

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

DIPLOMA IN INSTRUMENTATION ENGINEERING

SEMESTER - V

| S.No. | Board of Studies | Subject Code | Subject | Period per week | | | Scheme of Examination | | | | | Total Marks | Credit L+(T+P)/ 2 |
|--------------|----------------------------|--------------|---|-----------------|---|----|-----------------------|-----|-----|-----------|-----|-------------|-------------------|
| | | | | L | T | P | Theory | | | Practical | | | |
| | | | | | | | ESE | CT | TA | ESE | TA | | |
| 1 | Mechanical Engg. | 234511 (37) | Industrial Management | 4 | 1 | - | 100 | 20 | 20 | - | - | 140 | 5 |
| 2 | Electronics & Telcomm Engg | 234512 (28) | Advance Microprocessor And Micro controller | 4 | 1 | - | 100 | 20 | 20 | - | - | 140 | 5 |
| 3 | Mechanical Engg. | 234513 (37) | Mechanical Measurement | 4 | 1 | - | 100 | 20 | 20 | - | - | 140 | 5 |
| 4 | Instrumentation | 234514 (34) | Control System | 4 | 1 | - | 100 | 20 | 20 | - | - | 140 | 5 |
| 5 | Electronics & Telcomm Engg | 234515 (28) | Electronic System Design | 3 | 1 | - | 100 | 20 | 20 | - | - | 140 | 4 |
| 6 | Electronics & Telcomm Engg | 234521 (28) | Advance Microprocessor And Microcontroller | - | - | 2 | - | - | - | 40 | 20 | 60 | 1 |
| 7 | Mechanical Engg. | 234522 (37) | Mechanical Measurement | - | - | 2 | - | - | - | 40 | 20 | 60 | 1 |
| 8 | Instrumentation | 234523 (34) | Control System | - | - | 2 | - | - | - | 40 | 20 | 60 | 1 |
| 9 | Electronics & Telcomm Engg | 234524 (28) | Computer Aided Design & Drafting Lab | - | - | 3 | - | - | - | 40 | 20 | 60 | 2 |
| 10 | Instrumentation | 234525 (34) | Industrial Training* | - | - | 1 | - | - | - | 40 | 20 | 60 | 1 |
| Total | | | | 19 | 5 | 10 | 500 | 100 | 100 | 200 | 100 | 1000 | 30 |

*Industrial Training of one month will be organized after 4th semester examination and it's evaluation will be done in 5th semester.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

- A) **SEMESTER** : **V**
 B) **SUBJECT TITLE** : **INDUSTRIAL MANAGEMENT**
 C) **CODE** : 234511 (37)
 D) **BRANCH/DISCIPLINE** : **INSTRUMENTATION ENGINEERING**
 E) **RATIONALE** : Student has been earmarked for this course since the shop floor provides majority of the opportunity available for employment & many diploma pass outs are engaged in shop floor supervisory work. Hence it has been found necessary to impart information related to the concepts, principles, procedures and ‘understanding’ of management techniques so that the student is brought to fairly high level of competency in ‘supervisor ship’.

The course is introduced through a chapter on ‘Systems Thinking’. It is felt that considerable time is spent in identification and alternative solution selection when a young engineer encounters problematic situations on the shop floor. A systematic frame of thinking and a proper problem-solving attitude is required to with these situations. The course comprises of two major parts, one is of ‘Behavioral Science’ where the students are exposed to the principles of Group behavior, which will help them to deal with worker’s psychology, their motivation level, and finally an idea of how communication transfer is effected form the highest to lowest level. The second face deals with the ‘Mathematical Approach towards Management’, which comprises of Modern management concepts like CPM and PERT value Analysis, Inventory control, economic batch size determination and operation-research. It is hoped that this course will evoke considerable interest in the diploma students and will help to get jobs earlier.

F) TEACHING AND EXAMINATION SCHEME:

| Course Code | Periods/Week (In Hours) (Teaching Scheme) | | | Scheme of Examination | | | | | | Credit $L + \frac{T+P}{2}$ |
|-------------|---|---|---|-----------------------|----|----|-----------|----|-------------|-------------------------------|
| | L | T | P | Theory | | | Practical | | Total Marks | |
| | | | | ESE | CT | TA | ESE | TA | | |
| 234511 (37) | 4 | 1 | - | 100 | 20 | 20 | - | - | 140 | 5 |

