

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MC-I Sem

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(A70352) OPERATIONS RESEARCH**UNIT – I**

Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.

Allocation: Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method.

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UNIT – II

Transportation Problem – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

Assignment problem – Formulation – Optimal solution – Variants of Assignment Problem- Traveling Salesman problem.

UNIT – III

Sequencing – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely- Group Replacement.

UNIT – IV

Theory of Games: Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.

Inventory: Introduction – Single item, Deterministic models – Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand may be discrete variable or continuous variable – Single Period model and no setup cost.

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UNIT – V

Waiting Lines: Introduction – Terminology-Single Channel – Poisson arrivals and Exponential Service times – with infinite population and finite population models– Multichannel – Poisson arrivals and exponential service times with infinite population.

Dynamic Programming:

Introduction – Terminology- Bellman's Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming

problem.

Simulation: Introduction, Definition, types of simulation models, Steps involved in the simulation process- Advantages and disadvantages- applications of simulation to queuing and inventory.

TEXT BOOK :

1. Operations Research /J.K.Sharma 4e. /MacMilan
2. Introduction to O.R/Hillier & Libermann/TMH

REFERENCE BOOKS :

1. Introduction to O.R /Taha/PHI
2. Operations Research/ NVS Raju/ SMS Education/3rd Revised Edition
3. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
4. Operations Research / Wagner/ PHI Publications.
5. Operations Research/M.V. Durga Prasad, K, Vijaya Kumar Reddy, J. Suresh Kumar/ Cengage Learning.

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(A70430) MICROPROCESSORS AND MICROCONTROLLERS**Course Objective:**

- To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.

UNIT -I:

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086- Common Function Signals, Timing diagrams, Interrupts of 8086.

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UNIT -II:

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT -III:

I/O Interface: 8255 PPI, Various Modes of Operation and Interfacing to 8086, Interfacing Keyboard, Display, D/A and A/D Converter.

Interfacing with advanced devices: Memory Interfacing to 8086, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine.

Communication Interface: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

UNIT -IV:

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs

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UNIT -V:

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

TEXT BOOKS:

- D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition 2006.
- Kenneth. J. Ayala, The 8051 Microcontroller , 3rd Ed., Cengage Learning.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, PHI, 2nd Ed.
4. Microcontrollers and Application - Ajay. V. Deshmukh, TMGH, 2005.
5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson

Course Outcome:

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- The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
- The student will learn hardware and software interaction and integration.
- The students will learn the design of microprocessors/microcontrollers-based systems.

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(A70356) ROBOTICS AND ITS APPLICATIONS**UNIT – I**

Introduction: Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system.

Components of the Industrial Robotics: End effectors- types, mechanical grippers, and other types of grippers, comparison of Electric, Hydraulic and Pneumatic types of locomotion devices.

UNIT – II

Motion Analysis: Homogeneous transformations as applicable to rotation and translation – problems.

Manipulator Kinematics: Specifications of matrices, D-H notation joint coordinates and world coordinates

Forward and inverse kinematics problems.

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UNIT – III

Manipulator jacobians: Differential transformation and manipulators, Jacobians – problems.

Dynamics: Lagrange – Euler and Newton/Euler formulations – Problems.

UNIT IV

Trajectory planning: path planning and avoidance of obstacles, Slew motion, joint interpolated motion – straight line motion.

Programming Languages: Robot programming, languages and software packages.

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UNIT V

Robot actuators and Feed-back components: Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors. Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors.

Robot Application in Manufacturing: Material Transfer - Material handling, loading and unloading - Processing - spot and continuous arc welding & spray painting - Assembly and Inspection.

TEXT BOOKS :

1. Robo Technology Fundamentals, James G. Keramas, CENGAGE Publications
2. Industrial Robotics / Groover M P /Pearson Edu.

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3. Robotics and Control/ Nagrath and Mittal.

REFERENCES :

1. Introduction to Robotics / John J Craig / Pearson Edu
2. Applied Robotics / Edwin Wise / Cengage Publications
3. Robotics / Fu K S / McGraw Hill.
4. Robotic Engineering / Richard D. Klafter, Prentice Hall
5. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.
6. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pte Ltd.

