

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Scheme of Teaching and Examination

B.E. VIII SEMESTER

APPLIED ELECTRONICS AND INSTRUMENTATION

S.No.	Board of studies	Subject Code	Subject Name	Period Per Week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
				L	T	P	Theory / Practical				
							ESE	CT	TA		
1	Electronics & Instrumentation	312811 (27)	Supervisory Control & Data Acquisition System	3	1	-	80	20	20	120	4
2	Electronics & Instrumentation	312813 (27)	Industrial Instrumentation - III	3	1	-	80	20	20	120	4
3	Electronics & Instrumentation	327812 (27)	Optical Instrumentation	3	1	-	80	20	20	120	4
4	Refer Table –III		Elective – III	3	1	-	80	20	20	120	4
5	Refer Table – IV		Open Elective – IV	3	1	-	80	20	20	120	4
6	Electronics & Instrumentation	312821 (27)	Industrial Instrumentation Laboratory- III	-	-	4	40	-	20	60	2
7	Electronics & Instrumentation	312822 (27)	Optical Instrumentation Laboratory	-	-	4	40	-	20	60	2
8	Electronics & Instrumentation	312823 (27)	PC Interfacing Laboratory	-	-	4	40	-	20	60	2
9	Electronics & Instrumentation	312824 (27)	Major Project	-	-	5	100	-	80	180	3
10	Electronics & Instrumentation	300825 (27)	Report Writing & Seminar	-	-	2	-	-	40	40	1
11			Library	-	-	1	-	-	-	-	-
Total				15	5	20	620	100	280	1000	30

L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test, TA- Teacher's Assessment

Table – III
Professional Elective – III

Sl. No.	Board of Study	Code	Subject
1	Electronics & Instrumentation	327871 (27)	Robotics and Automation
2	Electronics & Instrumentation	327873 (27)	Power Plant Instrumentation
3	Electronics & Instrumentation	312871 (27)	Process Instrumentation
4	Electronics & Instrumentation	312872 (27)	Intelligent Instrumentation
5	Electronics & Instrumentation	312873 (27)	Environmental Instrumentation
6	Electronics & Instrumentation	312874 (27)	Instrument Organization & Ergonomics

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

Table – IV
Professional Elective – IV

Sl. No.	Board of Study	Code	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	Comp. Sc. & 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 Engineering	300889 (37)	Safety Engineering
10	Comp. Sc. & Engg.	300890 (22)	Bio Informatics
11	Mechanical Engineering	300891 (37)	Energy Conservation & Management
12	Nanotechnology	300892 (47)	Nanotechnology
13	Management	300893 (36)	Intellectual Property Rights
14	Mechanical Engineering	300894 (37)	Value Engineering
15	Civil Engineering	300895 (20)	Disaster Management
16	Civil Engineering	300896 (20)	Construction Management
17	Civil Engineering	300897 (20)	Ecology & Sustainable Development
18	Chemical Engineering	300898 (19)	Non Conventional Energy Sources
19	Electrical Engineering	300899 (24)	Energy Auditing and Management

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

Semester : **VIII**
Subject: **Supervisory Control & Data Acquisition Systems**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **AE&I**
Code: **312811 (27)**
Total Tutorial Periods: **12**

UNIT I : Introduction

Elements of SCADA system-History of SCADA-Development from telemetry- Dependence on communication and computers.

Real Time Systems: Communication access and Master-slave determining scan interval.

UNIT II: Remote Control

Murphy's Law and remote control- Safety instrumented systems- Regulatory requirements. Communications - AID conversion-Long distance communications in serial - communications system components - Protocol - Modem Synchronous/Asynchronous telephone. **Radio:** Simplex / Duplex-Turn on time-Frequencies available- Path studies- Seasonal variation-Reliability and maintenance-Satellite communications.

UNIT III : Remote Terminal Units

Communication interface-Protocol-Discrete control-Analog control-Pulse control-Serial control-Monitor discrete signals-Monitor analog signals-Monitor pulse count signals- Monitor serial signals- Non RIU functions.

UNIT IV : Master Terminal

Communication interface-Configuring-Simple applications: Data storage- Sensors-Actuators- ring applications-Real time, Revised accounting and grade of data- Scanning and communication-Automatic control-Advisory applications. (10 Periods)

UNIT V : Operator Interfacing

Security considerations-SCADA Economies-Better communications-Smarter RTUs-Smarter MTIJs- Local Area Networks -External applications.