L : Lecture hours : T : Tutorial hours, P : Practical hours

ESE – End of Semester Exam.; CT – Class Test; TA- Teacher’s Assessment

G) SUGGESTED DISTRIBUTION OF MARKS AND HOURS:

| Sl. No. | Chapter No. | Chapter Name | Hours | Marks |
|----------------|--------------------|---|--------------|--------------|
| 1 | 1 | Management & System Thinking Concepts | 9 | 10 |
| 2 | 2 | Materials Management | 9 | 10 |
| 3 | 3 | Production Planning And Control. | 9 | 10 |
| 4 | 4 | Project Planning Using Network Techniques | 9 | 10 |
| 5 | 5 | Industrial Relations | 10 | 10 |
| 6 | 6 | Supervision And Leadership | 10 | 10 |
| 7 | 7 | Organizational Dynamics | 7 | 10 |
| 8 | 8 | Operation Research | 6 | 10 |
| 9 | 9 | Planning & Preparing A Project Report | 6 | 10 |
| 10 | 10 | Value Analysis & Computers In Management | 5 | 10 |
| | | Total | 80 | 100 |

H) DETAILED COURSE CONTENTS:

Chapter- 1: Management& System Thinking Concepts:

- Management- definition, activities.
- Theories-Decision, Quantitative, Mathematical, Behavioral Sciences.
- System definition and parameters,
- Production system, Non-production system and objectives,
- System design, procedure, system variables,
- Different types of model under system thinking.

Chapter- 2: Materials Management:

- Introduction & function of purchase system,
- Inventory, need & advantages of Inventory control
- Different techniques of Inventory control -A.B.C. analysis, simple treatment only.
- Correlation, stock turn over, order quantity, Lead time purchase cycle,
- Economic order Quantity, simple numerical problems ,Safety stock
- Stores Management-Definition and importance, Storing Procedure and store records.

Chapter- 3: Production Planning And Control:

- Production system, concept of planning, meaning of PPC,
- Classification & characteristics of each type,
- Function of & place of PPC in a organization,
- Production and consumption rate,
- Job, Batch and Mass production,
- Batch size, Buffer stock, Production cost components,
- Concept of production scheduling. Difference between Loading & Scheduling,
- Gantt chart scheduling, advantages and preparation of GANTT chart,

- Interpretation updating, critical ratio scheduling.
- Gap phasing and Lap phasing

Chapter- 4: Project Planning Using Network Techniques:

- Network –meaning & objectives,
- Network formation, representation of activities and event on network, rules for drawing network diagram, Fulkerson’s rule,
- Different techniques-PERT & CPM.,
- Dependency of activities, Dummy activities,
- Different Time estimates- Optimistic, Pessimistic & Most likely Time, ET, LT, EST, LST, LCT, ECT, Floats & Slacks and Network analysis on tabular form,
- Updating of Network, control through updating.
- Main power loading and calculation on load smoothing.

Chapter- 5: Industrial Relations:

- Scope, definition, need, objective and function of personnel management.
- Job analysis, Job description and its constituents,
- Man power as resources, recruitment, selection, training and terminal behavior in an organization,
- Communication in Industry its need and importance,
- Classification, technique and barriers in communication and their effects
- Grievances, its meaning, factors responsible for grievances, process and condition for handling of grievances,
- Strikes and lockouts, conditions, conciliation and adjudication machinery
- Motivation, meaning and its benefits, factors responsible for lack of motivation, techniques to boost the motivation in workers,
- Job satisfaction, social and economic values, factors influencing job satisfaction.

Chapter- 6: Supervision And Leadership:

- Meaning and Role of supervisor in an industry,
- Need of supervision, older workers and their supervision,
- Concept of leadership, Qualities of a good leader
- Effectiveness of leadership system
- Industrial acts-Introduction, Factory acts, Industrial disputes act, Boiler act, Workman’s compensation act, Indian electricity act, Pollution control act, ESI act.

Chapter- 7: Organisational Dynamics:

- Organization structure, characteristic and principle of organization
- Modern organization approach,
- Types of organization, meaning and signification of various types,
- Organization change, resistance to change, employee’s attitude, factors for reducing the resistance to change.

Chapter- 8: Operation Research:

- Definition and concept & methods of Operation Research.,
- Linear programming-problem formulation and Graphical methods
- Simplex method of linear programming.

Chapter- 9: Planning and Preparing a Project Report:

- Selection of project, Scheduling of activities Involved, Model format,
- Project planning, preparation of action plan for implementation, preparation of project,
- Cases: - illustrate some real cases, the students are advised to
 1. Visit few small-scale industries situated in the city, near by industrial area.
 2. Discuss the problem related to S.S.I. with entrepreneurs.
 3. Collect information about the market rates, quality & quantity of goods of their choice.
 4. Develop logical & analytical approach to purchase the raw material, finished good.
 5. Prepare project report for the industry, they are willing to start.