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(A71404) MOTION CONTROL DESIGN**UNIT – I**

Introduction to Mechatronics, Mechatronics key elements, Graphical representation, Mechatronics design process, approaches in Mechatronics, Objectives of Mechatronics, Examples of Mechatronic Systems.

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UNIT – II

Transmission mechanics – linear power transmission, lead screw, timing belt, conveyors, Rotary transmission – spur gears and planetary transmission. Motors – DC servo motors with encoded feedback – Brushless DC servo motors with Hall-effect sensor, Stepper motors – full step, half step, and microstep. AC induction motors and their applications.

UNIT – III

Control system in Motion control: programmable motion control, closed loop PID control – feed forward control – velocity, acceleration – fundamental concept for adaptive control and fuzzy logic. Programmable Logic Controller: Basic PLC Structures, Input/Output Processing, Ladder Programming, Latching and Internal relays, Sequencing, Timers and counters, Shift registers, Master and Jump controls.

UNIT – IV

INDUSTRIAL HYDRAULICS: Introduction, Merits of Fluid power and its utility for increase in productivity, symbolic representation of hydraulic elements – Hydraulic control valves, Hydraulic cylinders, Hydraulic accessories, and various pumps used in hydraulic system, Hydraulic fluids, Hydraulic circuits using Hydraulic cylinders and other elements. Applications of Hydraulic systems.

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UNIT – V

INDUSTRIAL PNEUMATICS: Introduction, Symbolic representations of Pneumatic elements, Compressors and air installation, Pneumatic control valves, Pneumatic actuators, Pneumatic circuits using Pneumatic cylinders and other elements. Fluidics and fluid logic systems. Applications of Pneumatic systems.

TEXT BOOKS :

1. Introduction to Mechatronics and measurement Systems, Alciatore, 2009, 3e, TMH

2. Pneumatic systems - Principles and maintenance, SR Majumdar, TMH
3. Hydraulic systems – Principles and Maintenance, SR MAJumdar, TMH

REFERENCE BOOKS :

1. Mechatronics system design – Devdas shetty & Richard A. Kolk, Thomson, 2007
2. Mechatronics – W. Bolten, Pearson, 2010
3. Principles of Machine Tools – Sen & Bhattacharya
4. Introduction to Mechatronics, Appu Kuttan KK, Oxford Universities Press
5. Mechatronic systems: Fundamentals, Isermann, Springer

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(A71405) PRODUCT DESIGN AND ASSEMBLY AUTOMATION**(Elective - I)****UNIT - I**

Automatic Feeding And Orienting Devices: Vibrator feeders, Mechanics of vibratory conveying, load sensitivity, solutions to load sensitivity, spiral elevators, balanced feeders. Types of oriental systems, effect of active orienting devices on feed rate, natural resting aspects of parts for automatic handling, out-of-bowl tooling, Reciprocating - tube hopper feeder

UNIT-IIwww.universityupdates.in

Automatic Assembly Transfer Systems: Assembly machines classification, Continuous transfer, intermittent transfer, indexing mechanisms, and operator - paced free - transfer machine, choice of assemble method, advantages and disadvantages of automation.

UNIT-III

Product design for High speed Automatic Assembly and Robot Assembly : Introduction, design of parts for: high speed, feeding and orienting, example, additional feeding difficulties, high speed automatic insertion, example, analysis of an assembly, general rules for product design for automation, product design for robot assembly.

UNIT - IV

Design for Manual Assembly : General design guidelines for manual assembly, development of the systematic DFA methodology, assembly efficiency, classification system for manual handling, classification system for manual insertion and fastening, effect of part symmetry on handling time, effect of part thickness and size on handling time, effect of weight on handling time, parts requiring two hands for manipulation, effect of symmetry effect of chamfer design on insertion operations, estimation of insertion time, reducing disk assembly problems.

www.universityupdates.in**UNIT - V**

Performance and Economics of Assembly Systems: Indexing machines-effects of parts quality on down time and production time, free transfer machines- performance of free transfer machine, comparison of indexing and free - transfer machines.

