

Chhattisgarh Swami Vivekanand Technical University, Bhilai

SCHEME OF TEACHING AND EXAMINATION

B.E. VIII SEMESTER MECHATRONICS ENGINEERING

S. No.	Board of Study	Sub. Code	SUBJECT	PERIODS PER WEEK			SCHEME OF EXAM Theory/Practical			TOTAL MARKS	Credit L+(T+P)/2
1	Mech. Engg.	337811(37)	Robotics	4	1	-	80	20	20	120	5
2	Electronics and Telecom	367811 (28)	Process Control	4	1	-	80	20	20	120	5
3	Mech. Engg.	367812 (37)	Mechatronics Systems Design	4	1	-	80	20	20	120	5
4	Refer Table 3		Professional Elective 3	4	1	-	80	20	20	120	5
5	Refer Table 4		Open Elective – IV	4	1	-	80	20	20	120	5
6	Mech. Engg.	337821 (37)	Robotics Lab	-	-	2	40	-	20	60	1
7	Electronics and Telecom	367821 (28)	Process Control Lab	-	-	2	40	-	20	60	1
8	Mech. Engg.	367822 (37)	Simulation Lab	-	-	2	40	-	20	60	1
9	Mech. Engg.	367823 (37)	Major Project	-	-	6	100	-	80	180	3
10	Mech. Engg.	300824 (37)	Report Writing and Seminar	-	-	2	-	-	40	40	1
11			Library	-	-	1	-	-	-	-	-
Total				20	5	15	620	100	280	1000	32

L- Lecture T- Tutorial

P- Practical, ESE- End Semester Exam

CT- Class Test TA- Teacher's Assessment

Table – III			
Professional Elective- III			
S.No.	Board of Studies	Code	Name of Subject
1	Mech. Engg.	337813 (37)	Production Management
2	Mech. Engg.	367881 (37)	Engg. Materials
3	Mech. Engg.	367882 (37)	Product Development
4	Electronics and Telecom	367883 (28)	Neural Network & Fuzzy Systems
5	Electronics and Telecom	367884 (28)	Programmable Logic Controller
6.	Electronics and Telecom	367885 (28)	Automotive Electronics

Note : 1/4th of total strength of students subject to Minimum Strength of twenty students is required to offer an elective in the college in a particular academic session.

Note : Choice of elective course once made for an examination cannot be changed for future examinations.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Table – IV

Open Elective -IV			
S.No.	Board of Studies	Code	Name of Subject
1	Management	300881 (36)	Enterprise Resource Planning
2	Information Technology	300882 (33)	E-Commerce & strategic IT
3	Management	300883 (36)	Technology Management
4	Information Technology	300884 (33)	Decision Support & Executive Information System
5	Computer Science & Engg.	300885 (22)	Software Technology
6	Management	300886 (36)	Knowledge Entrepreneurship
7	Management	300887 (36)	Finance Management
8	Management	300888 (36)	Project Planning, Management & Evaluation
9	Mechanical Engg.	300889 (37)	Safety Engineering
10	Computer Science & Engg.	300890 (22)	Bio Informatics
11	Mechanical Engg.	300891 (37)	Energy Conservation & Management
12	Nanotechnology	300892 (47)	Nanotechnology
13	Management	300893 (36)	Intellectual Property Rights
14	Mechanical Engg.	300894 (37)	Value Engineering
15	Civil Engg.	300895 (20)	Disaster Management
16	Civil Engg.	300896 (20)	Construction Management
17	Civil Engg.	300897 (20)	Ecology and Sustainable Development
18	Chem. Engg.	300898 (19)	Non Conventional Energy Sources
19	Electrical Engg.	300899 (24)	Energy Auditing and management

Note (1) – 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a particular academic session.

Note (2) - Choice of elective course once made for an examination cannot be changed in Future examinations.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Subject: Robotics

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg. , Mechatronics Engg.

Code: 337811 (37)

Total Tutorial Period : 12

UNIT – I

Introduction to Robotics

Evolution of Robots and Robotics, Laws of Robotics, What is and What is not a Robot, Progressive Advancement in Robots, Robot Anatomy, Human Arm Characteristics, Design and Control Issues, Manipulation and Control, Sensors and Vision, Programming Robots, The Future Prospects, Notations.

UNIT – II

Coordinate Frames, Mapping and Transforms

Coordinate Frames, Description of Objects in Space, Transformation of Vectors, Inverting a Homogeneous Transform, Fundamental Rotation Matrices

UNIT – III

Symbolic Modeling of Robots – Direct Kinematic Model

Mechanical Structure and Notations, Description of Links and Joints, Kinematic Modeling of the Manipulator, Denavit – Hartenberg Notation, Kinematic Relationship between Adjacent Links, Manipulator Transformation Matrix. Introduction to Inverse Kinematic model

UNIT – IV

Robotic Sensors and Vision

The Meaning of Sensing, Sensors in Robotics, Kinds of Sensors used in Robotics, Robotic vision, Industrial Applications of Vision-Controlled Robotic Systems, Process of Imaging, Architecture of Robotic Vision Systems, Image Acquisition, Description of Other components of Vision System, Image Representation, Image Processing.

UNIT – V

Robot Applications

Industrial Applications, Material Handling, Processing Applications, Assembly Applications, Inspection Application, Principles for Robot Application and Application Planning, Justification of Robots, Robot Safety, Non-Industrial Applications, Robotic application for sustainable Development.

TEXT BOOKS

1. Robotics & Control – R.K. Mittal & I.J. Nagrath – TMH Publications
2. Robotics for Engineers - Yoram Korean- McGrew Hill Co.
3. Industrial Robotics Technology programming and Applications - M.P.Groover, M.Weiss, R.N.Nagel, N.G.Odrey

REFERENCE BOOKS

1. Robotics Control Sensing, Vision and Intelligence - K.S.Fu, R.C.Gonzalez, C.S.G.Lee- McGrew hill Book co.
2. Kinematics and Synthesis of Linkages - Hartenberg and Denavit - McGrew Hill Book Co
3. Kinematics and Linkage Design - A.S. Hall - Prentice Hall
4. Kinematics and Dynamics of Machinery - J.Hirshhorn - McGrew HillBook Company

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Subject: Process Control

Total Theory Periods: 40

Total Marks in End Semester Examination: 80

Minimum number of Class tests to be conducted: Two

Branch: Mechanical Engg. , Mechatronics Engg.

Code: 367811 (28)

Total Tutorial Periods: 10

UNIT – I : Introduction to Process control & process characteristics

Types of processes, process characteristics and controllability, step analysis method of finding time constant, self regulating and nonself regulating. Processes, interacting & non-interacting processes.

Unit II: Basic Control Actions

Characteristics of on-off, proportional, single -speed floating control, integral and derivative modes – composite control modes - PI, PD and PID control modes - Response of controllers for different types of test inputs – Integral wind up - Auto - manual transfer - Selection of control mode for different processes - Typical control schemes for level, flow, pressure and temperature.

Unit III: Process Dynamics

Elements of process control - process variables - degrees of freedom - Characteristics of liquid system, gas system, thermal system - Mathematical model of liquid process, gas process, flow process, thermal process, mixing process - Batch process and continuous process - Self regulation.

UNIT – IV : Process Control

Multiloop & multivariable process control systems, Feedback control, feed forward control, Cascade control, ratio control, auto selective control, adaptive control system, Coupling & decoupling control system, scaling the instruments. Analysis of flow, level, temperature loops.

UNIT – V : Applications of Process Control

Boiler Control: Combustion control, Air to fuel ratio control, 3-element drum level control, steam pressure, temp control, burner management and control, safely interlocks. Furnace control, FB-FF-CS of heat exchanger, Evaporator control.

Distillation column control: Flow control of distillate and bottoms products, reflux control, composition control, pressure & Temperature control. Reactor control:- Flow, temp, Pressure, endpoint controls , Reactor safety interlocks. Dryer control, pumps & compressor control, cooling Tower control, water treatment control.

Text Books :

1. Eckman, D.P., “ Automatic Process Control” , Wiley Eastern,1985.
2. Patranabis, D.,: “ Principles of Process Control”, TMH 1981.

Reference Books:

1. Process Instrumentation & Control Handbook by Considine .
2. Process Control Handbook by Bela G. Liptak
3. Process Control System 3/e by F.G.Shinskey, McGraw Hill.
4. Curtis Johnson, D., “ Process Control Instrumentation Technology” , Prentice Hall Of India,1996.
5. Peter Harriot.,: “Process Control” , TMH
6. Coughanoner, and Koppel., : “ Process Systems Analysis and Control” , TMH 1991.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Subject: Mechatronics System Design

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg. , Mechatronics Engg.