Chapter- 10: Value Analysis & Computers in Management

- Concept of Cost and Concept of value,
- Objectives, components and types of value,
- V.A. procedure and V.A. Test. DAR SIRI method, value improvement procedures.
- Role of computers in management, introduction to computer system, Personal computer and its uses-introduction to management information system (MIS).

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

- **Lecture Method:**
 - Teaching through chalk board
 - H.P, LCD Projector.
 - Interaction with students through seminar.
 - As far as possible concepts are to visualized by extensive use of charts models
- **Industrial Visits:**

Visits to nearby industries to expose them to industrial environment, their working, ways of written & verbal communications, their team working & decision-making styles, , problem solving strategies, computer usage in different aspects of industrial work, Industrial relations and material management methods.
- **Expert Lecturer:**
 - Expert lecturer as to be arranged on above subject through guest faculty.
- **Demonstration:**

J) SUGGESTED LEARNING RESOURCES.

(a) Reference Books :

| Sl. No. | Title | Author, Publisher, Edition & Year |
|----------------|--|--|
| 1. | Learning package on Industrial Management. | T.T.T.I., Bhopal. |
| 2. | CPM and FERT- Principles and Application. | L.S. Srinath. |
| 3. | Modern Production Management. | Buffa. |
| 4. | Essentials of Management | Kuntz , Mcgraw Hill. |

| | | |
|-----|---|------------------------|
| 5. | Industrial Engineering and Management | O.P. Khanna. |
| 6. | Industrial organization and management | Ahuja. |
| 7. | Value Analysis | Miles. |
| 8. | Manpower Management. | R.S. Diwedi. |
| 9. | Personnel Management and Industrial Relations | R.S. Davar. |
| 10. | Production and operations Management | Ray Wild. |
| 11. | Management of operations | Jack R. Meredith. |
| 12. | Production and Operations Management- Contemporary policy for managing Operating. | Tata McGraw Hill. |
| 13. | Project Engineering and Management | A.K.Sinha & Rama Sinha |

(b) Others:

- VCD's
- Learning Packages through CD
 - a. Charts

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

- A) **SEMESTER** : **V**
 B) **SUBJECT TITLE** : **ADVANCE MICROPROCESSOR &
MICROCONTROLLERS**
 C) **CODE** : **234512 (28)**
 D) **BRANCH/DISCIPLINE** :
INSTRUMENTATION
 E) **RATIONALE** : The aim of this course under the ‘specialized course category’ is to develop some level of specialization in students of electronics engineering. The micro controller that is a computer on a chip simpler in hardware is capable of having several different functions depending on the wishes of the programmer. Currently, use of micro controller is increasing in industries and therefore, it is necessary for the students to undertake this course.

F) TEACHING AND EXMINATION SCHEME:

| Sub. Code | Period per week | | | Scheme of Examination | | | | | Total Marks | Credit L+(T+P)/2 |
|----------------|-----------------|---|---|-----------------------|----|----|-----------|----|-------------|---------------------|
| | L | T | P | Theory | | | Practical | | | |
| | | | | ESE | CT | TA | ESE | TA | | |
| 234512 (28) | 4 | 1 | - | 100 | 20 | 20 | - | - | 140 | 5 |
| 234521 (28) | - | - | 2 | - | - | - | 40 | 20 | 60 | 1 |

L : Lecture hours : T : Tutorial hours, P : Practical hours
 ESE – End of Semester Exam.; CT – Class Test; TA- Teacher’s Assessment ;

G) DISTRIBUTION OF MARKS AND HOURS:

| Sl. No. | Chapter No. | Chapter Name | Hours | Marks |
|---------|-------------|--|-------|-------|
| 1 | 1 | Architecture of 8086 | 10 | 15 |
| 2 | 2 | Advance Microprocessors | 10 | 15 |
| 3 | 3 | Micro Controller 8051 | 20 | 25 |
| 4 | 4 | Micro Controller Programming & Designing | 20 | 25 |
| 5 | 5 | Applications | 20 | 20 |

| Sl. No. | Chapter No. | Chapter Name | Hours | Marks |
|---------|-------------|--------------|-----------|------------|
| | | Total | 80 | 100 |

H) DETAILED COURSE CONTENTS:

Chapter – 1 : Architecture of 8086

- Introduction: Features of 8086, Functional block diagram of 8086
- Bus Interface Unit (BIU): Pipelining, Segment register, Rules for segmentation
- Instruction: Instruction Pointer, Address Generation, Execution Unit (EU), Control Circuitry, Instruction Decoder
- ALU: Flag Register, General Purpose Register, Pointers & Index Register, Comparison With 8085
- Operating Modes of 8086: Min Mode, Max Mode, and Pin Definitions.

