTCOMES:

After the completion of the course, the student shall be able to

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- Achieve real life experience in Project design.
- Develop the skill of writing Project Report

STUDENTS' ACTIVITY

Students will do their project work as guidance from their guide (faculty member).

Guidelines:
The individual students have different aptitudes and strengths and also areas of interest. Project work, therefore, should match the strengths and interest of the students. For this purpose, students

should be asked to identify the type of project work they would like to execute. The activity of problem identification should begin well in advance (right from beginning of 5th semester). Students should be allotted a problem of interest to him/her as a project work. It is also essential that the faculty of the respective departments may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be an individual assignment or a group assignment. Preferably there should not be more than 5 students if the project work is given to a group. The project work identified in collaboration with industry/organization should be preferred.

Project Phase-I and Phase-II

The Project work duration shall cover 2 semesters (5th and 6th semester). The Grouping of students, selection of Project, assignment of Project Guide to the Group shall be done in the beginning of 5th semester under Project Phase-I. The students may be allowed to study literature, any existing system and then define the Problem/objective of the Project. Requirements specification and Preliminary work of the system have to be completed in Phase-I. Project Milestones are to be set so that progress can be tracked. In Phase-II Detailed work, Documentation has to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alterations in the components of Task and schedule.

At the end of Project Phase-I in the 5th semester there shall be one presentation by each group to mark to progress and also to judge whether the Project is moving in right direction as per the objective of the Project.
A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in the table below:

Sl. No.	Performance Criteria	
1.	Selection of project assignment	
2.	Planning and execution of considerations	
3.	Quality of performance	
4.	Providing solution of the problems or production of final product	
5.	Sense of responsibility	
6.	Self-expression/ communication/ Presentation skills	
7.	Interpersonal skills/human relations	
8.	Report writing skills	
9	Viva voce	

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.
It is proposed that the institute should organize an annual exhibition of the project work done by the students and invite leading Industrial organizations of area of subject to such an exhibition.

ORGANIZATION OF PROJECT REPORT
1. Cover page:

It should contain the following (in order)

I. Title of the Project
II. "Submitted in partial fulfillment of the requirements for the Diploma in <Branch Name>"

III. By Name of the Student(s)
IV. Logo of the Institution
V. Branch Name/Depart Name and Institution Name with Address
VI. Academic Year

2. 1st Inner
page
Certificate:
It should contain he is following
“This is to certify that the work in this Project Report entitled <Project Title> by <Name of student(s)> has been carried out under my supervision in partial fulfillment of the requirements for the Diploma in <Branch Name>” during session <session > in <Branch /Department Name> of <Institute name> and this work is the original work of the above student(s).
Seal and signature of the Supervisor/Guide with date

3. 2nd Inner Page
Acknowledgement by the
Student(s)

4. Contents.

5. Chapter wise arrangement of Reports

6. Last Chapter:
Conclusion It should
contain
I. Conclusion
II. Limitations
III. Scope for further Improvement

7. References

SEMINAR

L	T	P		
0	0	2		**Course Code: SE302**
Total Contact Hours				**Practical Assessment**
Practical		: 30Hrs		End Term Exam 30
			Total Marks: 100	Progressive Assessment 70
Pre Requisite		**: Nil**		
Credit		**1**		Category of Course : Seminar

RATIONALE:

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of MECHATRONICS and practices in real life situations, so as to participate and manage a large organization and projects, in future. The work must be presented in front of the examiner's panel consisting of an approved external examiner, an internal examiner and a guide,co-guide etc. as decided by the Head of the Department.

LEARNING OUTCOMES:

After completion of the course the students will be able to

- Present and convince their work as a seminar in front of the examiners and engineering community
- Develop presentation skills
- create interaction among listeners
- Display experimental set up/ equipment/test rig
- Conduct experiments/tests on existing set ups/equipment and draw logical conclusions from the results after analyzing them
- Learn to appreciate your peers and give positive feedback.

Guidelines:

It is a continuation of Project work started in semester IV. He has to submit the report in prescribed format and also present a seminar. The dissertation should be presented in the standard format as provided by the department. The candidate has to prepare a detailed project report consisting of the introduction of the problem, problem statement, literature review, objectives of the work, methodology (experimental set up or numerical details as the case may be) of solution and results and discussion. The report must bring out the conclusions of the work and future scope for the study. The work has to be presented in front of the examiner's panel consisting of an approved external examiner, an internal examiner and a guide, co-guide etc. as decided by the Head of the Department. The candidate has to be in regular contact with his/her guide.