TEXT BOOKS:

1. Geoffrey Boothroyd, "Assembly Automation and Product Design", Marcel Dekker Inc., NY, 1992.

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2. Geoffrey Boothroyd, Peter Dewhurst, Winston Knight, "Product design for Manufacture and assembly", 2e, CRC Press

REFERENCE BOOKS:

1. A.K. Chitale, RC Gupta, "Product design and Manufacturing", PHI
2. Geoffrey Boothroyd, "Hand Book of Product Design" Marcel and Dekken, N.Y. 1990.
3. A Delbainbre "Computer Aided Assembly London, 1992.

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(A70324) RENEWABLE ENERGY SOURCES

(Elective - I)

UNIT - I

Principles of Solar Radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power - Physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, Solar radiation on tilted surface, Instruments for measuring solar radiation and sun shine, solar radiation data.

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UNIT - II

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Solar Energy Storage and Applications: Different methods, sensible, latent heat and stratified storage, solar ponds. Solar applications - solar heating/cooling techniques, solar distillation and drying, Photovoltaic energy conversion.

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UNIT - III

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics.

Bio-Mass: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation, and economic aspects.

UNIT - IV

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

OTEC : Principles, utilization, setting of OTEC plants, thermodynamic cycles.

Tidal and Wave Energy: Potential and conversion techniques, mini-hydel power plants, their economics.

UNIT -V

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, Principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thompson effects, figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principle, faraday's laws,

thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. Renewable Energy Sources / Twidell & Weir / Taylor and Francis / 2nd Special Indian Edition.
2. Non- conventional Energy Sources / G.D. Rai / Dhanpat Rai and Sons.

REFERENCE BOOKS:

1. Energy Resources Utilization and Technologies / Anjaneyulu & Francis / BS Publications/2012.
2. Principles of Solar Energy / Frank Krieth & John F Kreider / Hemisphere Publications.
3. Non-Conventional Energy / Ashok V Desai / Wiley Eastern.
4. Non-Conventional Energy Systems / K Mittal / Wheeler.
5. Renewable Energy Technologies / Ramesh & Kumar / Narosa.
6. Renewable Energy Resources / Tiwari and Ghosal / Narosa.

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(A70338) COMPUTATIONAL FLUID DYNAMICS**(Elective – I)**www.universityupdates.in**UNIT-I**

Elementary details in numerical techniques: Number system and errors, representation of integers, fractions, floating point arithmetic, loss of significance and error propagation, condition for instability, computational methods for error estimation, convergence of sequences.

Applied Numerical Methods: Solution of a system of simultaneous Linear Algebraic Equations, iterative schemes of Matrix Inversion, Direct Methods for Matrix inversion, Direct Methods for banded matrices.

UNIT - II

Finite Difference Applications in Heat conduction and Convection – Heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer, closure.

Finite Differences, discretization, consistency, stability, and Fundamentals of fluid flow modeling: Introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods.

UNIT - III

Introduction to first order wave equation; Stability of hyperbolic and elliptic equations, fundamentals of fluid flow modeling, conservative property, the upwind scheme.

UNIT - IV

Review of Equations Governing Fluid Flow and Heat Transfer: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navier-stokes equations, conservation of energy principle, special forms of the Navier-stokes equations.

UNIT-V

Finite volume method: Approximation of surface integrals, volume integrals, interpolation and differentiation practices, upwind interpolation, linear interpolation and quadratic interpolation.

TEXT BOOKS:

1. Numerical heat transfer and fluid flow / Suhas V. Patankar/ Hema shava Publishers corporation & Mc Graw Hill.

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2. Computational Fluid Flow and Heat Transfer/ Muralidaran/ Narosa Publications.

REFERENCES:

1. Computational Fluid Dynamics: Basics with applications/John D. Anderson/ Mc Graw Hill.
2. Fundamentals of Computational Fluid Dynamics/Tapan K. Sengupta / Universities Press.
3. Introduction to Theoretical and Computational Fluid Dynamics/C. Pozrikidis/Oxford University Press/2nd Edition.

