

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Grading System

Mechanical Engg, VIII-Semester

PTME-801 Refrigeration & Air Conditioning

Unit-I Introduction: Principles and methods of refrigeration, freezing; mixture cooling by gas reversible expansion, throttling, evaporation, Joule Thomson effect and reverse Carnot cycle; unit of refrigeration, coefficient of performance, vortex tube & thermoelectric refrigeration, adiabatic demagnetization; air refrigeration cycles- Joule's cycle Boot-strap cycle, reduced ambient cycle and regenerative cooling cycles.

Unit-II Vapour compression system: Vapor compression cycle, p-h and t-s diagrams, deviations from theoretical cycle, sub-cooling and super heating, effects of condenser and evaporator pressure on cop; multi-pressure system: removal of flash gas, multiple expansion & compression with flash inter cooling; low temperature refrigeration: production of low temperatures, cascade system, dry ice, production of dry ice, air liquefaction system,.

Unit-III (a) Vapour absorption system: Theoretical and practical systems such as aquaammonia, electrolux & other systems; (b) Steam jet refrigeration: Principles and working, simple cycle of operation, description and working of simple system, (c) refrigerants: nomenclature & classification, desirable properties, common refrigeration, comparative study, leak detection methods, environment friendly refrigerants and refrigerant mixtures, brine and its properties

Unit-IV Psychrometric: Calculation of psychrometric properties of air by table and charts; psychrometric processes: sensible heating and cooling, evaporative cooling, cooling and dehumidification, heating and humidification, mixing of air stream, sensible heat factor; principle of air conditioning, requirements of comfort air conditioning, ventilation standards, infiltrated air load, fresh air load human comfort, effective temperature & chart, heat production & regulation of human body,

Unit-V Air conditioning loads: calculation of summer & winter air conditioning load, bypass factor of coil, calculation of supply air rate & its condition, room sensible heat factor, grand sensible heat factor, effective sensible heat factor, dehumidified air quantity. Problems on cooling load calculation. Air distribution and ventilation systems

References: 1. Arora CP; Refrigeration and Air Conditioning; TMH

2. Sapali SN; Refrigeration and Air Conditioning; PHI

3. Ananthanarayan; Basic Refrigeration and Air conditioning; TMH

4. Manohar Prasad; Refrigeration and Air Conditioning; New Age Pub

5. Ameen; Refrigeration and Air Conditioning; PHI

6. Pita ; Air conditioning Principles and systems: an energy approach; PHI

7. Stoecker W.F, Jones J; Refrigeration and Air conditioning; McGH, Singapore

8. Jordan RC and Priester GB Refrigeration and Air Conditioning, PHI USA

9. Arora RC; Refrigeration and Air conditioning; PHI Learning

List of Experiments (Please Expand it): Refrigeration and Air Conditioning AU/ ME 803

1. General Study of vapor compression refrigeration system.

2. General Study of Ice Plant

3. General Study and working of cold storage

4. General Study Trane Air Condition (Package Type)

5. General Study of Electrolux Refrigeration

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Mechanical Engg, VIII-Semester

PTME-802 Enterprise Resource Planning, ERP

Unit 1. Evolutionary stages of Enterprise Resource Planning (ERP), Need for ERP, Variety accommodation, Strategic and operational issues in ERP, Integrated and Business model of ERP, Online analytical processing(OLAP)

Unit 2. Introduction to Business Process Re-Engineering (BPR), ERP Implementation: Role of consultants, vendors and users, Guidelines and Procedure for ERP implementation, strategic advantage through ERP, ERP Domain.

Unit 3. Business module in ERP, Finance, Manufacturing, Human resources, Plant maintenance, Materials management, Quality management, Sales and Distribution.

Unit 4 Turbo Charge the ERP System, Enterprise Integration Applications (EIA), ERP and E – Commerce, ERP and internet , Future of ERP.

Unit 5 Resource Management, ERP – A Manufacturing perspective, ERP Case studies with applications and uses of software, E- business components and interrelationship, Integrated data model, Information Technology and computer net work support to MIS

References:

References 1. Chhabra, Ahuja & Jain, Planning Men at Work.

2. Enterprise Resource Planning, Concept and Practice Garg V.K. Venkitkrishnan N.K., PHI

3. Business Process Re-Engineering, Jayaraman, , TMH. 4. ERP by Alexis Leon

4. Entrepreneurship and management Concept Dr.Puspendra Sharma & Keerti Sharma –Ik international Pub.

5. Murdick & Ross, Management Information System, PHI.

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Grading System

Mechanical Engg, VIII-Semester

Elective III PTME-803(A) Mechatronics

Unit 1. Introduction

Definition of mechatronics. Mechatronics in manufacturing, products and design. Review of fundamentals of electronics.

Mechatronics elements Data conversion devices, sensors, micro sensors, transducers, signal processing devices, relays, contactors and timers.

