VELTECH HIGH TECH

Dr RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

(Owned by Vel Trust 1997)

(An ISO 9001: 2008 Certified Institution)

Accredited By NAAC with 'A' Grade and NBA Accredited Institution

(Approved by AICTE New Delhi and Govt. of Tamil Nadu, Affiliated to Anna University Chennai)

SYLLABUS

WEEKLY SCHEDULE

VII SEMESTER 2017 - 2018

DEPARTMENT OF MECHANICAL ENGINEERING

IV YEAR DEGREE COURSE

#42, Avadi – Vel Tech Road,
Avadi
Chennai – 600062
Telefax – 044-26840181
E-mail: veltech@vsnl.com
Website : www.velhightech.com

Vision of the Institute

Elevating Well Being of Humanity by Augmenting Human Resource Potential Through Quality Technical Education and Training

Mission of the Institute

To effectuate supremacy in technical education through articulation of research and industry practices for social relevance. To inculcate the habit of lifelong learning To exhibit professional ethics, commitment and leadership qualities

Vision of the Department

To become a centre of eminence in educating students to become triumphant mechanical engineers.

Mission of the Department

- To endue the students with the fundamentals of mechanical engineering with a passion for lifelong learning of industry practices
- To propagate lifelong learning.
- To impart the right proportion of knowledge blended with attitude and ethics in students to enable them take up positions of responsibility in the society and make significant contributions.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. Preparation and Breadth: Graduates will apply their knowledge and skills, to solve the problems in the field of Mechanical Engineering occurring in industries and transportation.

2. Expertise: Graduates of the programme will find employment as Mechanical engineers in engineering and business or will be admitted for higher studies.

3. Professionalism: Graduates of the programme will solve problem with professionalism.

4. Lifelong Learning: Graduates will be taught and exposed to the emerging technologies to cope up with technological obsolescence

PROGRAM OUTCOME (POs)

Engineering Graduates will be able to:

1**. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	**WEEK1**	**24.06.17**	**24.06.17**
2	**WEEK2**	**27.06.17**	**01.07.17**
3	**WEEK3**	**03.07.17**	**08.07.17**
4	**WEEK4**	**10.07.17**	**15.07.17**
5	**WEEK5**	**17.07.17**	**22.07.17**
6	**WEEK6**	**24.07.17**	**29.07.17**
7	**WEEK7**	**31.07.17**	**05.08.17**
8	**WEEK8**	**07.08.17**	**12.08.17**
9	**WEEK9**	**16.08.17**	**19.08.17**
10	**WEEK10**	**21.08.17**	**26.08.17**
11	**WEEK11**	**28.08.17**	**02.09.17**
12	**WEEK12**	**04.09.17**	**09.09.17**
13	**WEEK13**	**11.09.17**	**16.09.17**
14	**WEEK14**	**18.09.17**	**23.09.17**
15	**WEEK15**	**25.09.17**	**30.10.17**
16	**WEEK16**	**03.10.17**	**07.10.17**
17	**WEEK17**	**09.10.17**	**14.10.17**

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	ME6701	Power Plant Engineering
2	ME6702	Mechatronics
3	ME6703	Computer Integrated Manufacturing
4	GE6757	Total Quality Management
5	ME6005 / ME6008 (Elective -II)	Process Planning and Cost Estimation / Welding Technology
6	GE6081/ ME6012 (Elective-III)	Fundamentals of Nano science / Maintenance Engineering
PRACTICAL		
7	ME6711	Simulation and Analysis Laboratory
8	ME6712	Mechatronics Lab