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(A70502) DATA STRUCTURES**(Elective – I)****Objectives:**

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms. www.universityupdates.in
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose the appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

UNIT- I

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction-Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures.

Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists-Operations for circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

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Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

UNIT- III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max Priority

Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

UNIT- IV

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

UNIT- V

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees-Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees(Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

TEXT BOOKS:

1. Fundamentals of Data structures in C, 2nd Edition, F.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

REFERENCE BOOKS:

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum, Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung, Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz, Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson..
9. Data Structures using C & C++, R.Shukla, Wiley India.

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10. Classic Data Structures, D.Samanta, 2nd edition, PHI.

11. Advanced Data structures, Peter Brass, Cambridge.

Outcomes:

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in respective language.
- Ability to solve problems independently and think critically.

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(A70353) POWER PLANT ENGINEERING**(Elective – II)****UNIT – I**

Introduction to the Sources of Energy – Resources and Development of Power in India. **Steam Power Plant** : Plant Layout, Working of different Circuits, Fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, Ash handling systems.

Combustion Process: Properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction, Dust collectors, cooling towers and heat rejection. Corrosion and feed water treatment.

UNIT – IIwww.universityupdates.in**Internal Combustion Engine Plan:**

DIESEL POWER PLANT: Introduction – IC Engines, types, construction– Plant layout with auxiliaries – fuel supply system, air starting equipment, lubrication and cooling system – super charging. **Gas Turbine Plant**: Introduction – classification – construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines. Combined Cycle Power Plants and comparison. **Direct Energy Conversion**, Solar energy, Fuel cells, Thermo electric and Thermo ionic, MHD generation.

UNIT – III

Hydro Electric Power Plant: Water power – Hydrological cycle / flow measurement – drainage area characteristics – Hydrographs – storage and Pondage – classification of dams and spill ways. **Hydro Projects And Plant**: Classification – Typical layouts – plant auxiliaries – plant operation pumped storage plants. **Power From Non-Conventional Sources**: Utilization of Solar- Collectors- Principle of Working, Wind Energy – types – HAWT, VAWT -Tidal Energy.

UNIT – IVwww.universityupdates.in

Nuclear Power Station: Nuclear fuel – breeding and fertile materials – Nuclear reactor – reactor operation. **Types of Reactors**: Pressurized water reactor, Boiling water reactor, sodium-graphite reactor, fast Breeder Reactor, Homogeneous Reactor, Gas cooled Reactor, Radiation hazards and shielding – radioactive waste disposal.

UNIT – V

Power Plant Economics And Environmental Considerations: Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, Load curves, load duration curve. Definitions of connected load, Maximum demand, demand factor, average load, load factor, diversity factor – related exercises. Effluents from power plants and Impact on environment – pollutants and pollution standards – Methods of Pollution control.

TEXT BOOK :

1. Power Plant Engineering/ P.C.Sharma/ S.K.Kataria Pub
2. A Course in Power Plant Engineering: / Arora and S. Domkundwar.

REFERENCES :

1. A Text Book of Power Plant Engineering / Rajput / Laxmi Publications
2. Power Plant Engineering: P.K.Nag/ II Edition /TMH.
3. An Introduction to Power Plant Technology / G.D. Rai/Khanna Publishers
4. Power plant Engg / Elanchezhian/ I.K. International Pub
5. Power plant Engineering/ Ramalingam/ Sciotech Publishers

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(A70506) COMPUTER ORGANIZATION**(Elective – II)****Objectives:**

- To understand basic components of computers.
- To explore the I/O organizations in depth.
- To explore the memory organization.
- To understand the basic chip design and organization of 8086 with assembly language programming.