Code: 367812 (37)

Total Tutorial Period: 10

UNIT I

Mechanical systems and design:

Mechatronic approach – Control, program control, adaptive control and distributed systems – Design process – Types of Design – Integrated product design – Mechanisms, load conditions, design and Specialisation
Mechatronics Mechanical flexibility – Structures, load conditions, flexibility and environmental isolation – Man machine interface, industrial design and ergonomics, information transfer from machine to man and to machine, safety.

UNIT II

Motion control:

Control devices – Electro hydraulic control devices – Electro pneumatic proportional controls – Control of electrical drives – Basics of Magnetic circuits – Linear systems – Pneumatic ram – Hydraulic cylinder – Direct linear electrical actuators – Solenoids – Pneumatic motors- continuous and limited rotation – Hydraulic Motors: continuous and limited rotation – Brushless DC Motors – Hydraulic circuits and Pneumatic Circuits.

UNIT III

Advanced applications:

Sensor for condition monitoring - Mechanical control in automated manufacturing – Artificial Intelligence and Fuzzy – Micro sensors application and real time interfacing - Elements of Data acquisition and control - Overview of Input/Output process.

UNIT IV

Virtual Instrumentation:

Functional description of a digital instrument- Block diagram of a virtual instrument- Architecture of virtual instruments - advantages of virtual instruments-Hardware and software- Basics of LabVIEW, For and while loops, structures, Arrays and clusters, graphs and charts, String handling, Basics of data acquisition, Data acquisition with LabVIEW, Interfacing Instruments:GPIB,RS232.

UNIT V

Case Studies:

Testing of transportation bridge surface materials- Rotary optical encoder-controlling temperature of a hot/cold reservoir-pH control system-Design of a coin counter-design of a robotic walking machine-skip and control of a CD player, strain gauge weighing system.

Text Books:

1. Bolton, “Mechatronics – Electronic Control Systems in Mechanical and Electrical Engineering”, Second Edition, Addison Wesley Longman Ltd., 1999.
2. Devdas Shetty, Richard A.Kolk, “Mechatronic System Design”, PWS Publishing Company, 1997.
3. Sanjay Gupta, Joseph John,“Virtual Instrumentation using LabVIEW”, Tata McGraw Hill,2005.

Reference Books:

1. Bradley D.Dawson, Burd, N.C. and Loader, A.J., “Mechatronics: Electronics in Products and Processes”, Chapman and Hall, London, 1991
2. Brian Morriss, “Automated Manufacturing Systems - Actuators, Controls, Sensors and Robotics”, Mc Graw Hill International Edition, 1995
3. Burford Furman. Dave Pinkernell and Steve Elgee, “Case Studies on Design of Mechatronic Products”. IEEE Transactions on Components, Packaging and Manufacturing Technology – Part C, Vol 20. No.1. Jan .1997.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Subject: Production Management

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg. , Mechatronics Engg.

Code: 337813 (37)

Total Tutorial Period : 12

UNIT-I

Production Management

Definition, objectives, scope, benefits, functions of production management, place of production management in an organization, types of production system, Product life cycle, product design and development, production cycle.

Costing and Cost Analysis

Elements of costs, Break even analysis, Incremental costs, make or buy decision.

UNIT-II

Sales Forecasting

Purposes, methods – Delphi, linear regression, economic indicators, time-series analysis, adjustment for seasonal variations, moving average, exponential smoothing.

UNIT-III

Production Planning and Control

Functions, Organization, Master Scheduling, Aggregate planning and strategies ,Materials requirement planning, product structure tree, Routing, Loading Scheduling – forward and backward, Dispatching – priority rules, Sequencing, Johnson's algorithm for n jobs and two machines, Gantt's chart, Bar chart, Flow process chart.

Materials Handling

Principles of materials handling, unit load, Types of materials handling equipment, Relation between materials handling and plant layout.

UNIT - IV

Material Management

Objectives and functions of materials management, Organization of materials management.

Procurement

Objectives of purchase deptt. purchase responsibilities and organization, types of purchasing, purchase procedures, Import and Export.

Stores Keeping

Stores management, functions of stores, classification of materials, standardization of materials, identification and maintenance of layout of stores, physical control of materials, pricing of stores, issuing of stores.

Inventory Control

Objective, scope and functions of inventory control, inventory control techniques, economic ordering quantity, periodic ordering quantity, A.B.C. analysis, General idea regarding inventory control under risk and uncertainty.

UNIT – V

Quality Control

Difference between inspection and quality control, acceptance sampling, procedure's risk and consumer's risk, operating characteristic curve for single sampling plan, AOQL

Quality of conformance, quality of design, economics of quality, SQC charts for variables and attributes.

Introduction toJIT manufacturing, kanban system.

TEXT BOOKS

1. Production and operation Management – By P. Ramamurty – New Age International Pub., 2005
2. Production and operation Management – By R. Mayer – TMH
3. Quality Planning and Analysis, Juran and Gryna

REFERENCE BOOKS

1. Industrial Engineering & Production Management – Martand Telsang – S. Chand & Co., 2004
2. Production and operations Management by – Adam and Ebert – PHI – 6th Edn., 2003
3. Production planning and Control – By Samuel Eilon, Navneet Prakashan Ltd., Bombay

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Sub : Engineering Materials

Total Theory Periods : 40

Total Marks in End Semester Exam : 80

Minimum number of class tests to be conducted : 02

Branch: Mechanical Engg. , Mechatronics Engg

Code : 367881 (37)

Total Tutorial Periods : 10

UNIT – I

a) Engineering Materials:

Selection of materials based on properties, cost, availability, appearance, service life and recycling, Mechanisms of strengthening in metals – strengthening by grain reduction, solid solution strengthening, strain hardening, failure mechanism fracture – Ductile, Brittle, Griffith theory of brittle fracture, methods of fracture protection, fatigue, creep.

b) Modern methods for materials studies:

Optical Microscopy, Electron Microscopy, Chemical Analysis using atomic absorption spectroscopy, photo electron spectroscope, magnetic response, Moss Bayer spectroscopy, non destructive testing (NDT)

UNIT – II

a) Iron & Steel

Iron, steel, classification, designation of Iron & Steel, properties and applications of steels, alloy steels, effect of alloying element, functions and uses of alloying elements, typical examples of alloy stress, stainless steel – types, properties, corrosion, resistance, selection, failure, tool steel, structural steels, HSLA steel, Heat treatment of iron & steel.

b) Non Ferrous metals and alloys

Copper – properties of copper, uses of copper

Copper alloys – properties and uses of brasses and bronzes

Aluminum – Aluminum castings, wrought Aluminum alloy, application of Aluminum and its alloys.

Magnesium – Application of Magnesium and its alloys

Titanium – Titanium and its alloys

Lead, Tin and Nickel

Heat treatment of non ferrous metal & alloys

UNIT – III

Polymers:

The structure of polymers, thermoplastics, thermos setting plastics, additives in plastics, properties and applications of thermo plastics, thermo setting plastics, biodegradable plastics, elastomers (rubber)

UNIT – IV

Ceramics and Composites:

a) Ceramics: Ceramics and non ceramic phases, classification of ceramics, the structure of ceramics, properties and application of ceramics, glass, glass ceramics, graphite, diamond.

b) Composite: Introduction, particle reinforced composite, fiber reinforced composite, structural composite, other composites, their structure, properties and applications.

UNIT – V

Miscellaneous Materials

a) Dielectric Material: Basic concept, frequency and temperature dependencies, energy loss, requirement of insulating materials, insulating materials and their application.

- b) **Magnetic Materials:** Ferro magnetic anisotropy, hard and soft magnetic materials, application of soft and hard magnetic material.
- c) **Super Conductivity:** Experimental results, theoretical approaches, flux quantization, electron tunneling, application of super conducting
- d) **Semi Conductors:** Energy band concept, Intrinsic and Extrinsic semiconductors, mechanism of current conductors, materials for semiconductors, application of semi conducting materials.
- e) Materials for Nuclear and space applications

TEXT BOOKS

1. Science of Engineering Materials – C.M. Shrivastava and C. Srinivasan – New Age Publishers, New Delhi (1997)
2. Advances in Material Science for Engineers and Technologists – Dr. R.K. Dongre, Dr. A.K. Sharma – S.K. Kataria & Sons, New Delhi (2001)

REFERENCES

1. Elements of Material Science and Engineering – Lawrence H. Van Vlack - Addison Wesley Publishing Company
2. Modern Materials and Manufacturing Processes – R.G. Bruce, W.K. Dalton, J.E. Neely, R.R. Kibbe, Pearson - Prentice Hall of India
3. Manufacturing Engineering and Technology – S. Kalpakjian, S.K. Schmid – 4th Edition – Pearson Education, Asia

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Subject: Product Development

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 367882 (37)

Total Tutorial Period: 12

UNIT-I

Product Development Process

Background for design, design theory ,design materials, human factors in design applied ergonomics, product development processes and organization, identifying customer needs, establishing product specifications..

UNIT-II

Product Design Methods

Concept generation ,selection of a concept, Testing of concept, Physical reliability & Economic feasibility of design concepts, product architecture, Creative and rational clarifying objectives- the objective trees methods, establishing functions – the function analysis methods, setting requirement- requirements specification methods determining characteristics – the QFD method, generating alternatives-the morphological chart method, evaluating alternatives- the weighted objectives methods, improving details-the value engineering method and design strategies.

UNIT –III

Design for Manufacture

Estimating manufacturing costs, reducing component, assembly and support cost design for assembly, design for disassembly, design for environment, design for graphics and packaging, effective prototyping – principle and planning.

UNIT –IV

Industrial Design

Its need - Ergonomic needs, Aesthetic needs, impact, accessing the quality, steps involved in Industrial design process, Management of Technology & user driven products, Technological Forecasting

UNIT – V

Patents, Product Development & Project Management

Legal issues in product design, trademarks, trade-secret, copy rights, patents – types, steps for disclosure, design resources, economics – quantitative & qualitative analysis, management of product development projects, Design Structure Matrix, Gantt Chart, Project schedule, budget, risk plan, accelerating project, execution, assessing and correction, Intellectual property rights.

TEXT BOOKS

1. Karl. T. Ulrich and Steven D. Eppinger “Product Design & Development” – TMH – 3rd addition
2. Kevin Otto and Kristin wood “Product Design” –Pearson Education
3. Chitale & Gupta, “Product Development”, Tata McGraw Hill.

REFERENCE BOOKS

1. Monks, J.G, “Operations Management”, McGraw Hill, 1977
2. Francis, R. L., and White, J. A., “Facility Layout and Location”, Prentice Hall of India, 1974
3. Imad Moustapha “Concurrent Engineering in Product Design and Development” – New Age International Publishers

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Subject: Neural network & Fuzzy Systems (Elective – III)

Total Theory Periods: 40

Total Marks in End Semester Examination: 80

Minimum number of Class tests to be conducted: Two

Branch: Mechanical Engg.

Code: 367883 (28)

Total Tutorial Periods: 10

UNIT – I: Introduction and different architectures of neural networks :

Artificial neuron - MLP – Back propagation – Hopfield networks – Kohonen self organizing maps – adaptive resonance theory.

UNIT – II: Neural network for controls

Schemes of neuro-control – Identification and control of dynamics systems – adaptive neuro controllers – case study.

UNIT – III: Introduction to fuzzy logic.

Fuzzy sets – fuzzy relations – fuzzy conditional statements – fuzzy rules – fuzzy algorithm.

UNIT – IV: Fuzzy logic control system

Fuzzy logic controller – fuzzification interface- knowledge base- decision making logic – Defuzzification interface – decision of fuzzy logic controller – case study.

UNIT – V: Neuro Fuzzy logic control

Optimization of membership function and rules base of fuzzy logic controller using neural networks – generic algorithm – Fuzzy neuron – Adaptive Fuzzy systems – case study.

List of Text Books:

1. Kosko B, “Neural Networks & Fuzzy Systems”
2. Milion W.T., Sutton R.S. & Webrose P.J. , “Neural network for controls” MIT Press.

List of Reference Books:

1. Zimmermann H.J. , Fuzzy set theory & Applications , Allied Publications
2. Laurance Fausett, Fundamentals of Neural Networks, Prentice Hall
3. Rolstan D.W., “Principles of Artificial and Expert systems Development”, McGraw Hill Book Company.
4. Tsoukalas L.H. & Robert Uhrig, “Fuzzy & Neural Approach in Engineering ” John Wiley & Sons.
5. Klir G.J. & Yuan B.B. , “Fuzzy sets & Fuzzy logic” Prentice Hall of India

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Subject: Programmable Logic Controller (Elective – III)

Total Theory Periods: 40

Total Marks in End Semester Examination: 80

Minimum number of Class tests to be conducted: Two

Branch: Mechanical Engg.

Code: 367884 (28)

Total Tutorial Periods: 10

UNIT I

Programmable Logic: Introduction, programmable Logic structures Programmable Logic Arrays (PLAs), Programmable Array Logic (PALs), Programmable Gate Arrays (PGAs), Field Programmable Gate Arrays (FPGAs) Sequential network design with Programmable Logic Devices (PLDs) Design of sequential networks using ROMs and PLAs Traffic light controller using PAL.

UNIT II

Programmable Logic Controllers (PLCs): Introduction Parts of PLC Principles of operation PLC sizes PLC hardware components I/O section Analog I/O section Analog I/O modules, digital I/O modules CPU. Processor memory module Programming devices Diagnostics of PLCs with Computers.

UNIT III

PLC programming: Simple instructions Programming EXAMINE ON and EXAMINE OFF instructions Electromagnetic control relays Motor starters Manually operated switches Mechanically operated and Proximity switches Output control devices Latching relays PLC ladder diagram Converting simple relay ladder diagram in to PLC relay ladder diagram.

UNIT IV

Timer: Instructions ON DELAY timer and OFF DELAY timer counter instructions Up/Down counters Timer and Counter applications program control instructions Data manipulating instructions math instructions.

UNIT V

Applications of PLC: Simple materials handling applications Automatic control of warehouse door Automatic lubricating oil supplier Conveyor belt motor control Automatic car washing machine Bottle label detection. Process control application.

List of Text Books:

1. Charles H. Roth, Jr " Fundamentals of Logic Design ", Fourth Edition, Jaico Publishing House.
2. Frank D. Petruzella " Programmable Logic Controllers ", McGraw- Hill book, company.

List of Reference Books:

1. William I. Fletcher " An Engineering Approach to Digital Design ", Prentice, Hall of India Ltd.
2. Programmable Logic Controllers: Principles & Applications, Webb & Reis, Prentice Hall of India.
3. Programmable Logic Control: Principles & Applications, NIIT, Prentice Hall of India.
4. Siemens " PLC Handbook ".

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: VIII

Subject: Automotive Electronics (Elective – III)

Total Theory Periods: 40

Total Marks in End Semester Examination: 80

Minimum number of Class tests to be conducted: Two

Branch: Mechatronics

Code: 367885 (37)

Total Tutorial Periods: 10

UNIT I

Introduction: Automotive component operation Electrical wiring terminals and switching Multiplexed wiring systems Circuit diagrams and symbols. Charging Systems and Starting Systems: Charging systems principles alternations and charging circuits. New developments requirements of the starting system. Basic starting circuit.

UNIT II

Ignition systems: Ignition fundamental, Electronic ignition systems. Programmed ignition distribution less ignition direct ignition spark plugs. Electronic Fuel Control : Basics of combustion Engine fuelling and exhaust emissions Electronic control of carburation Petrol fuel injection Diesel fuel injection.

UNIT III

Instrumentation Systems: Introduction to instrumentation systems Various sensors used for different parameters sensing Driver instrumentation systems vehicle condition monitoring trip computer different types of visual display

UNIT IV

Electronic control of braking and traction: Introduction and discription control elements and control methodology Electronic control of Automatic Transmission: Introduction and description Control of gear shift and torque converter lockup Electric power steering Electronic clutch.

UNIT V

Engine Management Systems: Combined ignition and fuel management systems Exhaust emission control Digital control techniques Complete vehicle control systems Artificial intelligence and engine management Automotive Microprocessor uses.

Lighting and Security Systems: Vehicles lighting Circuits Signaling Circuit Central locking and electric windows security systems Airbags and seat belt tensioners Miscellaneous safety and comfort systems

List of Text Books:

1. Tom Denton, Automobile Electrical and Electronic Systems, Edward Arnold Pub.
2. Young A.P. & Griffiths, “Automotive Electrical Equipment”, ELBS & New Press.

List of Reference Books:

1. Don Knowels, Automotive Electronic and Computer controlled Ignition Systems, Prentice Hall
2. William, T.M., Automotive Mechanics, McGraw Hill Book Co.,
3. Ronald K Jurgen, Automotive Electronics Handbook, McGraw Hill, Inc.
4. William B. Riddens, “Understanding Automotive Electronics”, 5th Edition, Butterworth Hennimann Woburn’
5. Crouse W.H., “Automobile Electrical Equipment”, Mc Graw Hill Co. Inc.
6. Bechhold, “Understanding Automotive Electronic”, SAE.
7. Robert Bosch,” Automotive Hand Book”, SAE (5TH Edition).

Chhattisgarh Swami Vivekanand Technical University, Bilai (C G)

Semester: B.E. VIII Sem.

Branch: Mechanical Engg., Mechatronics Engg.

Subject: Robotics Lab

Code: 337821 (37)

Total Practical Periods: 28

Total Marks in End Semester Exam: 40

EXPERIMENTS TO BE PERFORMED (MINIMUM FIVE NUMBERS)

1. To detect the sensor scanning system to overcome limitation of fixed sensors on various robotic applications, ultrasonic sensor, laser range finders, infrared detectors and miniature.
2. To find the horizontal and vertical movement up to 180o in either direction.
3. To detect objects with infrared ray detector.
4. To determine object distance (3cm – 300cm).
5. To detect distance (10cm to 80 cm) with infrared object detector.
6. To determine 5 Axis Robotic Arm movement and its degree of rotation.
7. To lift the object and place 100m away in various directions.
8. To find the gripper movement (0 to 50mm).
9. To study various Robotic Arm Configurations.
10. To study Pick and Place Robot

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. 5 Axis Robotic Arm System
2. Hex Crawler Robot. The Mechatronics Robot
3. Ultrasonic Range Finder
4. Servo Power Supply
5. Infrared Object/Distance Detector
6. A 7.2V Battery Charger
7. Blue Tooth Transducer
8. Blue Tooth Pc Adaptor
9. Various Wooden Models to study Robotic Arm Configuration
10. Working model of Pick and Place Robot

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: B.E. VIII Sem.

Subject: Process Control Lab

Total Practical Periods: 24

Total Marks in End Semester Examination: 40

Branch: Mechanical Engg.

Code: 367821 (28)

List of Experiments to be performed: (at least 12 experiments are to be performed out of the following list)

1. On-Off Controller with and without neutral zone
2. Controller tuning using continuous cycling methods
3. Controller tuning using Process Reaction Curve
4. Study of P, I, D, PI, PD and PID Controller for : Temperature, Pressure, Flow and Level control system
5. Calibrations and tuning of a PID controllers.
6. Test and find the characteristics of a given control valve.
7. To study the auto tuning PID controller using virtual instrumentation (LABVIEW) based DAQ.
8. To maintain the constant pressure of a process (Pressure) tank using Auto PID in LABVIEW.
9. To study the closed loop operation of the Temperature Process control using Auto PID controller with LABVIEW. Also To find the K_c and T_i value of the PID controller for a particular set point.
10. Study of a typical Temperature Control Loop having Furnace, suitable final control element, SMART/Analog temperature transmitter (hand held communicator for SMART Transmitter), PID controller, and data logger etc.
11. Study of a typical Pressure Control Loop having Pressure source, Pneumatic control valve, I to P Converter, Compressor, SMART/Analog pressure transmitter, and PID controller etc.
12. Study of a typical Flow Control Loop having SMART/Analog DP/Mass Flow meter, Motorized / Pneumatic control valve (I to P Converter and Compressor for pneumatic control valve), and PID controller etc.
13. Study of a typical Level Control Loop having Ultra Sonic/ Capacitor Level Transmitter, Motorized / Pneumatic control valve (I to P Converter and Compressor for pneumatic control valve), and PID controller etc.
14. Study of a typical Duct Air Flow monitoring and Control.
15. PLC Programming through PC
16. Study of a PC based Simulation Software i.e. simulation of boiler of a power plant etc.
17. Study of flow/temperature control loop with DCS

List of Instruments:

All sorts of transducers with kits, Discrete components like OPAMP, Resistor & Capacitors, Voltage source, Function generator, CRO, Models of Process Control, NI-LabView, MATLAB with SIMULINK

Reference Book:

Handbook of Instrumentation, Liptak

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: VIII

Subject: Simulation Lab

Total Practical Periods: 28

Total Marks in End Semester Examination: 40

Branch: Mechatronics

Code: 367822 (37)

Experiments to be performed:

- To Design, implement and Simulate Fixed bias and self bias transistorized circuit for determining the bandwidth
- To Design, implement and Simulate Fixed bias and self bias for studying the low frequency and high frequency effect.
- To Design, implement and Simulate Miller integrator for determining the nonlinearities.
- To Design, implement and simulate current Sweep generator for determining the nonlinearities.
- To Design, implement and Simulate Inverting and non inverting amplifier for determining the bandwidth
- To Design, implement and Simulate Integrator & differentiator for studying output responses for different inputs.
- To Design, implement and Simulate zero crossing detector & comparator for studying output responses for different inputs.
- To Design, implement and Simulate Series Voltage regulator.
- To Design, implement and Simulate 1 st & 2nd order LPF for determining the bandwidth and studying output responses for different inputs.
- To Design, implement and Simulate 1 st & 2 nd order HPF for determining the bandwidth
- To Design, implement and Simulate Half wave & Full wave rectifier way op-Amp for determining the bandwidth.
- To Design, implement and Simulate Series and Shunt Clipper for studying output responses
- To Design, implement and Simulate Clamping circuit for studying output responses for different inputs
- To Design, implement and Simulate Clamping Circuit with op-Amp for studying output responses for different inputs.
- To Design, implement and Simulate Instrumentation Amplifier using three op-Amp for determining the bandwidth
- To Design, implement and Simulate Monostable & Astable using 555 timer
- To Design, implement and Simulate R -2R ladder type Digital to analog converter
- To Design, implement and Simulate Flash type Analog to digital

List of Equipments/Machine Required:

Desktop PCs, Simulation Software for Analog Circuits like MULTISIM, PSPICE etc.

Recommended Books:

1. Experiments and SPICE Simulations in Analog Electronics Laboratory, Maheswari & Anand, PHI
2. Manuals of MUSLTISIM
3. Manuals of PSPICE

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C G)

Semester: BE VIII

Subject: Report Writing & Seminar

Total No. of periods: 2 per week

Total marks in End Semester Exam: Nil

Minimum Number of class test to be conducted: 2

Branch: Mechanical Engg., Mechatronics Engg.

Code: 300824 (37)

Total Tutorial Periods : Nil

Teacher's Assessment: 40 marks

Unit - I

Introduction to Technical Writing: how differs from other types of written communication Purpose of technical writing, Correspondence: prewriting, writing and rewriting Objectives of Technical Writing. Audience Recognition: High-tech audience, Low tech audience, Lay audience, Multiple Audience.

Unit - II

Correspondence: Memos, Letters, E-mails, Its differentiation, types of letters, Document Design, its importance, Electronic Communication: Internet, Intranet, extranet, Writing effective e-mail.

Unit - III

Summary: Report Strategies, Effective style of technical report writing: Structures: content, introduction, conclusions, references, etc., Presentation, Writing first draft, revising first draft, diagrams, graphs, tables, etc. report lay-out.

Unit -IV

Report Writing: Criteria for report writing, Types of Report: Trip report, Progress report, lab report, Feasibility report, project report, incident report, etc. Case Studies.

Unit -V

Proposals & Presentation: Title page, Cover letter, Table of Content, list of illustrations, summary, discussion, conclusion, references, glossary, appendix, Case Studies. Oral Presentation/ Seminar:

Text Books:

1. Sharon J. Gerson & Steven M. Gerson "Technical Writing - Process & Product", Pearson Education.

Reference Books:

1. Sunita Mishra, "Communication Skills for Engineers" Pearson Education
2. Davies J.W. "Communication for engineering students", Longman
3. Eisenberg, "Effective Technical Communication", Mc. Graw Hill

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI (C.G.)**

Semester: VIII

Subject :Enterprise Resource Planning

Total Theory Periods : 40

Total Marks in End Semester Exam : 80

Minimum no. of class tests to be conducted : 2

Branch : Common to All Branches

Code : 300881 (36)

Total Tut Periods : 10

UNIT-1

Conceptual foundation of Business Process reengineering: Role of information Technology and BPR; Process improvement and Process redesign, Process identification and mapping; Role/Activity diagrams, Process Visioning, and benchmarking.

[No of Periods: 8 + 2]

UNIT -2

Enterprise Resource Planning: Evolution of ERP- MRP and MRP II, structure of ERP- two tier architecture, three tier architecture, Electronic data processing, management information system, Executive information system, ERP as an integrator of information needs at various Levels.

[No of Periods: 8

+ 2]

UNIT -3

Typical Business Processes: Core processes, Product control, Sales order processing, Purchases, Administrative processes, Human resource, Finance support processes, Marketing, Strategic planning, Research and development, Problems in traditional view.

[No of Periods: 8 + 2]

UNIT -4

ERP models/functionality: Sales order processing, Production scheduling, forecasting, distribution, finance, features of each of the models, description of data flow across each module, overview of supporting databases & packages.

[No of Periods: 8 + 2]

UNIT -5

ERP implementation issues: Opportunities and problems in ERP selection, and implementation; ERP implementation: identifying ERP benefits, team formation, Consultant intervention, Selection of ERP, Process of ERP.

[No of Periods: 8 + 2]

Books:

1. V.K. GARG & N .K. VENKATKRISHNAN:, ERP, Concepts and Practices, PM
2. Rahul V. Altekar, Enterprise wide Resource Planning-theory and practice, PHI

References:

1. ALEXIS LEON: Enterprise Resource Planning, TMH
2. S. SADAGOPAN: MIS, PM
3. V. RAJARAMAN: Analysis and Design of Information Systems, PHI
4. MONK' & BRADY: Concepts in ERP, Vikas pub, Thomson

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI (C.G.)

Semester: **VIII**

Branch: **Common to All**

Branches

Subject: **E-Commerce and Strategic IT**

Code: **300882 (33)**

Total Theory Periods: **50**

Total Tutorial Periods: **Nil**

Total Marks in End Semester Exam: **80.**

Minimum number of class tests to be conducted: **02**

UNIT – I Introduction: What is E-Commerce, Forces behind E-Commerce, E-Commerce Industry Framework, and Brief History of E-Commerce. Inter Organizational E-Commerce, Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce, Architectural framework

Unit – II

Network Infrastructure : LAN, Ethernet(IEEE standard 802.3) LAN , WAN , Internet, TCP/IP Reference Model, Domain Name Server , Internet Industry Structure,

UNIT – III

Electronic payment systems, types of electronic payment systems, digital token-based electronic payment systems, smart cards & electronic payment systems, credit card based electronic payment systems, risk and electronic payment systems, designing electronic payment systems.

UNIT – IV

Information Distribution and Messaging: FTP,E-Mail,WWW server,HTTP, Web service implementation, Information publishing , Web Browsers, HTML, Common Gateway Interface

UNIT – V Mobile & wireless computing fundamentals, mobile computing framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications, personal communication service.

BOOKS :

1. Frontiers of E-commerce by Kalakota & Whinston (Addison-wesley) E-business roadmap for success by Dr. Ravi Kalakota & Marcia Robinson (addision wesicy)
2. Electronic Commerce By Bharat Bhasker (TMH)

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI (C.G.)**

Semester: VIII
Subject Name: Technology Management
Total Theory periods: 40
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Branch: **Common to All Branches**
Subject Code: 300883 (36)
Total Tutorial periods: 10

Unit I

Technology: - Definitions, Types and Characteristics, Management of Technology (MOT), Technological Environment, Parameters of Technological Environment; Science & Technology in India.

[No of Periods: 8 + 2]

Unit II

Innovation Management: - Invention v/s Innovation, Definition and components of innovation. Types of innovations: Product, Process and system innovations, Understanding Innovation Process.

[No of Periods: 8+ 2]

Unit III

Technology life cycle, Technology evolution and S-curves of Technology Evolution, Technology Diffusion, Dynamics of Diffusion, Mechanism of Diffusion.

[No of Periods: 8 + 2]

Unit IV

Technology strategies & Intelligence: Technology Strategy & types, Models for technology strategy formulation Definition of Technology Intelligence, Technology Audit, Process of Technology Intelligence: Technology Scanning, Monitoring, Forecasting and Assessment.

[No of Periods: 8 + 2]

Unit V

Acquisition and technology transfer. **Over view of - GATT, Intellectual property rights (IPR)**

[No of Periods: 8 + 2]

Texts Books:

1. V. K. Narayanan, "Managing Technology and Innovation for competitive advantage", Pearson Education.
2. Tarek Khalil, "Management of Technology", McGraw Hill.

Reference Books:

1. Lowell Steele, "Managing Technology", McGraw Hill.
2. R. A. Burgelman and M. A. Maidique, "Strategic Management of Technology and Innovation", Irwin.
3. Plsek, Crativity, Innovation and Quality, PHI

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C.G.)**

Semester: VIII

Branch: Common to all Branches

Subject: Decision Support and Executive Information System Code: 300884(33)

Total Theory Periods: 50

Total Tut Periods: Nil.

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02.

UNIT-I Decision Support System:

What is a DSS, Decision Making Rational Decisions, Definitions of Rationality, Bounded Rationality and Muddling Through, The Nature of Managers, Appropriate Data Support, Information Processing Models, Group Decision Making?

UNIT-II Component OF DSS:

Data Component : Information and its Usefulness, Characteristics of Information, Databases to Support Decision Making, Database Management Systems, Data Warehouses, Data Mining and Intelligent Agents Model Component:-Models Representation Methodology, TimeModel Based ManagementSystems, Access to Models Understandability of Results, Integrating Models Sensitivity of aDecision, Brainstorming and Alternative Generation, Evaluating Alternatives, Running External Models. Mail Component: Integration of Mail Management Examples of Use implications for DSS.

Unit-III Intelligence and Decision Support Systems:

Programming Reasoning, Backward Chaining Reasoning, Forward Chaining Reasoning, Comparison, Certainty Factors, User-Interface Component: User Interface Components, The Action Language, Menus, Command Language, I/O Structured Formats, Free Form Natural Language, The Display or Presentation Language, Windowing Representations, Perceived Ownership of Analyses, Graphs and Bias Support for All Phases of Decision Making, The Knowledge Base Modes of Communication

Unit-IV Designing A DSS: Planning for DSS, Designing a Specific DSS, Interviewing Techniques, Other Techniques, Situational Analysis Design Approaches, Systems Built from Scratch, Using Technology to Form the Basis of the DSS, Evaluating a DSS Generator, Using a DSS Generator, The Design Team, DSS Design and Re-engineering Discussion .

Unit-V Implementation and Evaluation of DSS : Implementation Strategy , Prototypes, Interviewing , User Involvement , Commitment to Change, Managing Change, Institutionalize System, Implementation and System Evaluation, Technical Appropriateness, Measurement Challenges , Organizational Appropriateness.

Name Of Text Books:-

Decision Support System By Vicki I Sauter

Management Information system-Gerald V. Post & David L. Anderson

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: VIII

Branch: **Common to All Branches.**

Subject: Software Technology

Code: 300885 (22)

Total Theory Periods: 4 per week.

Total Tut Periods: Nil.

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02.

UNIT-1 ASSEMBLY LANGUAGE PROGRAMMING

Pentium Assembly languages-Registers, Memory Model, Addressing mode, 1source Link, Installation, Assembler Directives.

ASSEMBLER DESIGN

Simple manual Assembler, Assembler Design Process, Load and Go Assembler, Object File Formats.

UNIT-2 LINKERS

Linking -Combining Object Modules, Pass I, Pass II; Library Linking; Position Independent Code (PIC); Shared Library Linking.

LOADERS- Binary Image; Types of Loaders.