Text Book:

Stuart A.Boyer "Supervisors **Control and Data Acquisition**", ISA.

Reference Books:

Jeff Weigunt. "Creating **HMI/ SCADA Industrial Applications using Microsoft Access**", ISA.

RJ.Willam, "**Hand book of SCADA System for the Oil and Gas Industry**", Mold Clwyd.

Michael Wicl," **A Guide to Utility Automation AMR, SCADA and IT system for electric power**", Penwell,

Jon Stenerson "**Fundamentals of Programmable Logic Controllers, Sensors and Communications**",

Prentice Hall of India.

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

Semester : **VIII**

Subject: **Industrial Instrumentation-III**

Total Theory Periods: **40**

Total Marks in End Semester Examination: **80**

Minimum number of Class tests to be conducted: **Two**

Branch: **AE&I**

Code: **312813 (27)**

Total Tutorial Periods: **12**

UNIT – I : Instrumentation in Petrochemical Industries

Instrumentation and control in reactors and distillation column, Temperature and pressure control, Optimization, Elementary idea of batch reactors, Measurement and control of column pressure, Control of feed, reboiler, Reflux rates, Optimization of distillation columns, Instrumentation and control in dryers. Batch and continuous dryers, Types of evaporators, Instrumentation and control in evaporators, Measurement and control of pressure, density conductivity, differential pressure.

UNIT – II : Nuclear Reactor Instrumentation

Diffusion, Moderation, Absorption and delay processes, Neutron flux measurement, Control rod calibration, Nuclear fuel inspection and testing including poisoning, Radiation energy measurement, Remote control Instrumentation, Nuclear Instrumentation, Maintenance.

UNIT – III : Measurement of Chemical Composition

Chemical analysis-Introduction, Spectroscopy-X-Ray, Photo acoustic, Microwave, Mass-spectrometers Electrochemical Techniques - Conductivity, P.H. Potentiometry, etc.

UNIT – IV : Instrumentation for Pollution Monitoring

Air Pollution Monitoring: Air Pollutants- basics of monitoring technologies like conductimetry, coulometry – piezoelectric oscillations methods-paper tape method- optical method-air pollution monitoring instruments.

Water Pollution Monitoring: Water pollutants –basic techniques –spectrometric methods- emission spectrograph-atomic absorption spectra photometry- water pollution monitoring instruments.

Noise pollution monitoring: Noise pollution and its measurement

UNIT – V : Ultrasound Instrumentation

Ultrasonic waves: Principle and propagation of ultrasound waves, characterization of ultrasonic transmission, reflection and transmission coefficients, intensity and attenuation of sound beam. Power level, medium parameters. Generation of ultrasonic waves: Magnetostrictive and piezoelectric effects, search unit types, construction and characteristics. Ultrasonic test methods: Pulse echo, transit time, resonance, direct contact and immersion type and ultrasonic methods of flaw detection. Ultrasonic measurement: Ultrasonic method of measuring thickness, depth and flow, variables affecting ultrasonic testing in various applications.

Reference Books:

☞☞ Bela G. Liptak Instrumentation in the Process Industries, Chillion Bock company.

☞☞ M. Douglas Constidine and S.P. Ross: Handbook of Applied Instrumentation McGraw Hill.

Reference Book

☞☞ Faith W.L., and Atkinson A.A., : “Air pollution”, 2nd edition Wiley Interscience Inc., New York, 1972.

☞☞ B.C. Punmia, Ashok Jain, “Waste Water Engineering”, Laxmi Publication

☞☞ V.P. Kuderia, “Noise Pollution & Its Control”, Pragari Prakasan

☞☞ Jones Instrument Technology Vol:-2 Butterworths

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

Semester : VIII
Subject: **Optical Instrumentation**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **E&I/AE&I**
Code: **327812 (27)**
Total Tutorial Periods: **12**

UNIT – I : Optical Fibers and Their Properties

Principles of light propagation through a fiber – different types of fibers and their properties transmission characteristics of optical fiber – absorption losses – scattering losses – dispersion – optical fiber measurement – optical sources – optical detectors – LED – LD – PIN and APD

UNIT – II : Industrial Application of Optical Fibers

Fiber optic sensors – fiber optic instrumentation system – different types of modulators – detectors – application in instrumentation – interferometric method of measurement of length – moiré fringes – measurement of pressure, temperature, current, voltage liquid level and strain – fiber optic gyroscope – polarization maintaining fibers.