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Basic Computer Organization – Functions of CPU, I/O Units, Memory: Instruction: Instruction Formats- One address, two addresses, zero addresses and three addresses and comparison; addressing modes with numeric examples: Program Control- Status bit conditions, conditional branch instructions, Program Interrupts: Types of Interrupts

UNIT-II

Input-Output Organizations- I/O Interface, I/O Bus and Interface modules: I/O Vs memory Bus, Isolated Vs Memory-Mapped I/O: Asynchronous data Transfer- Strobe Control, Hand Shaking: Asynchronous Serial transfer- Asynchronous Communication interface, Modes of transfer- Programmed I/O, Interrupt Initiated I/O, DMA; DMA Controller, DMA transfer, IOP-CPU-IOP Communication, Intel 8089 IOP.

UNIT-III

Memory Organizations

Memory hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, associate memory, Cache Memory, Data Cache, Instruction cache, Miss and Hit ratio, Access time, associative, set associative, mapping, waiting into cache, Introduction to virtual memory.

UNIT-IV

8086 CPU Pin Diagram- Special functions of general purpose registers, Segment register, concept of pipelining, 8086 Flag register, Addressing modes of 8086.

UNIT-V

8086-Instruction formats: assembly Language Programs involving branch & Call instructions, sorting, evaluation of arithmetic expressions.

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TEXT BOOKS:

- 1) Computer system Architecture: Morris Mano (UNIT-1,2,3).
- 2) Advanced Micro Processor and Peripherals- Hall/ A K Ray(UNIT-4,5).

REFERENCE BOOKS:

- 1) Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
- 2) Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson.
- 3) Fundamentals of Computer Organization and Design, - Sivarama Dandamudi Springer Int. Edition.
- 4) Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier.
- 5) Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

Outcomes:

After this course students understand in a better way the I/O and memory organization in depth. They should be in a position to write assembly language programs for various applications.

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(A70341) FLEXIBLE MANUFACTURING SYSTEM**(Elective – II)****UNIT – I**

Introduction: Types of production, characteristics, applications, need for FMS, where to apply FMS technology. Components of FMS, FMS layout configurations, planning the FMS, FMS's Work- stations. Flexible Manufacturing Cell: Characteristics, Flexible Machining systems, achieving flexibility in machining systems, Machine cell design, quantitative techniques

UNIT – IIwww.universityupdates.in

Group Technology(GT) –Part classification and coding systems: Part families, Optiz system, structure, MULTICODE differences between Optiz and MULTICODE systems, relative benefits. GT- production flow analysis: Composite part concept, numerical problems for parts clustering, advantages of GT in manufacturing and design.

UNIT - III

Material Handling systems, Automatic Guided vehicle systems, Automated storage and retrieval systems and Computer control systems.

UNIT - IV

Implementing FMS: FMS Layout configurations, Quantitative Analysis methods for FMS, Applications and benefits of FMS, problems in implementing FMS.

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Computer Aided Process planning: Importance, generative and retrieval systems, advantages and disadvantages, Generation of route sheets, selection of optimal machining parameters, methods.

Computer aided quality control and testing: Coordinate measuring machines, over view, contact and non contact inspection principles, Part programming coordinate measuring machines, In-cycle gauging

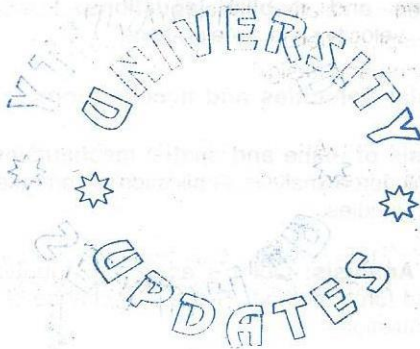
TEXT BOOKS:

1. Automation, Production systems and Computer Integrated Manufacturing System – Mikell P. Groover
2. The design and operation of FMS –Dr. Paul Ranky Nort –Holland Publishers

REFERENCES:

1. Flexible Manufacturing systems in practice by Joseph talvage and roger G. Hannam, Marcel Dekker Inc., New york
2. Hand book of FMS – Nand Jha .K.
3. FMS and control of machine tools - V. Ratmirov, MIR publications
4. Flexible Manufacturing – David J. Parrish

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(A70335) ADVANCED KINEMATICS AND DYNAMICS OF MACHINERY**(Elective – II)****UNIT-I:**

Geometry of motion-Grublers Criterion for plain and spatial mechanisms-Grashoff's law for planar and spatial mechanisms, Kutn Batch criterion for planar and spatial mechanisms Velocity and acceleration analysis, use of computers in analysis. Velocity and accelerations analysis of complex mechanisms.