Chapter – 2 : Advance Microprocessors

- Comparison of different 16 bit microprocessors
- Introduction to Coprocessor : Block level study of 8087, Introduction to 80286 Microprocessors, Introduction to 80386, Introduction to 80486
- Pipelining: Elementary idea of Pipeline, Pipelined architecture.
- Brief Introduction of Pentium: Series of Pentium 1, 2, 3 & 4 and their Special Features

Chapter – 3 : Micro Controller 8051

- Introduction to Micro Controller, Comparison between Microprocessor & Micro controller.
- 8051 Micro Controller Hardware: 8051 Block diagram, Function of each block, 8051 Programming model, Internal memory organization, Special function registers, I/O Pin ports, counters & timers.

Chapter – 4 : Micro Controller Programming & Designing

- Assembly Language Mnemonics
- Assembly Language Programming: Data transfer, Logical operations, Arithmetic operations, Jump & Call instructions.
- Micro Controller Specification

Chapter – 5 : Applications

- Interface Keyboards to 8051 Based Micro Controller: Interface LED & LCD display
- Interfacing Key Board, Display LCD & LED Matrix
- Micro Controller System To A/D & D/A Converters
- 8051 Data Communications Modes, Example, Programmes.
- Elementry Idea of Supervisory Control and Data Acquisition (SCADA)

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

Assignments and programming suggested will help the students to get thorough knowledge on the subject. When teaching this course more drill and practice exercises have to be given in laboratory and as well as in home assignments.

J) SUGGESTED LEARNING RESOURCES.

(c) Reference Books :

| Sl. No. | Title | Author, Publisher, Edition & Year |
|---------|---|-----------------------------------|
| 1 | Advance Microprocessors & peripherals | A.K. Ray & K.M. Bhurchundi (TMH) |
| 2 | Programming & Interfacing of 8086/8088 | Douglas V. Hall (TMH) |
| 3 | The Intel 8086/8088, 80286, 80386, 80486, Pentium & Pentium, Pro processor Architecture & Interfacing | Barry B. Brey |
| 4 | Microcomputer systems 8086/8088 family, programming and interfacing | Y. Liu & G.A. Gibson (PHI) |
| 5 | Introduction to programmable logic controller | Dunning, Gary, Delmar, Thomson |
| 6 | 8051 micro controller & embedded systems | M.A. Mazidi & J.G. Mazidi |
| 7 | The 8051 micro controller architecture programming & applications | Kenneth J. Ayala |
| 8 | Micro controllers | Peathnan (McGraw Hill) |
| 9 | Intel Reference Manuals, Microprocessors' & Microcontrollers | Sntel |

(d) Others:

- VCDs.
- Learning Packages.
- Lab Manuals.
- Charts.

Subject: Advance Microprocessor And Micro Controller Lab

PRACTICAL CODE : 234521 (28)

Hours: 32

LIST OF PRACTICALS / TUTORIALS:

1. To identify different components/unit in 8086 kit.
2. To execute a sample programme

3. Develop 8051 assembly language programmes on trainer kit for addition of two 8 bit numbers and 16 bit numbers
4. Develop 8051 assembly language programmes on trainer kit for subtraction of two 8-bit numbers and 16 bit numbers
5. Develop 8051 assembly language programmes on trainer kit for Byte & bit logical operation
6. Develop 8051 assembly language programmes on trainer kit for multiplication & division of two 8-bit numbers/2 decimal numbers
7. Interface ELC matrix display
8. Interfacing design for A/D & D/A converter
9. Develop 8051 assembly language programmes on trainer kit for OR-ing of two 8-bit numbers
10. Develop 8051 assembly language programmes on trainer kit for AND-ing of two 8-bit numbers
11. Develop 8051 assembly language programmes on trainer kit for Inverse AND-ing of a 8-bit numbers
12. Develop 8051 assembly language programmes on trainer kit for Inverse EX-ORing of 8-bit numbers
13. Develop 8051 assembly language programmes on trainer kit for finding 1's and 2's complements of 8-bit numbers

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

- (A) SEMESTER : V
 (B) SUBJECT TITLE : MECHANICAL MEASUREMENTS
 (C) CODE : 234513 (37)
 (D) BRANCH / DISCIPLINE : INSTRUMENTATION ENGINEERING
 (E) RATIONALE

This measurement subject enables the student to understand the very basic facts, Concepts and principles of measurement and will be able to apply the same for solving simple test procedures. This subject also enables the student to understand various skills in measuring devices and in display and recording systems.