UNIT – III : Laser Fundamentals

Fundamental characteristics of lasers – three level and four level lasers – properties of laser – laser modes – resonator configuration – Q-switching and mode locking – cavity dumping – types of lasers: gas lasers, solid lasers, liquid lasers and semi conductor lasers

UNIT – IV : Industrial Application of Lasers

Laser for measurement of distance, length velocity, acceleration, current, voltage and atmospheric effect – material processing – laser heating, welding melting and trimming of materials – removal and vaporization.

UNIT – V : Hologram and Medical Application

Holography – basic principle; methods; holographic interferometry and applications, holography for non – destructive testing – holographic components – medical applications of lasers; laser and tissue interaction – laser instruments for surgery, removal of tumors of vocal cords, brain surgery, plastic surgery, gynecology and oncology

Text Books:

- ✍✍ John and Harry, Industrial lasers and their applications, McGraw-hill, 1974
- ✍✍ Senior J.M., Optical Fiber Communication Principles and Practice, Prentice Hall, 1985

Reference Books:

- ✍✍ John F Read, Industrial Applications of Lasers, Academic Press.
- ✍✍ Monte Ross, Laser Applications, McGraw-Hill.
- ✍✍ Keiser G., Optical Fiber Communication, McGraw-Hill.
- ✍✍ Jasprit Singh, Semiconductor Optoelectronics, McGraw-Hill.
- ✍✍ Ghatak A.K and Thiagarajar K, Optical Electronics, TMH.

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

Semester : **VIII**

Subject : **Robotics & Automation**

Total Theory Periods: **40**

Total Marks in End Semester Examination: **80**

Minimum number of Class tests to be conducted: **Two**

Branch: **E&/AE&I**

Code: **327871 (27)**

Total Tutorial Periods: **12**

UNIT – I : BASIC CONCEPTS IN ROBOTICS

Advantages, Applications, Basic structure of robots , Numerical control of machine tools , Resolution , Accessories and Repeatability. Classification and Structure: Point to point Robotic system, control tool of Robotic systems, Manipulator, The wrist motors and the grips, structure of continuous path robot systems.

UNIT – II : DRIVES AND CONTROL SYSTEMS

Hydraulic system Direct current servo motors, Control approaches of Robots, Control and loops using current amplifier, Control loop using voltage amplifier, Elimination of Stationary position errors, Control loop in CNC system. Kinematics Analysis and Coordinate Transformation: - Direct Kinetic problems in Robotics, Geometry based Direct Kinematics Analysis, Co-ordinate and vector Transformations using matrices, Denavit – Hartenberg convention, Applications of the DH method, Quaternion and rotation vector representations .

UNIT – III : TRAJECTORY INTERPOLATORS

Necessity of Interpolators , Generation of motion commands Trajectory planning , Basic structure of Interpolators , Particular Solutions for the Inverse Kinetics problem Resolved motion state control method , solving the Inverse Kinetic problem using rotation vector .

UNIT – IV : SENSORS AND INTELLIGENT ROBOTS

Introduction to Robotic Sensors, Vision System, Range detectors, Assembly aid devices, Force and torques Sensors Brief concept of Artificial Intelligence.

Installing a Robot: Plant Survey, Selecting Robots, Economic Analysis, case study, Robot safety.

UNIT – V : APPLICATION OF ROBOTS

Handling , Loading and Unloading , the manufacturing cell , Welding , Spray painting , Assembly , Machining , Press work & Forging , Heat treatment applications , Robots in Electroplating .

Text Books :-

☞☞ Korem Yoram ROBOTICS FOR Engineering: Tata McGraw Hall

Reference Books :-

☞☞ Koyre Yu. Industrial Robotics –(Mir Publishers Moscow)

☞☞ Anthony CMC Donad, Robot Technology : (Theory Design and Application) (Prentice Hall)

☞☞ Mikell P. Groover etal, "Industrial Robots – Technology Programming & Applications" McGraw Hill Ltd.

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

Semester : **VIII**

Subject: **Power Plant Instrumentation**

Total Theory Periods: **40**

Total Marks in End Semester Examination: **80**

Minimum number of Class tests to be conducted: **Two**

Branch: **E&/AE&I**

Code: **327873 (27)**

Total Tutorial Periods: **12**

UNIT – I : Overview Of Power Generation

Brief survey of methods of power generation – hydro, thermal, nuclear, solar and wind power – importance of instrumentation in power generation – thermal power plants – building blocks – details of boiler processes UP&I diagram of boiler – cogeneration.