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Coupler curves, Robert's Chebychev spacing method. Cognate linkages. Path curvature- Polodes- Euler Savery equation -Bobiller and Hartman's Construction- Equivalent mechanisms.

Space mechanisms and mobility equations: Positional problems. Vector analysis of velocity and accelerations,

UNIT-III:

Theorem of angular velocities and accelerations - computer aided analysis.

Static force analysis of plane and spatial mechanisms: Inertia forces and torques. Dynamic force analysis, application of computer animation and simulation of motion studies.

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Dynamic Motion Analysis: Quinn's energy distribution method, the equivalent mass and force method. The rate of change of energy method, dynamic motion simulation.

UNIT-V:

Synthesis of linkages: Two position synthesis. Properties of rotopole, Chebychev spacing. Optimization of the transmission angles. The overlay method; Three-position synthesis; point position reduction; synthesis of dwell mechanisms;

Codes / Tables: No table/code books required for examination

TEXTBOOKS:

1. Kinematics and Dynamics and design of machinery, Waldron, Wiley Publishers.
2. Shigley : J.E. Kinematic Analysis of mechanism, McGraw 111.

REFERECES:

1. Hirschcom : J.K.. KinciBcs and Dynamics of Plane Mechanisms Mc.Graw Hill.
2. Holewenko, A.R. Dynamics of machinery, John Wiley & Sons.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. MC-I Sem****L T/P/D C****- /3/- 2****(A70494) MICROPROCESSORS AND MICROCONTROLLERS LAB****Note:**

- Minimum of 12 experiments are to be conducted.
- The Following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051 kits.

List of Experiments:

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes). www.universityupdates.in
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/ Counter in 8051.
12. Program and verify Interrupt handling in 8051.
13. UART Operation in 8051. www.universityupdates.in
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. MC-I Sem

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(A71484) MOTION CONTROL DESIGN AND CNC &ROBOTICS LAB

Note: Any Six from each Laboratory

MOTION CONTROL ROBOTICS LABwww.universityupdates.in

1. Study of the following equipment :
 - a. Relief Valve,
 - b. Flow Control Valves
 - c. Directional Control Valves
 - d. Pressure Control Valves
2. Circuits for reciprocating motion of a single acting and double acting pneumatic cylinders.
3. Circuits for reciprocating motion of hydraulic cylinders.
4. Circuits for speed control of a
 - (a) double acting pneumatic cylinder.
 - (b) Double acting hydraulic Cylinder.
5. Circuits for semi automatic and automatic operation of a double acting Pneumatic cylinders.
6. Circuits for semi automatic and automatic operation of a double acting hydraulic cylinders.
7. Circuits for sequencing motion of two pneumatic cylinder
 - (a) by cascading
 - (b) by using a sequence valve
8. Circuits for Measurement of pressure of air/oil in fluid power system.
9. Design and simulation of pneumatic circuits using simulation software.
10. Design and simulation of hydraulic circuits using simulation software.

CNC &ROBOTICS LABwww.universityupdates.in

1. Study and operation of CNC lathe.
2. Study and operation of CNC milling machine.
3. Preparation of typical part programs of CNC lathe.
4. Preparation of typical part programs on CNC milling machine.
5. Exercises using CAM software.
6. Communication within Flexible Manufacturing Cell-cell computer

to machine, cell computer to robot, Machine - to - machine Interfacing.

7. Part program generation through G and M Codes for turning, contouring, drilling, and Milling.
8. Development of tool path simulation by setting tool offsets for multi operations.
9. Machining of various Components by generation of CNC code by CAM Software.
10. Robot Programming.

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