(F) TEACHING & EXAMINATION SCHEME

| Sub. Code | Period per week | | | Scheme of Examination | | | | | Total Marks | Credit L+(T+P)/2 |
|-------------|-----------------|---|---|-----------------------|----|----|-----------|----|-------------|---------------------|
| | L | T | P | Theory | | | Practical | | | |
| | | | | ESE | CT | TA | ESE | TA | | |
| 234513 (37) | 4 | 1 | - | 100 | 20 | 20 | - | - | 140 | 5 |
| 234522 (37) | - | - | 2 | - | - | - | 40 | 20 | 60 | 1 |

. DISTRIBUTION O MARKS & HOURS:

| S. No. | Chapter Name | Hours | Marks |
|--------|-----------------------------------|-------|-------|
| 1 | MEASUREMENT OF FORCE AND TORQUE | 06 | 08 |
| 2 | COMMUNICATION SYSTEMS AN OVERVIEW | 12 | 22 |
| 3 | AMPLITUDE MODULATION | 26 | 21 |
| 4 | ANGULAR MODULATION | 16 | 24 |
| 5 | PULSE MODULATION | 24 | 20 |
| 6 | MISCELLANEOUS TOPICS | 12 | |
| | Total | 80 | 128 |

1) MEASUREMENT OF FORCE AND TORQUE

- Definitions of
Mass, weight, force, torque and power
- Methods of force measurements
- Use of pendulum scale, springs, load cells, and proving rings
- Hydraulic and pneumatic measurement methods of force measurement

2) MEASUREMENT OF PRESSURE

- Pressure
- Absolute pressure and gauge pressure
- Pressure measuring devices
- Manometers
Simple, inclined and cistern manometers
- Elastic gauges
Bourdon tube gauges and bellow gauges
- Measurement of low Pressure
MC load gauge
- Names of secondary transducers used with elastic gauges
- Calibration of Pressure gauges using dead weight gauge tester

3) MEASUREMENT OF FLUID FLOW

- Flow characteristics
Laminar and turbulent flow
Reynolds No.
Bernoulli's equation
- Constriction type
- Rate of flow
- Meters
Venturimeter,
flow nozzle,
orifice flow,
variable area flow meter
fluid velocity meters
pitot tube
- Hot wire anemometer
- Volumetric flow meter
Below type
Rotating impeller
Rotating disc type
- Special flow measuring devices
- Turbine type meters
- Electromagnetic type flow meter
- Ultrasonic type flow meter
- Primary and secondary calibration of flow measuring devices

4) Measurement of temperature

- Conduction, convection, and radiation
- Temperature scales
- Temperature measuring instruments
Liquid in glass thermometer

- Liquid in metal thermometer
- Constant volume gas expansion thermometer
- Vapor pressure thermometer
- Bimetallic strip thermometer
- Temperature indication by change of state of solids
- Thermo electricity
- Thermo electric pyrometer
- Application of thermo couple pyrometer
- Radiation pyrometer
- Optical pyrometer
- Photoelectric pyrometer
- Temperature measurement by change of electrical resistance
- Resistance thermometer and thermistor
- Calibration of temperature measuring devices
- Cold junction compensation
- Compensating cables
- Selection of resistance thermometers and thermocouples

5) MEASUREMENT OF STRAIN

- Strain
- Requirement for accurate measurement
- Bonded electrical resistance strain gauge factor
- Rosette gauges
- Metallic resistance strain gauges
- Selection and installation factor for bonded metallic strain gauge
- The strain gauge bridge circuit temperature compensation
- Self temperature compensating strain gauge
- Lead connections
- Semiconductors or piezo electric strain gauges
- Commercial strain measuring systems
- strain gauge calibration
- extensometers
- use of strain gauge on rotating shafts

6) MEASUREMENT OF SPEED AND ACCELERATION

- Measurement of speed
- Mechanical tachometers-
 - Revolution counter type
 - Centrifugal force type
 - Resonance type
- Electrical tachometers.
 - Eddy current type
 - Electric generator type
 - Frequency type
 - Ignition type &
 - Stroboscopic tachometer
- Measurement of acceleration
 - Elementary accelerometer
 - Seismic accelerometer
 - Effect of temperature on seismic instruments.