TEST / EXAM SCHEDULE

SL. NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	Pre Model Exam	UNIT TEST IV
1	ME6701	Power Plant Engineering	13.07.17 (FN)	27.07.17 (FN)	16.08.17	07.09.17 (FN)
2	ME6702	Mechatronics	13.07.17 (AN)	27.07.17 (AN)	17.08.17	07.09.17 (AN)
3	ME6703	Computer Integrated Manufacturing	14.07.17 (FN)	28.07.17 (FN)	18.08.17	08.09.17 (FN)
4	GE6757	Total Quality Management	14.07.17 (AN)	28.07.17 (AN)	19.08.17	08.09.17 (AN)
5	GE6081/ ME6008	Fundamentals of Nano science/ Welding Technology	15.07.17 (FN)	29.07.17 (FN)	21.08.17	09.09.17 (FN)
6	ME6005 /ME6012	Process Planning and Cost Estimation / Maintenance Engineering	15.07.17 (AN)	29.07.17 (AN)	22.08.17	09.09.17 (AN)

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	ME6701	Power Plant Engineering	28.09.17
2	ME6702	Mechatronics	04.10.17
3	ME6703	Computer Integrated Manufacturing	06.10.17
4	GE6081/ ME6008	Fundamentals of Nano science/ Welding Technology	09.10.17
5	GE6081/ ME6008	Fundamentals of Nano science/ Welding Technology	11.10.17
6	ME6005 /ME6012	Process Planning and Cost Estimation / Maintenance Engineering	13.10.17

ME6701 POWER PLANT ENGINEERING

WEEK: 1 –

UNIT I COAL BASED THERMAL POWER PLANTS

Rankine cycle - improvisations, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers

WEEK: 2

Turbines, Condensers, Steam & Heat rate Subsystems of thermal power plants, Fuel and ash handling,

WEEK: 3

Draught system, Feed water treatment. Binary Cycles and Cogeneration systems.

WEEK: 4 UNIT TEST-I

UNIT II DIESEL, GAS TURBINE AND COMBINED CYCLE POWER PLANTS

Otto, Diesel, Dual & Brayton Cycle - Analysis &
Optimisation, **WEEK: 5**

Components of Diesel and Gas Turbine power plants, Combined Cycle Power Plants.

WEEK: 6

Integrated Gasifier based Combined Cycle systems

UNIT TEST-II

WEEK: 7

UNIT III NUCLEAR POWER PLANTS

Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors : Boiling Water Reactor (BWR)

WEEK: 8

Pressurized Water Reactor (PWR), CANADA Deuterium-
Uranium reactor (CANDU), Breeder, Gas Cooled and Liquid Metal Cooled Reactors. Safety measures for Nuclear Power plants.

WEEK: 9 PREMODEL EXAM

WEEK: 10 UNIT IV POWER FROM RENEWABLE ENERGY

Hydro Electric Power Plants – Classification, Typical Layout and associated components including Turbines.)

WEEK: 11

Principle, Construction and working of Wind, Tidal, Solar Photo Voltaic (SPV

WEEK: 12

Principle, Construction and working of Solar Thermal, Geo Thermal, Biogas and Fuel Cell power systems.

UNIT TEST-IV

WEEK 13

UNIT V ENERGY, ECONOMIC AND ENVIRONMENTAL ISSUES OF POWER PLANTS

Power tariff types, Load distribution parameters, load curve,
Comparison of site selection criteria, relative merits & demerits,

WEEK 14

Capital & Operating Cost of different power plants. Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants

WEEK- 15- REVISON CLASS

WEEK- 16- MODEL EXAM

WEEK -17- MODEL EXAM

TEXT BOOK:

1. Nag. P.K., "Power Plant Engineering", Third Edition, Tata McGraw – Hill Publishing Company Ltd., 2008.

REFERENCES:

1. El-Wakil. M.M., "Power Plant Technology", Tata McGraw – Hill Publishing Company Ltd., 2010.
2. Black & Veatch, Springer, "Power Plant Engineering", 1996.
3. Thomas C. Elliott, Kao Chen and Robert C. Swanekamp, "Power Plant Engineering", Second Edition, Standard Handbook of McGraw – Hill, 1998.
4. Godfrey Boyle, "Renewable energy", Open University, Oxford University Press in association with the Open University, 2004

ME6702 MECHATRONICS

WEEK: I

UNIT I INTRODUCTION

Introduction to Mechatronics – Systems – Concepts of Mechatronics approach – Need for Mechatronics – Emerging areas of Mechatronics

WEEK: 2

Classification of Mechatronics. Sensors and Transducers: Static and dynamic Characteristics of Sensor, Potentiometers – LVDT

WEEK: 3

Capacitance sensors – Strain gauges – Eddy current sensor – Hall effect sensor – Temperature sensors – Light sensors

WEEK: 4 UNIT TEST-I

UNIT II 8085 MICROPROCESSOR AND 8051 MICROCONTROLLER

Introduction – Architecture of 8085 – Pin Configuration

WEEK: 5

Addressing Modes –Instruction setTiming diagram of 8085

WEEK: 6

Concepts of 8051 microcontroller – Block diagram.

UNIT TEST-II

WEEK: 7

UNIT III PROGRAMMABLE PERIPHERAL INTERFACE

Introduction – Architecture of 8255, Keyboard interfacing, LED display

WEEK 8

Interfacing, ADC and DAC interface, Temperature Control Stepper Motor Control – Traffic Control interface

WEEK: 9 PREMODEL EXAM

WEEK: 10

UNIT IV

PROGRAMMABLE LOGIC CONTROLLER Programmable Logic Controllers – Basic Structure – Input / Output Processing- Introduction –

WEEK: 11

Basic structure – Input and output processing.

WEEK: 12

Programming – Mnemonics- Timers, counters and internal relays – Data handling – Selection of PLC.

UNIT TEST IV

WEEK: 13

UNIT V ACTUATORS AND MECHATRONIC SYSTEM DESIGN

Types of Stepper and Servo motors – Construction – Working Principle – Advantages and Disadvantages. Design process-stages of design process – Traditional and Mechatronics design concepts

WEEK: 14

Case studies of Mechatronics systems – Pick and place Robot – Engine Management system – Automatic car park barrier

WEEK: 15 REVISION CLASS
WEEK-16- MODEL EXAM
WEEK-17- MODEL EXAM

TEXT BOOKS:

1 Bolton, "Mechatronics", Printice Hall, 2008
2. Ramesh S Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085", 5th Edition, Prentice Hall, 2008.

REFERENCES:

1.Michael B.Histand and Davis G.Alciatore, "Introduction to Mechatronics and Measurement systems", McGraw Hill International edition, 2007.
2. Bradley D.A, Dawson D, Buru N.C and Loader A.J, "Mechatronics", Chapman and Hall, 1993.
3. Smaili.A and Mrad.F , "Mechatronics Integrated Technologies for Intelligent Machines", Oxford University Press, 2007.
4. Devadas Shetty and Richard A. Kolk, "Mechatronics Systems Design", PWS publishing company, 2007.
5. Krishna Kant, "Microprocessors & Microcontrollers", Prentice Hall of India, 2007.
6. Clarence W, de Silva, "Mechatronics" CRC Press, First Indian Re-print, 2013

ME6703 COMPUTER INTEGRATED MANUFACTURING

WEEK 1

UNIT I INTRODUCTION

Brief introduction to CAD and CAM – Manufacturing Planning, Manufacturing control- Introduction to CAD/CAM – Concurrent Engineering-CIM concepts – Computerised elements of CIM system

WEEK 2

Types of production - Manufacturing models and Metrics – Mathematical models of Production Performance – Simple problems – Manufacturing Control – Simple Problems

WEEK 3

Basic Elements of an Automated system – Levels of Automation – Lean Production and Just-In-Time Production

WEEK 4 UNIT TEST-I

UNIT II PRODUCTION PLANNING AND CONTROL AND COMPUTERISED PROCESS PLANNING

Process planning – Computer Aided Process Planning (CAPP) – Logical steps in Computer Aided Process Planning – Aggregate.

WEEK 5

Production Planning and the Master Production Schedule – Material Requirement planning - Capacity Planning- Control Systems-Shop Floor Control.