UNIT 3 MACROPROCESSORS

Macro in NASM- Local Labels in Macro Body, Nested Macros.; Design of Macroprocessors – Major Data Structures, Macroprocessing Technique, Simple macroprocessors without nesting, Nested calls & definitions

UNIT – 4 COMPILERS

Lexical Analysis; Syntax Analysis; Intermediate Code Generation; Target Code Generation; Optimizing Transformation

UNIT – 5 TEXT EDITORS

Design of a Text Editor ; Data Structures for Text Sequences; Text Document Design; Text view Design

DEBUGGER

Features; Breakpoint mechanism; Hardware support; context of Debugger; Check pointing & reverse Execution

Textbooks

1. SYSTEM SOFTWARE by Santanu Chattopadhyay ; Prentice Hall of India
2. Software Engineering By Roger S Pressman ; Mc-Graw Hill

References

1. Foundations of Software Technology and Theoretical Computer Science, By V. (Venkatesh) Raman: Springer
2. Software Visualization by John Stasko; MIT press
3. Software Engineering By Rajib Mall : PHI

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI (C.G.)**

Semester: VIII
Subject: Knowledge Entrepreneurship
Total Theory Periods: 40
Total Marks in End Semester Exam:80
Minimum no. of class tests to be conducted: 2

Branch: Common to All Branches
Code: 300886 (36)
Total Tut Periods: 12

Unit – I

Introduction: Entrepreneurship in Knowledge economy, abundant & accessible information, implication, impact & consequence, knowledge based opportunities, aims, scope, and objectives.

Unit-II

Managing knowledge & intellectual capital:

Knowledge management, loss of knowledge, knowledge implementation, knowledge creation, property intellectual capital.

Unit-III

Contemporary information problems:

Information overload, winning & losing barrier to entry, emerging issues, customers, investors, myth of inevitable program.

Unit-IV

Creating enterprise cultures:

Working with employer, organizing for entrepreneurship, unity & diversity, ten essential freedoms, freedom of operation, effective issue monitoring, establish search criteria.

Unit-V

Becoming a knowledge entrepreneur:

Entrepreneur qualities, knowledge entrepreneur, challenge of launching new product, creating launch support tool, examples of best practice.

Text & Reference Books

Amrit Tiwana ,The Knowledge Management tool kit, Pearson Education.

Lunlin Conlson, Knowledge Entrepreneur, Thomas Press.

Catheriue L Mann, Knowledge entrepreneurship, Oxford

Heinke Robkern ,Knowledge entrepreneurship,.

Bonnie Montano,Knowledge Management, , IRM Press, London

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: VIII

Subject: Financial Management

Total Theory Periods: 3

Total Marks in End Semester Exam: 80

Minimum No. Of Class test to be conducted: 2

Branch: **Common to All Branches**

Code: 300887(36)

Total tutorial Period: 12

UNIT I

Financial Management –an overview: Introduction, finance and other disciplines, objectives and scope of financial management, role and responsibility of finance manager.

[No of Periods: 8 + 2]

UNIT II

Working capital management-nature, need, importance and concept of working capital, trade off between profitability and risk, Determining finance mix.

[No of Periods: 8 + 2]

UNIT III

Inventory management-Introduction, objectives, ordering cost, carrying cost, lead time, economic order quantity and safety stock, deterministic model.

[No of Periods: 8 + 2]

UNIT IV

Management of cash-introduction motives for holding cash, objectives of cash management and technique/process of cash management.

[No of Periods: 8 + 2]

UNIT V

Receivables management-introduction, objectives, credit terms, credit policies and collection policies.

[No of Periods: 8 + 2]

Text books:

Basic financial management, M Y Khan and P K Jain, TMH

Financial Management, I M Pandey.

References books:

Financial management and policy, V K Bhalla, Anmol publications pvt. Ltd.

Financial management, Van Horne.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI (C.G.)**

Semester : VIII

Branch : **Common to All Branches**

Subject : Project planning management and Evaluation

Code : 300888 (36)

Total Theory Periods : 40

Total tutorial Period : 12

Total Marks in End Semester Exam :80

Minimum No. Of Class test to be conducted : 2

UNIT I

Identification of projects-generation and screening of idea, monitoring corporate appraisal, preparing project profiles and project rating index.

UNIT II

Feasibility studies: Market and demand analysis, technical analysis, financial analysis and economic viability.

UNIT III

Project appraisal: Criteria, net present value, internal rate of return, payback period and accounting rate of return method.

UNIT IV

Project management and implementation-

Project planning, project control, prerequisites of implementation. Network techniques of project management-Project evaluation and review technique (PERT) and critical path method (CPM).

UNIT V

Project review and control-

Initial review, performance evaluation, abandonment analysis and its behavioral issues.

Text books:

Project planning, analysis, selection, implementation and review by Prasanna Chandra, TMH.

Reference Books:

Project management-Dr. Harold Kerzner.

Total Project management-Dr. P K Macmillan.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: VIII

Branch: **Common to All Branches**

Subject: **Safety Engineering**

Code: 300889 (37)

Total Theory Periods: 50

Total Tutorial Period : 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

UNIT – I

Safety Philosophy and principles of Accident prevention

Introduction, accident, injury, unsafe act, unsafe condition, reportable accidents, need for safety, break down of accidents, hazardous industries.

Theories & Principle of accidents

Casualty, cost of accident, computation of cost, utility of cost data.

Accident reporting & Investigation

Identification of the key facts, corrective actions, classification of facts.

Regulation American (OSHA) and Indian Regulation.

UNIT – II

Safety Management

Division of responsibility, Location of Safety function, size of safety department, qualification for safety specialist, safety committee – structure and functions.

UNIT – III

Safe Working Condition and Their Development

SOP for various Mechanical equipments, Incidental safety devices and methods, statutory of provisions related to safeguarding of Machinery and working condition.

UNIT – IV

Safety in Operation and Maintenance

Operational activities and hazards, starting and shut down procedures, safe operation of pumps, compressor, heaters, reactors, work permit system, entry into confined spaces.

UNIT – V

Safety in Storage and Emergency Planning

Safety in storage, handling of chemicals and gases, storage layout, ventilation, safety in chemical laboratories, emergency preparedness on site plan, off site plan, toxic hazard control.

TEXT BOOKS

Safety and Accident Prevention in Chemical Operation – H.H. Fawcett and Wood

Personal Protective Equipment – NSC Bombay

REFERENCE BOOKS

Ergonomics - P. Krishna Murthy

Fire Prevention Hand Book – Derek James

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: VIII

Branch: **Common to All Branches**

Subject: Bioinformatics

Code: 300890 (22)

Total Theory Periods: 4 per week.

Total Tut Periods: Nil.

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02.

UNIT-1

Bioinformatics-introduction, Application, Data Bases and Data Management, Central Dogma; information search and Data retrieval, Genome Analysis and Gene mapping- Analysis, Mapping, Human Genome Project (HGP).

UNIT-2

Alignment of Pairs and Sequences; Alignment of Multiple Sequences and Phylogenetic Analysis; Tools for similarity Search and Sequence Alignment- FASTA BLAST.

UNIT-3

Profiles and Hidden Markov Models (HMMs); Gene Identification and Prediction-Basics, Pattern Recognition, Methods and Tools; Gene Expression and Micro arrays.

UNIT-4

Protein Classification and Structure Visualization; Protein Structure Prediction; Proteomics; Computational methods-Analysis of Pathways, Metabolic Network Properties, Metabolic Control Analysis, Stimulation of Cellular Activities, Biological Mark Up Languages.

UNIT-5

Drug Discovery-Introduction, Technology and Strategies, Cell Cycle, G-protein, Coupled, Receptors. Computer Aided Drug Design-Introduction, Drug Design Approaches, Designing methods, ADME-Tox Property Prediction.

TEXT BOOKS

- I. BIOINFORMATICS by S.C. Rastogy, 2nd Edition, Prentice Hall of India.
- II. BIOINFORMATICS by V. R Srinivas, Prentice Hall of India

REFERENCES

1. BIOINFORMATIC COMPUTING by Bergeron, MIT Press.
2. Evolutionary Computation in Bioinformatics, Gary B. Fogel, David W. Corne (Editors), 2002
3. Introduction to Bioinformatics, Arthur M. Lesk, 2002, Oxford University Press
4. Current Topics in Computational Molecular Biology (Computational Molecular Biology), Tao Jiang, Ying Xu, Michael Zhang (Editors), 2002, MIT Press

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: VIII
Subject: Energy Conservation & Management
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**
Code: 300891 (37)
Total Tutorial Period : 12

UNIT – I

Energy Scenario

Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, re-structuring of the energy supply sector, energy strategy for the future, air pollution, climate change, Energy Conservation Act – 2001 and its features.

UNIT – II

Energy Conservation in Electric Utility and Industry

Energy costs and two-part tariff, Energy conservation in utility by improving load factor, Load curve analysis, Energy efficient motors, Energy conservation in illumination systems, Importance of Power factor in energy conservation – Power factor improvement methods, Energy conservation in industries, case studies.