RECOMMENDED BOOKS

Mechanical measurement by A K sawhney

Mechanical measurement by R K Jain

Subject: Mechanical Measurement Lab

Practical Code: 234522 (37)

Hours: 32

LIST OF PRACTICALS:

Determination of torque using torquemeter

Measurement of pressure using manometer

Measurement of pressure by using bourdon's tube pressure gauge

Measurement of rate of fluid flow by using venturimeter /orifice meter

Measurement of flow rate using rotameter

Measurement of strain using strain gauge

Measurement of acceleration using accelerometer

Measurement of speed of a flywheel using mechanical /electrical tachometer

Measurement of power using absorption dynamometer

Measurement of temperature using thermister/resistance
thermometer/thermocouple

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

- (A) SEMESTER : V
 (B) SUBJECT : CONTROL SYSTEMS
 (C) CODE : 234514 (34)
 (D) BRANCH / DISCIPLINE : INSTRUMENTATION ENGINEERING
 (E) RATIONALE:

The syllabus of this course has been designed to make the student know about the process control component the relation between final 7 primary component functioning of various components. Coverage is given to various types of control values & their applications knowledge of specification of various process conform components will help the student in procurement of components.

(F) TEACHING & EXAMINATION SCHEME

| Sub. Code | Period per week | | | Scheme of Examination | | | | | Total Marks | Credit L+(T+P)/2 |
|----------------|-----------------|---|---|-----------------------|----|----|-----------|----|-------------|---------------------|
| | L | T | P | Theory | | | Practical | | | |
| | | | | ESE | CT | TA | ESE | TA | | |
| 234514 (34) | 4 | 1 | - | 100 | 20 | 20 | - | - | 140 | 5 |
| 234523 (34) | - | - | 2 | - | - | - | 40 | 20 | 60 | 1 |

Distribution of Marks and Hours:

| S. No. | Chapter Name | Hours | Marks |
|--------|---------------------------------|-------|-------|
| 1 | INTRODUCTION TO CONTROL SYSTEMS | 10 | 15 |
| 2 | SERVO COMPONENTS | 20 | 20 |
| 3 | TRANSFER FUNCTION CALCULATION | 10 | 15 |
| 4 | TRANSIENT RESPONSE | 15 | 15 |
| 5 | CONTROL ACTION | 10 | 15 |
| 6 | STABILITY OF CONTROL SYSTEMS | 15 | 20 |
| Total | | 80 | 100 |

1) INTRODUCTION TO CONTROL SYSTEMS

- Open and closed loop control systems ,their merits and demerits
- Block representation of simple systems
- Differential equation representing a system
- Definition of laplace transforms
- Laplace transforms of important functions(no derivations)
- Transfer function type and order of the system

2) SERVO COMPONENTS

- Potentiometer as error detector
- Synchro transmitter, synchro receiver
- Synchro controlled transformer
- Differential synchro
- Servo amplifiers
- Magnetic amplifiers
- Dc generators as amplifier
- Amplidyne
- Dc/Ac servo motor
- Gear
- Tacho generator
- Ac and DC transfer functions of the above

3) TRANSFER FUNCTION CALCULATION

- Block reduction algebra
- Signal flow graph
- Mason's gain formula

4) TRANSIENT RESPONSE

- Transient response of first and second order system
- Second order system, ramp, accelerating input
- Damping ratio
- Steady state condition
- Natural frequency, damped frequency
- Rise time
- Settling time

5) CONTROL ACTION

- ON/OFF
- PROPORTIONAL, INTEGRAL AND DERIVATIVE ACTIONS AND THEIR COMBINATION
- Effect of this action on error
- Examples of simple controllers

6) STABILITY OF CONTROL SYSTEMS

- stability of control systems, Routh criterion,
- Nyquist criterion
- Nyquist plot
- root loci technique
- different types of compensation

RECOMMENDED BOOKS:

1. Control systems -- by Nagrath Gopal
2. Control systems -- by Ogata
3. Control systems -- by Manke

SUBJECT: CONTROL SYSTEMS LAB

Practical Code: 234523 (34)

Hours: 32

LIST OF PRACTICALS

- characteristics of synchro transmitter
- operation of synchro transmitter and receiver
- xfer function of DC generator
- time response of second order system two step input
- bode plot of simple electrical system
- visit to observe different practical control systems used in industries

- A) SEMESTER : V
 B) SUBJECT TITLE : ELECTRONIC SYSTEM DESIGN
 (C) CODE : 234515 (28)
 D) BRANCH/DISCIPLINE : INSTRUMENTATION
 E) RATIONALE :

This course is intended to help the students to appreciate the designing aspects of various basic electronic circuits & their applications in various other complex circuits. It also covers the latest development in the different electronics system. Students also use the knowledge and skills gained to apply them in new related situations.

F) TEACHING AND EXAMINATION SCHEME:

| Periods/Week (In Hours) (Teaching Scheme) | | | Scheme of Examination | | | | | Credit L+(T+P)/2 | |
|---|---|---|-----------------------|----|----|-----------|----|---------------------|-------------|
| L | T | P | Theory | | | Practical | | | Total Marks |
| | | | ESE | CT | TA | ESE | TA | | |
| 3 | 1 | - | 100 | 20 | 20 | - | - | 140 | 4 |

L : Lecture hours : T : Tutorial hours, P : Practical hours

ESE – End of Semester Exam.; CT – Class Test; TA- Teacher’s Assessment

G) DISTRIBUTION OF MARKS AND HOURS:

| Sl. No. | Chapter No. | Chapter Name | Hours | Marks |
|---------|-------------|--------------------------|-----------|------------|
| 1 | 1 | POWER SUPPLY SYSTEM | 15 | 25 |
| 2 | 2 | CONSTANT CURRENT SOURCES | 12 | 25 |
| 3 | 3 | SMALL SIGNAL AMPLIFIERS | 12 | 15 |
| 4 | 4 | SINUSOIDAL OSCILLATORS | 15 | 25 |
| 5 | 5 | INTRODUCTION OF CNT | 10 | 10 |
| | | TOTAL | 64 | 100 |

H) DETAILED COURSE CONTENTS:

Chapter – 1: POWER SUPPLY SYSTEM

- Unregulated dc power supply system with rectifiers and filters
- Design of emitter follower regulators
- Series regulators
- Overload protection circuits for regulators
- Design of SMPS : stepup and step down

Chapter – 2: CONSTANT CURRENT SOURCES

- Design of function generators
- Design of tuned amplifiers
- Design of Butterworth filter, Chebyshev filter upto 4th order.

Chapter –3: SMALL SIGNAL AMPLIFIERS

- Emitter follower
- Darlington pair amplifier with and without bootstrapping
- Two stage direct couple amplifier
- Design of class A , class AB, audio power amplifier with drivers.

Chapter – 4 : DESIGN OF SINUSOIDAL OSCILLATORS

- Opamps based wein bridge and phase shift ascillator with AGC circiuts.
- Transistor based Hartely, colpitts and crystal oscillator
- Evaluation of figure of merit for all above oscillator circuits.

Chapter – 5 : INTRODUCTION OF CNT (CARBON NANO TUBES)

- Doide, Transistors, Insulators, Conductors
- Nano tube based IC's.

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

- Lecture sessions
- Use of audio visual cassettes
- Assignments on various topics

J) SUGGESTED LEARNING RESOURCES.

(a) Reference Books :

| Sl. No. | Title | Author, Publisher, Edition & Year |
|---------|--|-----------------------------------|
| 1 | Electronics : BJT's, FET's & Microcircuits | Aniello |
| 2 | Monograph on electronic circiut design | Goyal & Khetan |

(b) Others:

- VCDs.
- Learning Packages.
- Charts.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

- A) **SEMESTER** : **V**
 B) **SUBJECT TITLE** : **COMPUTER AIDED DESIGN & DRAFTING
LAB**
 C) **CODE** : **234524 (28)**
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**
 E) **RATIONALE** : In order to develop and produce an electronic device, a technical passout requires many skills. Drawing intends to equip students with the ability to read and sketch P.C.B. layout and artwork. The advent of computers has also touched the area of design and drawing of electrical and electronic circuits. Hence a technician need to learn to use computers and take its' aid in drawing, designing and enhancing the quality of electronic circuits.

This course also intends to help the student to use the knowledge of CAD for preparing working drawings of electronics projects. The course also aims to develop the skills to build and test analog and digital electronic circuit using electronics workbench software on a computer. It will also be beneficial if a student is aware about other software's being currently used for drawing, drafting and designing of electronic circuits.

These skills are required to develop prototype designs, Printed circuit design, Electronic maintenance and troubleshooting in the industry. This course will also help to provide necessary knowledge & skills for the project work in third year of this diploma programme.