WEEK 6

Inventory Control – Brief on Manufacturing Resource Planning-II (MRP-II) & Enterprise Resource Planning (ERP) - Simple Problems

UNIT TEST II

WEEK 7

UNIT III CELLULAR MANUFACTURING

Group Technology(GT), Part Families – Parts Classification and coding – Simple Problems in Opitz Part Coding system Production flow Analysis – Cellular Manufacturing – Composite part concept

WEEK 8

– Machine cell design and layout – Quantitative analysis in Cellular Manufacturing Rank Order Clustering Method - Arranging Machines in a GT cell – Hollier Method – Simple Problems

WEEK 9 PREMODEL

WEEK 10

UNIT IV FLEXIBLE MANUFACTURING SYSTEM (FMS) AND AUTOMATEDB GUIDED VEHICLE SYSTEM (AGVS)

Types of Flexibility - FMS – FMS Components – FMS Application & Benefits –

WEEK 11

. FMS Planning and Control Quantitative analysis in FMS – Simple Problems

WEEK 12

Automated Guided Vehicle System (AGVS). AGVS Application – Vehicle Guidance technology – Vehicle Management & Safety

UNIT TEST-IV

WEEK 13

UNIT V INDUSTRIAL ROBOTICS

Robot Anatomy and Related Attributes – Classification of Robots- Robot Control systems – End Effectors – Sensors in Robotics

WEEK 14

Robot Accuracy and Repeatability - Industrial Robot Applications – Robot Part Programming – Robot Accuracy and Repeatability – Simple Problems

WEEK 15- REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXT BOOK:

1. Mikell.P.Groover "Automation, Production Systems and Computer Integrated Manufacturing", Prentice Hall of India, 2008.
2. Radhakrishnan P, Subramanyan S.and Raju V., "CAD/CAM/CIM", 2nd Edition, New Age International (P) Ltd, New Delhi, 2000.

REFERENCES:

1. Kant Vajpayee S, "Principles of Computer Integrated Manufacturing", Prentice Hall India, 2003.
2. Gideon Halevi and Roland Weill, "Principles of Process Planning – A Logical Approach" Chapman & Hall, London, 1995.
3. Rao. P, N Tewari &T.K. Kundra, "Computer Aided Manufacturing", Tata McGraw Hill Publishing Company, 2000.

GE6757 TOTAL QUALITY MANAGEMENT

WEEK 1

UNIT I INTRODUCTION

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM

WEEK 2

TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus

WEEK 3

Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality.

WEEK 4 UNIT TEST -1

UNIT II TQM PRINCIPLES

Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment.

WEEK 5

Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal, Continuous process improvement.

WEEK 6

PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating

UNIT TEST -II

WEEK 7

UNIT III TQM TOOLS AND TECHNIQUES I

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing**.**

WEEK 8

Service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types**.**

WEEK 9 PREMODEL

WEEK 10

UNIT IV TQM TOOLS AND TECHNIQUES II

Control Charts - Process Capability - Concepts of Six Sigma -

WEEK 11 Quality Function Development (QFD).Taguchi quality loss function -

WEEK 12

TPM - Concepts, improvement needs - Performance measures

UNIT TEST -IV

WEEK 13

UNIT V QUALITY SYSTEMS

Need for ISO 9000 - ISO 9001-2008 Quality System - Elements, Documentation,

WEEK 14

Quality Auditing - QS 9000, ISO 14000 - Concepts, Requirements and Benefits- TQM Implementation in manufacturing and service sectors

WEEK 15 REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXT BOOKS:

1. Dale H. Besterfiled, et at., "Total quality Management", Third Edition, Pearson Education Asia, Indian Reprint, 2006

REFERENCES:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.
2. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.
3. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006

ME6005 PROCESS PLANNING AND COST ESTIMATION (Elective -II)

WEEK 1

UNIT I INTRODUCTION TO PROCESS PLANNING

Introduction- methods of process planning-Drawing interpretation-

WEEK 2

Material evaluation – steps in process selection-.