UNIT – II : Measurements In Power Plants

Electrical measurements – current, voltage, power, frequency, power – factor etc. – non electrical parameters – flow of feed water, fuel, air and steam with correction factor for temperature – steam pressure and steam temperature – drum level measurement – radiation detector – smoke density measurement – dust monitor.

UNIT – III : Analyzers In Power Plants

Flue gas oxygen analyser – analysis of impurities in feed water and steam – dissolved oxygen analyser – chromatography – PH meter – fuel analyser – pollution monitoring instruments.

UNIT – IV : Control Loops In Boiler

Combustion control – air/fuel ratio control – furnace draft control – drum level control – main stem and reheat steam temperature control – superheater control – attemperator – deaerator control – distributed control system in power plants – interlocks in boiler operation.

UNIT – V : Turbine – Monitoring And Control

Speed, vibration, shell temperature monitoring and control – steam pressure control – lubricant oil temperature control – cooling system

TEXT BOOKS

Sam G. Dukelow, The control of Boilers, instrument Society of America.

Modern Power Station Practice, Vol.6, Instrumentation, Controls and Testing, Pergamon Press, Oxford.

REFERENCES

Elonka, S.M. and Kohal A.L. Standard Boiler Operations, McGraw-Hill, New Delhi.

R.K.Jain, Mechanical and industrial Measurements, Khanna Publishers, New Delhi.

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

Semester : **VIII**
Subject: **Process Instrumentation**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **AE&I**
Code: **312871 (27)**
Total Tutorial Periods: **12**

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 : 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 – III : Boiler instrumentation

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

UNIT – IV : 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.

UNIT – V : Introduction to Intelligent controllers

Optimal controller, predictive controller, Expert system and controllers, Artificial Neural networks controllers, fuzzy logic & Neurofuzzy control system, linear and non linear controllers, Single loop and multiloop controllers., model based PID controllers.

Text Books :

1. Process Control Handbook by Bela G. Liptak
2. Process Control System 3/e by F.G.Shinsky, McGraw Hill.

Reference Books:

1. Computer Based Industrial Control by—Krishnakant. (PHI)
2. Process Instrumentation & Control Handbook by Considine .

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

Semester : **VIII**

Subject: **Intelligent Instrumentation**

Total Theory Periods: **40**

Total Marks in End Semester Examination: **80**

Minimum number of Class tests to be conducted: **Two**

Branch: **AE&I**

Code: **312872 (27)**

Total Tutorial Periods: **12**

UNIT – I : Introduction

Intelligent versus dumb instrument, Information signals and systems, Elements of a Microcomputer and operation, Interfacing, intelligent instrument in use.

UNIT – II : Digital Computation

The powers of digital computer, Information transfer and input output structure, Measurement of digital computer power and performance.

UNIT – III : Interfacing

Interfacing components and techniques, Signal processing, Interfacing system and standard.

UNIT – IV : Communication

Interconnection devices, Serial computer and equipment connection, communication standards.

UNIT – V : Intelligent Sensors

Intelligent pressure, Flow, Level, Temperature sensors, Intelligent sensor application in process control, Intelligent analytical instruments, Application of intelligent sensor in biomedical engineering, Future scope of intelligent instrument.

Text Books:

Intelligent Instrumentation-George C. Barney, Prentice Hall of India.

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

Semester : **VIII**
Subject : **Environmental Instrumentation**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **AE&I**
Code: **312873 (27)**
Total Tutorial Periods: **12**

UNIT – I : Introduction

Environmental definition, Constituents, biochemical cycle, causes of pollution, types of pollution and their measurement, effects of pollution, different sensors for measurement of pollution, difference between off –line measurement and continuous monitoring. Environmental toxicology and hazards. Common toxic agents, their analysis and safety measures. Environmental regulation and standards. Review of standard methods of pollution analysis, sampling operation, Devices and techniques as related to environmental engineering.

UNIT – II : Air

Air pollution Analysis: Analysis of aerosols and Monitoring of gaseous pollutants like SO₂, H₂S, NO-NO_x, CO-CO₂, ozone, NH₃, and organic gases , Vapor Analysis Monitoring of suspended particulate matter and trace matter and trace metal pollutants.