F) TEACHING AND EXMINATION SCHEME:

| Course Code | Periods/Week (In Hours) (Teaching Scheme) | | | Scheme of Examination | | | | | | Credit $L+(T+P)/2$ |
|----------------|---|---|---|-----------------------|----|----|-----------|----|-------------|-----------------------|
| | L | T | P | Theory | | | Practical | | Total Marks | |
| | | | | ESE | CT | TA | ESE | TA | | |
| 234524 (28) | - | - | 3 | - | - | - | 40 | 20 | 60 | 2 |

L : Lecture hours : T : Tutorial hours, P : Practical hours

ESE – End of Semester Exam.; CT – Class Test; TA- Teacher's Assessment

G) DETAILED COURSE CONTENTS:

Chapter – 1 : Electronic Drawing

- Symbols and codes
- Conventions for schematic representation of electrical and electronic components, instruments and equipment

- Electronic circuit layout
- Sketching of front panel diagrams
- Preparing the layout for the printed circuit boards

Chapter – 2 : Commands of AutoCAD

- CAD concepts
- CAD hardware in brief
- Auto CAD 2000 GUI
- Basic drawing commands
- Facilitating commands
- Editing and modifying commands
- Informative commands
- Dimensioning and text annotation
- Using 'cal expression'
- Creating simple objects using Auto CAD

Chapter – 3 : CAD applications in electronics Using examples from electronics engineering discipline,

- Organizing and working with different layers
- Managing blocks
- Script files and slide show
- 3D visualization
- Surfacing
- Solid modeling and solid editing

Chapter – 4 : Using Multi SIM or Electronics Work Bench like software

- Overview
- Parts Bins
- Building & Testing Analog Circuits
- Analog Instruments
- *Building & Testing Digital Circuits*
- Digital Instruments
- Simulation

Chapter – 5 : Computer aided PCB Design

- Awareness of software for PCB design
- PCB layout of rectifier circuit
- PCB layout of amplifier circuit
- PCB layout of oscillator circuit

Chapter – 6 : Awareness about use of other software

- Exposure to 3 or 4 application software used for electronic applications like (At awareness level only)
- ORCAD

- MATLAB
- CASPOC
- PROTEUS VSM

D) SUGGESTED INSTRUCTIONAL STRATEGIES:

With the background of a course of engineering drawing, this course has to be started first by teaching various software directly on the computer with a little bit of theoretical introduction. For developing computer aided design, the student has to plan on with paper and pencil first which then will have to be done using computer. Therefore, enough of computer time will have to be provided to the students. A number of exercises and assignments will have to be given, so that the students master the techniques of drawing and designing using a computer.

J) SUGGESTED LEARNING RESOURCES

(e) Reference Books :

| Sl. No. | Title | Author, Publisher, Edition & Year |
|---------|--|--|
| 1. | IS: 696-1972, Code of practice for General Engineering Drawing | BIS, New Delhi, 1972 |
| 2. | Printed Circuit Board. Design & Technology. | William Bosschart , Tata McGraw Hill, New Delhi, 2 nd , 1983 |
| 3. | Electronic Drafting & Drawing. | Y.I. Shah, Jeevandeep Prakashan, Ramdeet, Mumbai, 2 nd , 1988 |
| 4. | Computer and commonsense | Hunt, R and Shelley, Prentice Hall, New Delhi, 1989 |
| 5. | Inside AutoCAD | D. Rakerad H. Rice, BPB Delhi |
| 6. | Computer Aided Drafting and Design | Donald D. Voisinet, McGraw Hill, New Delhi |
| 7. | Basic AutoCAD 2000 | Shyam Tickoo |
| 8. | Succeeding with AutoCAD | B. Hawkes, McGraw Hill, 1995 |

(f) Others:

- Learning Packages.
- Lab Manuals.
- Instructional Manuals,
- User's Guide,
- Educator's Guide,
- Technical Reference etc. for various application software

LIST OF PRACTICALS / TUTORIALS:

1. Draw electronic symbols.

2. Draw electronic components.
3. Draw common electrical and electronic instruments .
4. Draw front panel layout diagrams of typical Dual Cathode Ray Oscilloscope.
5. Draw block diagram of monochrome TV receiver.
6. Draw circuit diagram of radio receiver.
7. Draw circuit diagram, PCB component layout diagram and PCB artwork for discrete series regulated power supply using IC for +5 volts output.
8. Draw orthographic and isometric views of transformer.
9. Draw orthographic and isometric views of loudspeakers & microphones.
10. Provide practical hand on experience in using various commands of Auto CAD 2000 for creating 2D/3D shapes, surface and solid modeling especially with reference to electrical engineering.