WEEK 3

Production equipment and tooling selection

WEEK 4 UNIT TEST -I

UNIT II PROCESS PLANNING ACTIVITIES

Process parameters calculation for various production processes-

WEEK 5

Selection jigs and fixtures election of quality assurance methods –

WEEK 6

Set of documents for process planning-Economics of process planning- case studies

UNIT TEST-II

WEEK 7

UNIT III INTRODUCTION TO COST ESTIMATION

Importance of costing and estimation –methods of costing-elements of cost estimation

WEEK 8

Types of estimates – Estimating procedure- Estimation labor cost, material cost- allocation of over head charges- Calculation of depreciation cost

WEEK 9 PRE MODEL

WEEK 10 UNIT IV PRODUCTION COST
ESTIMATION Estimation of Different Types of Jobs
WEEK 11
- Estimation of Forging Shop, Estimation of Welding Shop,
WEEK 12
Estimation of Foundry Shop
UNIT TEST –IV
WEEK 13
UNIT V MACHINING TIME CALCULATION
Estimation of Machining Time - Importance of Machine Time Calculation- Calculation of Machining
WEEK 14
Time for Different Lathe Operations ,Drilling and Boring - Machining Time Calculation for Milling, Shaping and Planning -Machining Time Calculation for Grinding
WEEK 15 REVISION CLASS
WEEK-16 – MODEL EXAM
WEEK-17- MODEL EXAM

TEXT BOOKS:
1. Peter scalon, "Process planning, Design/Manufacture Interface", Elsevier science technology Books, Dec 2002.
REFERENCES:
1. Ostwalal P.F. and Munez J., "Manufacturing Processes and systems", 9th Edition, John Wiley, 1998.
2. Russell R.S and Tailor B.W, "Operations Management", 4th Edition, PHI, 2003.
3. Chitale A.V. and Gupta R.C., "Product Design and Manufacturing", 2nd Edition, PHI, 2002.

GE6081 FUNDAMENTALS OF NANOSCIENCE (Elective -III)
WEEK 1
UNIT I INTRODUCTION
Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-
WEEK 2
Classifications of nanostructured materials- nano particles-quantum dots, nanowires-ultra-thinfilmsmultilayered materials.
WEEK 3
Length Scales involved and effect on properties: Mechanical, Electronic,

Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study(qualitative only).

WEEK 4 UNIT TEST -1

UNIT II GENERAL METHODS OF PREPARATION

Bottom-up Synthesis-Top-down Approach: Co-Precipitation,

WEEK 5

Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Ultrasonication, Mechanical Milling

WEEK 6

,Sputtering, Evaporation,Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE. **UNITTEST -II**

WEEK 7

UNIT III NANOMATERIALS

Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nanotubes (SWCNT) and Multi wall carbon nanotubes (MWCNT)- methods of synthesis(arc-growth, laser ablation, CVD routes, Plasma CVD),

WEEK 8

structure-property Relationships applications- Nanometal oxides- ZnO, TiO2,MgO, ZrO2, NiO, nanoalumina, CaO, AgTiO2, Ferrites, Nanoclays functionalization and applications-Quantum wires, Quantum dots-preparation, properties and applications

WEEK 9 PREMODEL

WEEK 10

UNIT IV CHARACTERIZATION TECHNIQUES X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission

WEEK 11

Electron Microscopy including high-resolution imaging,

WEEK 12

Surface Analysis techniques- AFM, SPM,STM, SNOM, ESCA, SIMS-Nanoindentation

UNIT TEST -IV

WEEK 13

UNIT V APPLICATIONS

NanoInfoTech: Information storage- nanocomputer, molecular switch, super chip, nanocrystal,Nanobiotechlogy: nanoprobes in medical diagnostics and biotechnology, Nano medicines, Targetted drug delivery, Bioimaging

WEEK 14

- Micro Electro Mechanical Systems (MEMS), Nano Electro MechanicalSystems (NEMS)- Nanosensors, nano crystalline silver for bacterial inhibition, Nanoparticles for sunbarrier products - In Photostat, printing, solar cell, battery

WEEK 15 REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXT BOOKS

1. Edelstein. A.S. and R.C. Cammearata, eds., "Nanomaterials: Synthesis, Properties and
Applications", Institute of Physics Publishing, Bristol and Philadelphia, 1996.
2. John Dinardo. N, "Nanoscale charecterisation of surfaces & Interfaces", 2nd edition, Weinheim
Cambridge, Wiley-VCH, 2000

REFERENCES

1. Timp .G, "Nanotechnology", AIP press/Springer, 1999.
2. Akhlesh Lakhtakia (Editor),"The Hand Book of Nano Technology, Nanometer Structure,
Theory, Modeling and Simulations". Prentice-Hall of India (P) Ltd, New Delhi, 2007.

ME6008 WELDING TECHNOLOGY (Elective -II)

WEEK 1

UNIT I GAS AND ARC WELDING PROCESSES

Fundamental principles – Air Acetylene welding, Oxyacetylene welding, Carbon arc welding,

WEEK 2

Shielded metal arc welding, Submerged arc welding, TIG & MIG welding, Plasma arc welding

WEEK 3

Electroslag welding processes - advantages, limitations and applications.

WEEK 4 UNIT TEST-I

UNIT II RESISTANCE WELDING PROCESSES

Spot welding, Seam welding, Projection welding, Resistance Butt welding,

WEEK 5
Flash Butt welding,Percussion welding
WEEK 6
High frequency resistance welding processes - advantages, limitations andapplications.
UNIT TEST -II
WEEK 7
UNIT III SOLID STATE WELDING PROCESSES
Cold welding, Diffusion bonding, Explosive welding,
WEEK 8 Ultrasonic welding, Friction welding, Forge welding, Roll welding and Hot pressure welding processes - advantages, limitations and applications.

WEEK 9 PRE MODEL
WEEK 10
UNIT IV OTHER WELDING PROCESSES
Thermit welding, Atomic hydrogen welding, Electron beam welding, Laser Beam welding, Friction stir
WEEK 11
Welding, Under Water welding, Welding automation in aerospace, nuclear and surface transport vehicles.
WEEK 12
UNIT V DESIGN OF WELD JOINTS, WELDABILITY AND TESTING OF WELDMENTS
Various weld joint designs – Weld ability of Aluminium,
WEEK 13
Weld ability Copper, and Stainless steels.
WEEK 14
Destructive and non destructive testing of weldments.
WEEK 15 -REVISION CLASS
WEEK-16 – MODEL EXAM
WEEK-17- MODEL EXAM

TEXT BOOKS:
1. Parmer R.S., “Welding Engineering and Technology”, 1st edition, Khanna Publishers, New Delhi, 2008.
2. Parmer R.S., “Welding Processes and Technology”, Khanna Publishers, New Delhi, 1992.
3. Little R.L., “Welding and welding Technology”, Tata McGraw Hill Publishing Co., Ltd., New Delhi, 34th reprint, 2008.

REFERENCES:

1. Schwartz M.M. “Metals Joining Manual”. McGraw Hill Books, 1979.
2. Tylecote R.F. “The Solid Phase Welding of Metals”. Edward Arnold Publishers Ltd. London, 1968.
3. AWS- Welding Hand Book. 8th Edition. Vol- 2.
“Welding Process”
4. Nadkarni S.V. “Modern Arc Welding Technology”, 1st edition, Oxford IBH Publishers, 2005.
5. Christopher Davis. “Laser Welding- Practical Guide”. Jaico Publishing House, 1994.
6. Davis A.C., “The Science and Practice of Welding”, Cambridge University Press, Cambridge, 1993

ME6012 MAINTENANCE ENGINEERING (Elective - III) WEEK 1

UNIT I PRINCIPLES AND PRACTICES OF MAINTENANCE PLANNING

Basic Principles of maintenance planning – Objectives and principles of planned maintenance activity

WEEK 2

Importance and benefits of sound Maintenance systems – Reliability and machine availability – MTBF

WEEK 3

MTTR and MWT – Factors of availability – Maintenance organization – Maintenance economics.

WEEK 4 – UNIT TEST-1

UNIT II MAINTENANCE POLICIES – PREVENTIVE MAINTENANCE

Maintenance categories – Comparative merits of each category –

WEEK 5

Preventive maintenance, maintenance schedules, repair cycle

WEEK 6

Principles and methods of lubrication – TPM

UNIT TEST-2

WEEK 7-

UNIT III CONDITION MONITORING

Condition Monitoring – Cost comparison with and without CM –

WEEK 8

On-load testing and offload testing – Methods and instruments for CM Temperature sensitive tapes – Pistol thermometers – wear-debris analysis

WEEK 9 PRE MODEL

WEEK 10

UNIT IV REPAIR METHODS FOR BASIC MACHINE ELEMENTS

Repair methods for beds, slide ways, spindles, and gears **WEEK 11**

lead screws and bearings – Failure analysis – Failures and their development**,**

WEEK 12

Logical fault location methods – Sequential fault location

UNIT TEST -IV

WEEK 13

UNIT V REPAIR METHODS FOR MATERIAL HANDLING EQUIPMENT

Repair methods for Material handling equipment **WEEK 14**

Equipment records Job order systems Use of computers in maintenance.

WEEK-15 REVISION CLASS

WEEK-16 – MODEL EXAM

WEEK-17- MODEL EXAM

TEXT BOOKS:

1.Srivastava S.K., "Industrial Maintenance Management", S. Chand and Co., 1981

2. Venkataraman .K "Maintancence Engineering and Management", PHI Learning, Pvt. Ltd., 2007

REFERENCES:

1. Bhattacharya S.N., "Installation, Servicing and Maintenance", S. Chand and Co., 1995

2. White E.N., "Maintenance Planning", I Documentation, Gower Press, 1979.

2. Garg M.R., "Industrial Maintenance", S. Chand & Co., 1986.

3. Higgins L.R., "Maintenance Engineering Hand book", 5th Edition, McGraw Hill, 1988.

4. Armstrong, "Condition Monitoring", BSIRSA, 1988.

5. Davies, "Handbook of Condition Monitoring", Chapman & Hall, 1996.

6. “Advances in Plant Engineering and Management”, Seminar Proceedings - IIPE, 1996.

ME6711 SIMULATION AND ANALYSIS LABORATORY

LIST OF EXPERIMENTS

A. SIMULATION

1. MATLAB basics, Dealing with matrices, Graphing-Functions of one variable and two variables
2. Use of Matlab to solve simple problems in vibration
3. Mechanism Simulation using Multibody Dynamic software

B. ANALYSIS

1. Force and Stress analysis using link elements in Trusses, cables etc.
2. Stress and deflection analysis in beams with different support conditions.
3. Stress analysis of flat plates and simple shells.
4. Stress analysis of axi – symmetric components.
5. Thermal stress and heat transfer analysis of plates.
6. Thermal stress analysis of cylindrical shells.
7. Vibration analysis of spring-mass systems.
8. Model analysis of Beams.
9. Harmonic, transient and spectrum analysis of simple systems

ME6712 MECHATRONICS LABORATORY

LIST OF EXPERIMENTS

1. Assembly language programming of 8085 – Addition – Subtraction – Multiplication – Division –
Sorting – Code Conversion.
2. Stepper motor interface.
3. Traffic light interface.
4. Speed control of DC motor.
5. Study of various types of transducers.
6. Study of hydraulic, pneumatic and electro-pneumatic circuits.
7. Modelling and analysis of basic hydraulic, pneumatic and electrical circuits using Software.
8. Study of PLC and its applications.
9. Study of image processing technique.

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