UNIT – III

Energy in Manufacturing

Introduction, Energy and Environmental Analysis of Products, Energy Consumption in Manufacturing, Energy Conservation, Transportation Systems, Water Conservation, Rules for the Efficient Conservation of Energy and Materials, Laws of Energy and Materials Flows.

UNIT – IV

Heat Recovery System

Sources of waste heat and its potential applications, heat recovery systems in Shell & Tube Heat Exchangers, Plate Heat Exchangers, Tubular Heat Exchangers. Vapour recompression and Energy conservation in Evaporator systems. Thermal Wheel, Heat Pipe, Heat Pumps. Waste Heat Boilers – Low Pressure & High Pressure Applications.

UNIT – V

Energy Conservation Economics

Basic discounting, life cycle costing and other methods, factors affecting economics, energy pricing and incentives for conservation, energy conservation of available work identification of irreversible processes, primary energy sources, Optimum use of prime movers, energy efficient house keeping, energy recovery in thermal systems, waste systems and waste heat recovery in thermal systems, waste heat recovery techniques, conservation in energy intensive industries, thermal insulation.

TEXT BOOKS

1. Energy Management – W.R. Murphy, G. Mckay –
2. Energy Management – Paul O’Callaghan –
3. Engineering Economics & Engineering Management – R. Raju – Anuradha Agencies

REFERENCE BOOKS

1. Principles of Energy Conversion – Archie W. Culp – Jr. International Student Edition – McGraw Hill Publishers
2. Energy Management in illuminating System – Kao Chen – CRC Publishers

3. Industrial Energy Recovery - D.A. Reay – Wiley Publishers
4. Thermal Energy Recovery – T.L. Boyer – Wiley Publishers
5. Energy Conservation Through Control – E.G. Shinskey – Academic Press
6. Economics of Solar Energy & Conservation Systems, Vol-I & II – F. Kreith & R.E. West – CRC Press

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: VIII

Subject: Nanotechnology

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum No. of Class test to be conducted:2

Branch: Common to All Branches

Code: 300892 (47)

Total tutorial Period: NIL

Unit I : Introduction to nanotechnology: background, definition , basic ideas about atoms and molecules, physics of solid state, review of properties of matter and quantum mechanics

Unit II : Preparation of Nanostructured Materials : Lithography : nanoscale lithography, E-beam lithography, dip pen lithography, nanosphere lithography. Sol gel technique Molecular synthesis, Self-assembly, Polymerization

Unit III : Characterization of Nanostructured materials : Microscopy: TEM, SEM, SPM techniques, confocal scanning microscopy,, Raman microscopy-Basic principles, applicability and practice to colloidal, macromolecular and thin film systems. Sample preparation and artifacts. Polymer fractionation techniques: SEC, FFF, Gel electrophoresis.: Basic theory, principles and practice.

Thermal analysis: Basic principles, theory and practice. Micro DSC in the study of phase behavior and conformational change.

Mass spectrometry of polymers: MALDI TOF MS – Basic theory, principles and practice. Applicability to proteins, polyethers, controlled architecture systems

Unit IV : Cross-cutting Areas of Application of Nanotechnology : Energy storage, Production and Conversion. Agriculture productivity enhancement Water treatment and remediation. Disease diagnosis and screening. Drug delivery systems. Food processing and storage. Air pollution and remediation. Construction. Health monitoring..Vector and pest detection, and control. Biomedical applications. Molecular electronics. Nanophotonics. Emerging trends in applications of nanotechnology

Unit V : Industrial Implications of Nanotechnology : Development of carbon nanotube based composites. Nanocrystalline silver Antistatic conductive coatings. Nanometric powders. Sintered ceramics. Nanoparticle ZnO and TiO₂ for sun barrier products. Quantum dots for biomarkers. Sensors. Molecular electronics. Other significant implications

References:

1. Guozhong Cao, “Nanostructures and Nanomaterials”, Imperial College Press, London
2. Mark Ratner and Daniel Ratner, “A Gentle Introduction to Next Big Thing”, Pearson Education 2005

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: VIII

Subject: Intellectual Property Rights

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum No. Of Class test to be conducted:2

Branch: **Common to All Branches**

Code: 300893 (36)

Total tutorial Period: 12

Unit-I

Basic Concepts of Intellectual Property: Introduction to intellectual property rights, laws and its Scope, Trade Related Aspects of Intellectual Property Rights.

Unit-II

Patents: Introduction to patent law and condition for patentability, Procedure for obtaining patents, Rights of a patentee, Patent infringements, Biotechnology patents and patents on computer programs, Patents from an international perspective.

Unit-III

Trademark and 'geographical Indications: Statutory authorities and registration procedure, Rights conferred by registration, Licensing, assignment and transfer of trademark rights, Trademark infringement, Geographical Indication of Goods & Appellations of Origin.

Unit-IV

Copyright: Registration procedure and copyright authorities, Assignment and transfer of copyright, copyright infringement and exceptions to infringement, Software copyright

Unit-V

Introduction to the law on Industrial Designs, Registration and piracy, International perspective, Introduction to the law on semiconductor layout design, Registration, commercial exploitation and infringement.

Text Books:

1. Vinod V Sople ,Managing Intellectual Property, – PHI
2. Kumar K ,Cyber law, intellectual property and e-commerce security, Dominant Publication and distribution, New Delhi.

Reference Books:

1. Inventors Guide to Trademarks and Patents- Craig Fellenstein, Rachel Ralson- Pearson Education.
2. Intellectual Property –David Bainbridge, Longman

Chhattisgarh Swami Vivekanand Technical University, Bilai (C.G.)

Semester: VIII

Branch: **Common to All Branches**

Subject: Value Engineering

Code: 300894 (37)

Total Theory Periods: 50

Total Tutorial Period: 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

UNIT – I

Basic Concepts

Meaning of the term value, basic kind, reasons for poor value, value addition, origin and history. Benefits, relevance in Indian scenario.

UNIT – II

Techniques

Different techniques, organizing value engineering study, value engineering and quality.

UNIT – III

Job Plan

Different phases, General phase, Information phase, Functional Phase, Creation Phase, Evaluation Phase, Investigation Phase, Implementation Phase, Audit.

UNIT – IV

Selection of evaluation of VE Projects

Project selection, method selection, value standard, application of methodology.

UNIT – V

Value Engineering Program

VE operations in maintenance and repair activities, VE Cost, life cycle, cost model, training for VE, general value engineering, case studies.

TEXT BOOKS

Value Engineering – S.S. Iyer – New Age International Publishers, New Delhi

Industrial Engineering & Management – O.P. Khanna – Dhanpat Rai & Sons

REFERENCES

Techniques of Value Analysis and Engineering – L.D. Miles – McGraw Hill, New York

Value Engineering, A Systematic Approach – A.E. Mudge – McGraw Hill, New York

Compendium on Value Engineering – H.G. Tufty – Indo American Society

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Disaster Management

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300895 (20)

Total Tutorial Periods: 12

Unit 1

Nature of disasters – natural and other disasters, Earthquakes, floods, draught, cyclones, fire and other environmental disasters.

Unit 2

Behaviour of structures in disaster prone areas, Disaster zoning, Hazard assessment, Environmental Impact Assessment

Unit 3

Methods of mitigating damage during disasters, disaster preparedness.

Unit 4

Management systems during disasters, Construction Technology for mitigation of damage of structures.

Unit 5

Short-term and long-term relief measures.