Unit 2. Processors /controllers

Microprocessors, microcontrollers, PID controllers and PLCs. Drives and mechanisms of an automated system Drives: stepper motors, servo drives. Ball screws, linear motion bearings, cams, systems controlled by camshafts, electronic cams, indexing mechanisms, tool magazines, and transfer systems.

Unit 3. Hydraulic system Hydraulic systems: flow, pressure and direction control valves, actuators, and supporting elements, hydraulic power packs, pumps. Design of hydraulic circuits.

Unit 4. Pneumatic system Pneumatics: production, distribution and conditioning of compressed air, system components and graphic representations, design of systems.

Unit 5. CNC technology and Robotics CNC machines and part programming. Industrial Robotics.

Text books

- [1] Boucher, T. O., Computer automation in manufacturing - an Introduction, Chapman and Hall, 1996.
- [2] HMT ltd. Mechatronics, Tata McGraw-Hill, New Delhi, 1988

References:

- [1] Deb, S. R., Robotics technology and flexible automation, Tata McGraw-Hill, New Delhi, 1994.
- [2] Boltan, W., Mechatronics: electronic control systems in mechanical and electrical engineering, Longman, Singapore, 1999.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Grading System

Mechanical Engg, VIII-Semester

Elective III PTME-803(B) Maintenance Engineering

UNIT I PRINCIPLES AND PRACTICES OF MAINTENANCE PLANNING

Basic Principles of maintenance planning – Objectives and principles of planned maintenance activity – Importance and benefits of sound Maintenance systems – Reliability and machine availability – MTBF, MTTR and MWT – Factors of availability – Maintenance organization – Maintenance economics.

UNIT II MAINTENANCE POLICIES – PREVENTIVE MAINTENANCE

Maintenance categories – Comparative merits of each category – Preventive maintenance, maintenance schedules, repair cycle - Principles and methods of lubrication – TPM. Maintenance policies for corrective maintenance, design-out-maintenance.

UNIT III CONDITION MONITORING

Condition Monitoring – Cost comparison with and without CM – On-load testing and offload testing – Methods and instruments for CM – Temperature sensitive tapes – Pistol thermometers – wear-debris analysis, Introduction to vibration monitoring.

UNIT IV REPAIR METHODS FOR BASIC MACHINE ELEMENTS

Repair methods for beds, slide ways, spindles, gears, lead screws and bearings – Failure analysis – Failures and their development – Logical fault location methods – Sequential fault location.

UNIT V REPAIR METHODS FOR MATERIAL HANDLING EQUIPMENT

Repair methods for Material handling equipment - Equipment records –Job order systems -Use of computers in maintenance. Reconditioning of equipments.

References:

- 1. Maintenance Engineering and Management” by R C Mishra and K Pathak**
- 2. Maintenance Engineering Hand Book” by Morrow**
- 3. Plant Engineer’s Handbook” by R Keith Mobley**
- 4. Maintenance Engineering” by Srivastava S K**
- 5. Reliability and Maintenance Engineering” by R C Mishra**

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Mechanical Engg, VIII-Semester

PTME-804 Major Project

Objectives of the course Minor/Major Project are:

- To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.
- To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems.
- To give students an opportunity to do something creative and to assimilate real life work situation in institution.
- To adapt students for latest development and to handle independently new situations
- To develop good expressions power and presentation abilities in students.

The focus of the Major Project is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit it the same in the form of a write up i.e. detail project report. The student should select some real life problems for their project and maintain proper documentation of different stages of project such as need analysis market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan. Each student is required to prepare a project report and present the same at the final examination with a demonstration of the working system

(if any)

Working schedule The faculty and student should work according to following schedule: Each student undertakes substantial and individual project in an approved area of the subject and supervised by a member of staff. The student must submit outline and action plan for the project execution (time schedule) and the same be approved by the concerned faculty.

Action plan for Major Project work and its evaluation scheme #(Suggestive)

Task/Process	week	Evaluation	Marks for term work#
Orientation of students by HOD/Project Guide	1 st	-	-
Literature survey and resource collection	2 nd	-	-
Selection and finalization of topic before a committee*	3 rd	Seminar-I	10
Detailing and preparation of Project (Modeling, Analysis and Design of Project work	4 th & 5 th	-	10
Development stage		-	
Testing, improvements, quality control of projec	6 th to 10 th 11 th	-	25
Acceptance testing	12 th	-	10
Report Writing	13 th to 15 th	-	15
Presentation before a	16 th	Seminars	30

committee (including user manual, if any)			
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Committee comprises of HOD, all project supervisions including external guide from industry (if any)
 # the above marking scheme is suggestive, it can be changed to alternative scheme depending on the type of project, but the alternative scheme should be prepared in advance while finalizing the topic of project before a committee and explained to the concerned student as well.

NOTE: At every stage of action plan, students must submit a write up to the concerned guide: