

VII SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	HSM03	<ol style="list-style-type: none"> 1. Entrepreneurship Development 2. Managing Innovation and Entrepreneurship 3. Knowledge Management 4. Hospital and Health Management 	3	0	0	3
2	PE-03	<ol style="list-style-type: none"> 1. Finite Element Methods 2. Advanced Materials 3. Non- Destructive Evaluation 4. Reliability Engineering 	3	0	0	3
3	PE04	<ol style="list-style-type: none"> 1. Mechanical Vibrations 2. Refrigeration and Air Conditioning 3. Advances in Welding technology 4. Production Planning Control 	3	0	0	3
4	PE05	<ol style="list-style-type: none"> 1. Automation in Manufacturing 2. Tribology 3. Material Handling Systems and Equipment 4. Total Quality Management 	3	0	0	3
5	OE-03	<ol style="list-style-type: none"> 1. Elements of Civil Engineering 2. Artificial Intelligence 3. Disaster Management 4. Optimization methods 	3	0	0	3
6	OE-04	<ol style="list-style-type: none"> 1. Product Design & Development 2. OOPS through JAVA 3. Project Management 4. Electrical & Hybrid Vehicles 	3	0	0	3
7	SKILL ORIENTED COURSE	Certification Course on Non-Destructive Evaluation Techniques.	1	0	2	2
8	PROJ- ME	Summer Internship 2 months (Mandatory) during summer vacation	0	0	0	3
		Total Credits				23

Category	CREDITS
Humanities and Social Science	3
Professional Elective courses	9
Open Elective courses	6
Skill Oriented Course	2
Summer Internship	3
TOTAL CREDITS	23

**IV B.Tech I Sem
(OPEN ELECTIVE)**

Course Code: 20SH7E01

Course Name: Entrepreneurship Development

L	T	P	C
3	0	0	3

Course objective:

The aim of this course is to develop and strengthen entrepreneurial quality and motivation among students. This course will impart the basic entrepreneurial skills and understandings to run a business efficiently and effectively.

Course outcomes: Upon completing this course, students are able to

CO1: To gain knowledge on Entrepreneurship and attain skills to become an entrepreneur.

CO2: To attain the competency of preparing business plans.

CO3: To get awareness on different financial institutions that support entrepreneurs.

CO4: To know the various financial sources in establishing a venture

CO5: To get awareness on various contemporary aspects of Social entrepreneurship.

UNIT - I: Entrepreneurship

Concept, knowledge and skills requirement; Types of entrepreneurs, characteristic of successful entrepreneurs; role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship.

UNIT-2: Business Plan & Marketing Plan

Business Plan: Meaning, Purpose and Contents of a Business Plan; Business Planning Process - Methods of generating business ideas, Creative problem solving, opportunity recognition.

Marketing Plan: Marketing Research – Need and Significance; Industry Analysis; Competitor Analysis; Marketing Mix; Market Segmentation, Target Markets, Market Positioning;

UNIT-3: Institutions supporting Entrepreneurs

A brief overview of financial institutions in India - Central level and state level institutions - SIDBI - NABARD - IDBI - SIDCO - Indian Institute of Entrepreneurship - DIC - Single Window - Latest Industrial Policy of Government of India.

UNIT-4: Financial Aspects of Entrepreneurship

Need and sources of finance, Venture capital, Nature and Overview; Locating venture capitalists; Venture capital process; Incubation centers.

UNIT-5: Social entrepreneurship

Rural entrepreneurship, MSME Policies. Make-In India, Start-Up India, Stand-Up India, Woman Entrepreneurship.

Text Books:

01. B. Janakiram, M. Rizwana, Entrepreneurship Development text & cases, ExcelBooks, New Delhi, 2011..
02. D. F Kuratko, T.V. Rao, Entrepreneurship – A south – Asian Perspective, Cengage Learning 2012.
03. Rajeev Roy, Entrepreneurship, Oxford University Press, 2010.
04. G. Shainesh Philip Kotler, Kevin lane Keller, Alexander Chernev, Jagdish N. Sheth, Marketing Management, 16th Edition, Pearson Education.
05. Michael E. Porter, Competitive Strategy: Techniques for Analyzing Industries and Competitors, Free Press; Illustrated edition
06. Richard Roberts, Finance for Small and Entrepreneurial Business, Routledge

Reference books:

01. S. S. Khanka, Entrepreneurial Development, S Chand & Company.
02. S A Kumar, S C Poornima, M K Abraham, K Jayshree, Entrepreneurship Development, New Age International Pvt Ltd
03. C. Paramasiva, T. Subramanian, Financial Management, New Age Publications

FACULTY

HOD

Programme: B. Tech. ME, SEMSTER-VII					
Course Code	Course Name	L	T	P	C
20ME7E03	Non- Destructive Evaluation	3	0	0	3
Subject Category : Engineering Science Course					

Course objective:

After completion of this course, students are able to

- Familiar with the concepts of various NDE techniques using radio graphy, ultra sonics, liquid penetrates, magnetic patches and Eddy currents
- Learn the basic principles of these methods and will be able to select a testing process
- understand the advantages and disadvantages of these techniques.

UNIT-I

Introduction to non-destructive testing: Radiographic test, Sources of X and Gamma Rays and their interaction with Matter, Radiographic equipment, Radiographic Techniques, Safety Aspects of Industrial Radiography

UNIT-II

Ultrasonic test: Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect, Ultrasonic Transducers and their Characteristics, Ultrasonic Equipment and Variables Affecting Ultrasonic Test, Ultrasonic Testing, Interpretations and Guidelines for Acceptance, Rejection - Effectiveness and Limitations of Ultrasonic Testing.

UNIT-III

Liquid Penetrant Test: Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing, Eddy Current Test: Principle of Eddy Current, Eddy Current Test System, Applications of Eddy Current Testing Effectiveness of Eddy Current Testing, Effectiveness of Eddy Current Testing

UNIT-IV

Magnetic Particle Test: Magnetic Materials, Magnetization of Materials, Demagnetization of Materials, Principle of Magnetic Particle Test, Magnetic Particle Test Equipment, Magnetic Particle Test Procedure, Standardization and Calibration, Interpretation and Evaluation, Effective Applications and Limitations of the Magnetic Particle Test

UNIT-V

Infrared And Thermal Testing: Introduction and fundamentals to infrared and thermal testing – Heat transfer – Active and passive techniques – Lock in and pulse thermography –

Contact and non contact thermal inspection methods–Heat sensitive paints –Heat sensitive papers –thermally quenched phosphors liquid crystals – techniques for applying liquid crystals –other temperature sensitive coatings –Inspection methods –Infrared radiation and infrared detectors–thermomechanical behavior of materials–IR imaging in aerospace applications, electronic components, Honey comb and sandwich structures–Case studies.

Industrial Applications of NDE: Span of NDE Activities Railways, Nuclear, Non-nuclear and Chemical Industries, Aircraft and Aerospace Industries, Automotive Industries, Offshore Gas and Petroleum Projects, Coal Mining Industry, NDE of pressure vessels, castings, welded constructions

Text Books:

1. Non-destructive test and evaluation of Materials/J Prasad, GCK Nair/TMH Publishers
2. Ultra sonic testing of materials/H Kraut Kramer /Springer
3. Non-destructive testing/Warren, JMcGonnagle/Godan and Breach Science publishers
4. Non-destructive evaluation of materials by infrared thermography / X. P. V. Maldague, Springer-Verlag, 1st edition, (1993)

References:

1. Ultrasonic inspection training for NDT/E.A. Gingel /Prometheus Press,
2. ASTM Standards, Vol 3.01, Metals and alloys
3. Non-destructive, HandBook–R. Hamchand

Programme: B. Tech. ME ,SEMSTER-VII					
Course Code	Course Name	L	T	P	C
20ME7E06	Refrigeration and Air Conditioning	3	0	0	3
Subject : Engineering Science Course Category					

Course Objective: To apply the principles of Thermodynamics to analyse different types of refrigeration and air conditioning systems and to understand the functionality of the major components.

UNIT – I:

Introduction to Refrigeration: - Necessity and applications – Unit of refrigeration and C.O.P. – Mechanical Refrigeration – Types of Ideal cycle of refrigeration.

Air Refrigeration: Bell Coleman cycle and Brayton Cycle, Open and Dense air systems – Actual air refrigeration system – Refrigeration needs of Aircrafts- Air systems – Actual Air refrigeration system – Refrigeration needs of Aircrafts – Application of Air Refrigeration, Justification – Types of systems – Problems.

UNIT – II:

Vapour compression refrigeration – working principle and essential components of the plant – Simple Vapour compression refrigeration cycle – COP – Representation of cycle on T-S and p-h charts – effect of sub cooling and super heating – cycle analysis – Actual cycle Influence of various parameters on system performance – Use of p-h charts – Problems.

UNIT III:

System Components: Compressors – General classification – comparison – Advantages and Disadvantages.

Condensers – classification – Working Principles, Evaporators – classification – Working Principles

Expansion devices – Types – Working Principles,

Refrigerants: Desirable properties – common refrigerants used – Nomenclature – Ozone Depletion – Global Warming – Azeotropes and Zeotropes

UNIT IV:

Vapor Absorption System – Calculation of max COP – description and working of NH₃ – water system – Li – Br system. Principle of operation Three Fluid absorption system, salient features.

Steam Jet Refrigeration System – Working Principle and Basic Components

Principle and operation of (i) Thermoelectric refrigerator (ii) Vortex tube or Hilsch tube.

UNIT – V:

Introduction to Air Conditioning:

Psychometric Properties & Processes – Sensible and latent heat loads – Characterization – Need for Ventilation, Consideration of Infiltration – Load concepts of RSHF, ASHF, ESHF and ADP.

Concept of human comfort and effective temperature – Comfort Air conditioning – Industrial air conditioning and Requirements – Air conditioning Load Calculations.

Air Conditioning systems - Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, deodorants, fans and blowers.

Heat Pump – Heat sources – different heat pump circuits – Applications.

TEXT BOOKS:

1. A Course in Refrigeration and Air conditioning - SC Arora & Domkundwar, Dhanpatrai Rai Publishers
2. Refrigeration and Air Conditioning - CP Arora, Tata McGraw Hill

REFERENCE BOOKS:

1. Refrigeration and Air Conditioning - Manohar Prasad, New Age
2. Principles of Refrigeration - Dossat, Pearson Education

Programme: B. Tech. ME ,SEMSTER-VII					
Course Code	Course Name	L	T	P	C
20ME7E09	Automation in Manufacturing	3	0	0	3
Subject Category : Engineering Science Course					

COURSE OBJECTIVES:

- Describe the basic concepts of automation in manufacturing systems.
- Acquire the fundamental concepts of automated flow lines and their analysis.
- Classify automated material handling, automated storage and retrieval systems.
- Illustrate adaptive control systems and automated inspection methods.

Course Outcomes: Upon completion of this course the student will be able to:

1. Illustrate the basic concepts of automation in machine tools.
2. Analyze various automated flow lines, Explain assembly systems and line balancing methods.
3. Describe the importance of automated material handling and storage systems.
4. Interpret the importance of adaptive control systems, automated inspection systems. Pre-Requisites: Machine Tools, Cad/ Cam

UNIT- I

INTRODUCTION: Single-Station Manufacturing Cells, types and strategies of automation, Automation in machine tools, automation principles, Mechanical feeding and tool changing, machine tool control, elements in product realization.

AUTOMATED FLOW LINES: Methods of work part transport, transfer mechanisms, buffer storage, control function, Design and fabrication consideration.

UNIT- II

ANALYSIS OF AUTOMATED FLOW LINES: General terminology, analysis of transfer lines with and without buffer storage, partial automation, implementation of automated flow lines.

ASSEMBLY SYSTEMS AND LINE BALANCING: Assembly process, Manual Assembly Lines, Line balancing methods, ways for improving line balance, flexible assembly lines.

UNIT- III

AUTOMATED MATERIAL HANDLING: Types of equipment, functions, analysis and design of material handling systems conveyor systems, automated guided vehicle systems. **AUTOMATED STORAGE SYSTEMS:** Automated storage and retrieval systems work in process storage, interfacing and line and storage with manufacturing.

UNIT - IV

ADAPTIVE CONTROL SYSTEMS: Introduction – Adaptive control with optimization, Adaptive control with constraints, Application of Adaptive control in Machining operations. Uses of various parameters such as cutting force, Temperature, vibration and acoustic emission Adaptive control.

UNIT - V

AUTOMATED INSPECTION: Fundamentals, types of inspection methods and equipment, CMM, Types, methods of CMM control, Machine vision- Introduction, image acquisition, and image processing applications of machine vision. Learning Resources

Text Book:

1. Automation, Production Systems and Computer Integrated Manufacturing: M.P. Groover./PE/PHI
2. Computer Control of Manufacturing Systems: Yoram Coren.

Reference Books:

1. CAD/CAM/CIM, (2 nd Edition),by Radhakrishnan and Subramanian, NewAge Publications,
2. CAD / CAM/ CIM by Radhakrishnan.
3. Automation by W. Buekinsham.



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Programme: Civil Engineering			Semester:			
Course Code	Course Name	L	T	P	C	
20CEOE02	ELEMENTS OF CIVIL ENGINEERING	2	0	2	3	
Subject Category : OEC						

Course Objectives:

COURSE CODE	COURSE OUTCOME	BLOOMS TAXONOMY
CO.1	Basics of Civil Engineering concepts	Understand
CO.2	The surveying the elevations and mapping	Understand
CO.3	The construction materials and elements	Understand
CO.4	Travel and Traffic management	Apply
CO.5	Water resource development	Apply
CO.6	Overall infrastructure development	Apply

UNIT-I

Scope of Civil Engineering

Surveying: Surveying and leveling, Object and uses, Primary divisions, Fundamental principles, Classification of surveying, Plans and maps, Scales, Units of measure.