Name of Text Books:

Design of Earthquake Resistant Buildings – Minoru Wakabayashi (McGraw Hill Publication)

Dynamics of Structures: Theory and Application to Earthquake Engineering (2nd edition) – Anil K Chopra (Pearson Education Publication)

Name of Reference Books:

Fundamentals of Vibrations – Anderson, R.A. (Mc Millan)

IS – 1893 (Part I): 2002, IS – 13920: 1993, IS – 4326: 1993, IS-13828: 1993

Earth quake engineering damage assessment and structural design – S.F. Borg

Disasters and development – Cuny F (Oxford University Press Publication)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Construction Management

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300896 (20)

Total Tutorial Periods: 12

Unit 1

The Owner's Perspective

Introduction-The project life cycle-Major Types of Construction-Selection of Professional Services-Construction contractors-Financing of constructed facilities-Legal and regulatory Requirements-The changing Environment of the construction Industry-The Role Project Managers

Unit 2

Organizing for Project Management

What is project management? – Trends in Modern Management-Strategic planning and project programming-Effects of project risks on organization-Organization of Project Participants-Traditional designer-Constructor sequence-Professional construction management-Owner-Builder-Operation-Turnkey operation-Leadership and Motivation for the Project team-Interpersonal behaviour in project organization-perceptions of Owners and Contractors

Unit 3

The Design and Construction Process

Design and construction as an integrated system-Innovation and technological Feasibility-Innovation and technological feasibility-Design Methodology-Functional Design-Physical Structures-Geo-Technical Engineering Investigation-Construction Site Environment-Value engineering-Construction Planning-Industrialized Construction and Prefabrication-Computer -Aided Engineering

Unit 4

Labour, Material and Equipment Utilization

Historical Perspective – Labour Productivity-Factors Affecting Job-Site Productivity-Labor Relations in construction-Problems in collective bargaining-Materials Management-Materials Procurement and Delivery-Inventory control-Tradeoffs of cost in Material Management-Construction Equipment-Choice of Equipment and Standard production Rates-Construction Processes Queues and Resource Bottlenecks

Unit 5

Cost Estimation

Costs Associated with Construction Facilities-Approaches to cost estimation-Type of construction cost estimates-Effects of scale on construction cost-Unit cost-Method of estimation-Methods for allocation of joint costs-Historical cost data-Cost indices-Applications of cost Indices to Estimating-Estimate based on Engineers List of Quantities-Allocation of Construction costs over time-Computer Aided cost Estimation-Estimation of operating costs

Name of Text Books:

Construction Project Management Planning, Scheduling and Control – Chitkara, K.K. (Tata McGraw Hill Publishing Co., New Delhi, 1998)

Project Mangement: A systems Approach to Planning, Scheduling and Controlling – Harold Kerzner (CBS Publishers & Distributors, Delhi, 1988)

Name of Reference Books:

Project management for Construction: Fundamental Concepts for owners, Engineers, Architects and Builders – Chris Hendrickson and Tung Au, (Prentice Hall, Pittsburgh, 2000)

Construction Project Management – Frederick E.Gould (Wentworth Institute of Technology, Vary E.Joyce, Massachusetts Institute of Technology, 2000)

Project Management – Choudhury, S. (Tata McGraw Hill Publishing Co., New Delhi, 1988)

Applied project Engineering and Management – Ernest E. Ludwig (Gulf Publishing Co., Houston, Texas, 1988)

Chhattisgarh Swami Vivekanand Technical University, Bilai

Semester: VIII

Branch: **Common to All Branches**

Subject: Ecology and Sustainable Development

Code: 300897 (20)

Total Theory Periods: 40

Total Tutorial Periods: 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Unit 1

Nature of ecology and sustainable development

Definition, scope of ecology and sustainable development, geomorphology, oceanography, climatology and biogeography.

Unit 2

Energy and environment

Introduction of energy environment, use of solar cells for heating and operated drills, methane gas digesters, environmentally friendly method of energy conservation, difference between conventional and non-conventional energy sources, future trends of energy systems.

Unit 3

Theory of isostasy

Concept of isostasy for sustainable development, discovery of the concept, concept of Hayford and Bowie, Joly, and Holmes, Global isostatic adjustment.

Unit 4

Physical geography and man human impact on the natural environment

Modification of land forms, direct alternation of land forms, wind deflation, coastal erosion and deposition, modification of the atmosphere, ultration process in eco and energy systems.

Unit 5

Obstacles in sustainable development

Pollution growth, species extinction, restriction of bat lands, desertification, soil erosion, soil pollution, characterisation of contaminated soil, global warming and ozone depletion etc.

Name of Text Books:

Energy and environment – Fowler (McGraw Hill, New Delhi)

Restoration Ecology and sustainable development – Krystyna M. Urbanska et.al. (Cambridge University Press, U.K.)

Name of Reference Books:

Reuniting Economy and Ecology in Sustainable Development – Russ Beaton et.al. (-----)

Theory and implementation of economic models for sustainable development – Jeroen C.J.M. Van Den Bergh (-----)

Economy and Ecology: Towards sustainable development – F. Archibugi et.al. (-----)

Evaluating Sustainable Development: Giving People a voice in their destiny – Okechukwu Ukaga et.al. (-----)

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: VIII

Subject: Non Conventional Energy Sources

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

Note: Internal Choice may be given in any three units.

Branch: **Common to All Branches**

Code : 300898 (19)

Total Tutorial Periods: 00

Unit I

Environmental Aspects of Power Generation, Heat Transfer for Solar Energy, Utilization Flat Plate Collectors: Physical principles of conversion of solar radiation into heat, Thermal losses and efficiency of FPC, Practical considerations for flat plate collectors, Applications of FPC – Water heating and drying .Focusing Type Collectors: Orientation and sun tracking systems, Types of concentrating collectors – Cylindrical parabolic collector, Compound parabolic collector, Thermal performance of focusing collectors, Testing of solar collectors.

Unit II

Solar cooking, solar desalination, solar ponds and solar space heating Solar Industrial process heating and Solar power generation. Solar Green Houses, Solar thermo mechanical power, solar refrigeration & air conditioning and Solar High Temperature Applications Gasifier- Classification, Chemistry, Application, advantages, disadvantages and application.

Unit III

Energy from Biomass: Type of biomass sources, biomass generation, factors affecting biodigestion, classification, advantages and disadvantages of biogas plants, community biogas plants, problems related to biogas plants, utilization of biogas. Energy plantation, methods for obtaining energy from biomass, thermal gasification of biomass.

Unit IV

Chemical Energy Sources: Fuel cells: Design, principle, classification, types, advantages and disadvantages Hydrogen Energy: Properties of hydrogen, methods of hydrogen production, physical and chemical principles, storage, advantages and application

Unit V

Wind Energy: Basic principle, wind energy conversion, wind energy conversion systems, design consideration, performance and application. Alcohol fuels: Overview, feedstock, methods for alcohol production, alcohol as an engine fuel; LPG, CNG Hydrogen and Ethanol as an alternative liquid fuel; engine performance with alcohol fuels. Tidal Energy.

Name of Text Books:

1. John A Duffie & William A Beckman: Solar Energy Thermal processes Wiley Inter science publication

2 H P Garg & J Prakash, Solar Energy – Fundamentals and Applications: - Wiley Inter science

Name of Reference Books:

1. G D Rai, Solar Energy Utilization – Khanna publishers.
2. S P Sukhatme, Solar Energy – Principles of thermal Collection & Storage – Tata McGraw Hill Publishing company ltd., New Delhi

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Energy Auditing

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of Class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300899 (24)

Total Tut Periods: Nil

UNIT I:

History of Energy Management: Energy forecasting, Limitations of energy resources. Renewable energy resources. Load management. Energy management. Demand side management (DSM) Energy conservation in realistic distribution system. Short term load forecasting for de-centralized load management.

UNIT II:

Energy Situation and Global Energy Sources: World energy consumption. Energy in developing countries. Firewood crises. Indian energy sources. Non-conventional renewable energy sources. Potential of renewable energy sources. Solar energy types. Wind energy. Wave, tidal and OTEC. Super-conductors in power system. Wind power generation for large scale generation of electricity. Wind driven induction generators.

UNIT III:

Energy Auditing as Applicable to an Industry: Classification of energy audit System optimization. Power factor improvement. Preventive maintenance. Process modification. Non-conventional energy sources. Electricity tariffs. Types of off-peak tariffs.

UNIT IV:

Elements of Energy Auditing and Metering Methodologies(Case Studies): Capacity utilization. Technology up-gradation. Fine tuning, Energy conservation. Concept and methods of energy conservation.

UNIT V:

Demand Side Management: Introduction to DSM. Concept of DSM. Benefits from DSM. DSM techniques. Time of day pricing, Multi-utility exchange model. Time of day pricing models for planning, load management. Load priority technique. Peak clipping. Peak shifting. Valley filling. Strategic conservation. Energy efficient equipment, Socioeconomic awareness programs.

Text Books:

1. Ashok.V.Desai(ED)-Energy Demand: Analysis, Management and Conservation, Wiley Eastern Ltd., New Delhi.
2. S. Rao, Parulekar, Energy technology, Khanna Pbs.

Reference Books:

1. Jyothi Prakash- Demand Side Management, Tata McGraw-Hill Publishers.
2. N.K.Bansal, Kleeman Millin-Renewable Energy Sources and Conservation Technology, Tata McGraw-Hill Publishers.