UNIT – III : Water

Water pollution Analysis Physical Examination-colour, conductivity, temp, odour , turbidity, hardness. Chemical Characterization-Ca²⁺, Mg²⁺, Na⁺, K⁺, Cl⁻, SO₄²⁻, HCO₃⁻, Al³⁺, Ba²⁺, Boron, F⁻, NO₃⁻, PO₄³⁻, Fe³⁺, Mn²⁺, SiO₂, Biological investigation-DO,BOD, bacteriological examination, water quality monitoring instrumentation. (pH meters, conductivity meters etc.) Water hardners testing & its removal, Water purification methods.

UNIT – IV : Soil

Soil pollution and pesticide Analysis : Analysis of Micronutrients, trace elements pesticides, Chromatographic Characterization. Polarographic and Spectroscope Analysis of pesticides.

UNIT – V : Pollution Control

Instrumentation setup for different type of pollution control like Wastewater treatment, HVAC control etc. Environmental testing, Dry heat, Dry cold, Damp Heat, Salt Spray, Dust, Altitude bump, Vibration drop/Topple, free fall, and study of ISO 14001.

Text Books :

1. Environmental Pollution Analysis by S. M. Khopkar 1st ed, Wiley Eastern.
2. Environmental Engineering by Peary H. S. and others.

Reference Books:

1. Sensor Systems for Environmental Monitoring by Campbell.
2. Basic Environmental Technology-(Ed-1997) by J. A. Nathanson.
3. Environmental Tech. Series, V,I,II,III,IV by Neal K. Ustler.

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

Semester : VIII

Subject: **Instrument Organization & Ergonomics**

Total Theory Periods: **40**

Total Marks in End Semester Examination: **80**

Minimum number of Class tests to be conducted: **Two**

Branch: **AE&I**

Code: **312874 (27)**

Total Tutorial Periods: **12**

UNIT – I : Introduction to Ergonomics

Management of Technology, Need analysis and product specification, Solution search, product planning and system breakup, sub-system interaction, environmental factors for successful operation, Anthropology and Anthropometry principles and applications

UNIT – II : Classification of tasks of Instruments

Activity analysis in terms of man machine tasks, Identification of constraints on instrument design arising out of Scientific, Technical, Production, Environmental and Maintenance replacement consideration..

UNIT – III : Design of configuration /options

Design of controls, Displays and graphics, Aesthetics of colour and form, Value engineering and Value analysis, Creativity tools like brain storming, Vicarious imagination, Lateral thinking and Spatial management.

UNIT – IV : Design of manuals

Job-aids and training aids, Cultural parameters of design. Concepts of drawing and various types of drawing, Creative thinking, free hand sketching, presentation drawings, engineering drawings, exploded views and enlarged details, Installation and performance charts.

UNIT – V : The design cycle

Need analysis, Formulation of design problem, Product planning, Product conceptualization, Design methods for divergent, transformation and convergent thinking, Instrument aesthetics, Instrument ergonomics, Model making, Product life cycle, Design consideration for reliability: Calibration and testing standards, Environmental testing of Instruments, Certification of performance.

Text Books:

- ✍✍ C. S. Rangan, G. R. Sarma and V. S. Mani: Instrumentation Devices and Systems
- ✍✍ David B. Osborne: Ergonomics at work

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

Semester : VIII
Subject: **Industrial Instrumentation Laboratory – III**
Total Practical Periods: **50**
Total Marks in End Semester Examination: **40**

Branch: **AE&I**
Code: **312821 (27)**

Experiments to be performed:

- ❏ On-Off Controller with and without neutral zone
- ❏ Controller tuning using continuous cycling methods
- ❏ Controller tuning using Process Reaction Curve
- ❏ Study of P, I, D, PI, PD and PID Controller for : Temperature, Pressure, Flow and Level control system
- ❏ RTD based temperature transmitter
- ❏ Differential Pressure Transmitter Characteristics
- ❏ Thermocouple based Temperature Transmitter
- ❏ Calibrations and tuning of a PID controllers.
- ❏ Test and find the characteristics of a given control valve.
- ❏ Study of hydraulic components and simple circuits.
- ❏ Study of pneumatic components and simple circuits.
- ❏ Study of two-wired transmitter and square root extractor.
- ❏ Study of alarm annunciator.
- ❏ Study of PLC and simple programming.
- ❏ Study of specific related equipment e.g. RTD (Resistant temperature Detector), transducer, pH simulator, pressure regulators and safety devices.

List of Instruments:

All sorts of transducers with kits, Discrete components like OPAMP, Resistor & Capacitors, Voltage source, Function generator, CRO.

Reference Book:

Handbook of Instrumentation, Liptak

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

Semester : **VIII**
Subject: **Optical Instrumentation Laboratory**
Total Practical Periods: **50**
Total Marks in End Semester Examination: **40**

Branch: **AE&I**
Code: **312822 (27)**

Experiments to be performed:

- ☞☞ To measure bending loss of a fiber.
- ☞☞ To propagation or attenuation loss in a fiber.
- ☞☞ To obtain amplitude modulation and to transmit the same over fiber optic cable and to demodulate the same at the receiver end.
- ☞☞ To determine the numerical aperture of a fiber.
- ☞☞ To measure various types of losses occur in an optical fiber.
- ☞☞ To study the AC characteristics of intensity modulation of laser and fiber optic system.
- ☞☞ To measure optical power of a laser diode Vs. forward current.
- ☞☞ To monitor photo diode current Vs. laser optical output.
- ☞☞ Demonstration of voice transmission through optical fiber using FM.
- ☞☞ Communication between two computers using RS232 interface via optical fiber.
- ☞☞ To measure plastic fiber patch cord loss for various lengths of fiber.
- ☞☞ To study voice transmission through fiber optic cable using PWM.
- ☞☞ To transmit and receive text files over fiber optic cable.
- ☞☞ To transmit, receive and observe digital signals over fiber optic cable.
- ☞☞ To measure rise time, fall time, pulse width distortion of a laser and to determine transmission delay.

List of Equipments/Machine Required:

Fiber optic trainer kit, optical fiber, Splicing unit, Data Acquisition card for optical signal, O/E & E/O Converter, CRO.

Recommended Books:

Fundamentals of Optical Fiber Communication – Sathish Kumar, PHI

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

Semester : VIII

Subject: **PC Interfacing Laboratory**

Total Practical Periods: **50**

Total Marks in End Semester Examination: **40**

Branch: **AE&I**

Code: **312823 (27)**

Experiments to be performed:

- ☞☞ Data acquisition using PC-add on cards under different operating systems.
- ☞☞ Data transfer via Modem under various operating systems.
- ☞☞ Installation of device drivers under various operating systems. e.g. mouse, CD-ROM, scanner, process controller.
- ☞☞ Setting up a PC based LAN network, System integration with various operating systems.
- ☞☞ Development of simple database applications.
- ☞☞ Development of a virtual instrument using GUI and Sub VIs.
- ☞☞ Measurement and logging of a process data and generating a report.
- ☞☞ Measurement of vibration of a given structure and analyzing the data.
- ☞☞ Measurement of strain of a given structure and publishing it in the web.
- ☞☞ Control of temperature using Multifunction RT Data Acquisition card
- ☞☞ Control of a given process using Real Time Embedded controller
- ☞☞ Control of temperature using Distributed input/output modules.
- ☞☞ Processing of simulated ECG signal
- ☞☞ Processing of simulated EEG signal
- ☞☞ Processing of simulated Heart sound

List of equipments:

NI Labview software, Electronic Workbench

Reference book:

Labview manual, National Instruments.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester : BE 8th
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: Two

Branch: Electronics & Instrumentation
Code: 300825 (27)
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:

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

Reference Books:

✍✍ Sunita Mishra, "Communication Skills for Engineers" Pearson Education

✍✍ Davies J.W. "Communication for engineering students", Longman

✍✍ 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-I

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**

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

Total Theory Periods: **50**

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

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

Branch: **Common to All Branches**

Code: **300882 (33)**

Total Tutorial Periods: **Nil**

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
Subject : Project planning management and Evaluation
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 : 300888 (36)
Total tutorial Period : 12

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

Subject: **Safety Engineering**

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: 300889 (37)

Total Tutorial Period : 12

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

Subject: Bioinformatics

Total Theory Periods: 4 per week.

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02.

Branch: **Common to All Branches**

Code: 300890 (22)

Total Tut Periods: Nil.

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 ecommerce 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 BHILAI (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, Bhilai

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

Branch: **Common to All Branches**

Subject: Non Conventional Energy Sources Code : 300898 (19)

Total Theory Periods: 50

Total Tutorial Periods: 00

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.

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.