UNIT-II

Compass surveying : Types and uses of compass, Bearings, Whole Circle Bearings, and Reduced Bearings, Levelling, object and uses. **Modern Tools of Surveying :-** Introduction of Total Station, Global Positioning System, Remote Sensing and Geographic Information System.

UNIT-III:

Construction Materials : Importance of Civil Engineering materials like Stone, Bricks, Lime, Cement, Metals, Timber, Sand, Aggregate, Mortar and Concrete, Paints and Varnishes,.

UNIT-IV

Elements of Building Construction

Planning: Basic requirements of a building planning, layout of residential & industrial buildings.

Construction: Classification of buildings, components, their functions, and nominal dimensions.

KITS

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building byelaws.

UNIT-V

Water Resources Development : Elementary Hydrology, Sources of water, Watershed Development, water requirements and its conservation, Hydraulic Structures of Storage.

Text books:

1. Surveying Vol. I & II, Dr. B. C. Punamia Laxmi Publication, Delhi
2. Building Construction, Dr. B. C. Punamia Laxmi Publication, Delhi
3. Engineering Material, Dr. S.C. Rangwal, Charotar Pub. House
4. Irrigation Engineering and Hydraulic Structures, Santoshkumar Garg, : Khanna Publishers Delhi
5. Civil Engineering Material, Jakson and Dhir, ELBS Publishing London
6. Civil Engg. Drawing, S. C. Rangwal, Charotar Pub. House Anand
7. Elements of Civil Engineering (IV Edition) by S.S. Bhavikatti, New Age International

course coordinator
A. Basu

vpr
H.O.D

Programme: EEE Semester:					
Course Code	Course Name	L	T	P	C
19EE3T0	HYBRID ELECTRIC VEHICLES	3	0	0	3
Subject Category : Programme Core Course					

COURSE OUTCOMES:

After successful completion of this course, students should be able to

- CO1 : Know the concept of electric vehicles
CO2 : Know the concept of hybrid electric vehicle
CO3 : Familiar with different configuration of hybrid electric vehicles
CO4 : Understand the power converters used in hybrid electric vehicles
CO5 : Know different batteries and other energy storage systems.

SYLLABUS

UNIT-I : Introduction

Introduction to Conventional vehicle-Longitudinal Vehicle Model; Concept of electric vehicle and hybrid electric vehicle; History of hybrid vehicles, advantages and applications of Electric and Hybrid Electric Vehicles, different Motors suitable for of Electric and Hybrid Electric Vehicles.

UNIT-II : Hybridization of Automobile

Architectures of HEVs, series and parallel HEVs, complex HEVs. Plug-in hybrid vehicle, constituents of PHEV, comparison of HEV and PHEV; Introduction to fuel cell vehicles

UNIT-III : Plug-in Hybrid Electric Vehicle

Functions and Benefits of PHEV, Components of PHEVs, PHEV Architectures, Operating Principles of Plug-in Hybrid Vehicle; Fuel economy of PHEVs, power management of PHEVs, PHEV-Related Technologies and Challenges- PHEV Batteries, PHEV Costs, Charging of PHEV

UNIT-IV : Power Electronics in HEVs

Rectifiers used in HEVs-single-phase full-wave bridge rectifier- electrical circuit, operation, wave forms, derivation of output voltage, single-phase inverter, electrical circuit, operation, DC-DC Converter use in modern electrified vehicle

UNIT-V : Battery and Storage Systems

Energy Storage Requirements for Electrified Vehicles; Electrochemical Cells- Lead-Acid, Ultra capacitor cells; Flywheels - Superconducting Magnetic Storage System; Compressed Air Hydraulics-Based Storage System

TEXTBOOKS:

1. Ali Emadi, Advanced Electric Drive Vehicles, CRC Press, 2014.
2. Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003.

REFERENCE BOOKS:

1. MehrdadEhsani, YimiGao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004.
2. James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003.
3. H. Partab: Modern Electric Traction - DhanpatRai& Co, 2007.
4. Pistora G., "Power Sources , Models, Sustainability, Infrastructure and the market", Elsevier 2008
5. Mi Chris, Masrur A., and Gao D.W., "Hybrid Electric Vehicle: Principles and Applications with Practical Perspectives" 1995.