

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

## DIPLOMA PROGRAMME IN ELECTRONICS & TELE-COMMUNICATION ENGINEERING

### Semester – IV

#### COURSE OF STUDY AND SCHEME OF EXAMINATION

S. No	Board of Study	Course Code	Course	Periods/Week (In Hours)			Scheme of Examination					Credit L+(T+P)/2	
				L	T	P	Theory			Practical			Total Marks
							ESE	CT	TA	ESE	TA		
1	Mechanical Engineering	200415 (37)	Industrial Management	4	-	-	100	20	10	-	-	130	4
2	Electronics & Telecomm Engg..	228412 (28)	Analog Electronics	4	1	-	100	20	20	-	-	140	5
3	Electronics & Telecomm Engg..	228413 (28)	Principles of Communication	4	1	-	100	20	20	-	-	140	5
4	Electronics & Telecomm Engg..	200414 (28)	Power Electronics	4	1	-	100	20	20	-	-	140	5
5	Computer Engineering	228415 (22)	Programming in 'C'	4	2	-	100	20	20	-	-	140	5
6	Electronics & Telecomm Engg..	228421 (28)	Analog Electronics Lab	-	-	2	-	-	-	50	10	60	1
7	Electronics & Telecomm Engg..	228422 (28)	Principles of Communication Lab	-	-	2	-	-	-	50	10	60	1
8	Electronics & Telecomm Engg..	200423 (28)	Power Electronics Lab	-	-	2	-	-	-	50	10	60	1
9	Computer Engineering	228424 (22)	Programming in 'C' Lab	-	-	2	-	-	-	50	10	60	1
10	Electronics & Telecomm Engg..	228425 (28)	Minor Project	-	-	3	-	-	-	50	20	70	2
<b>TOTAL</b>				<b>20</b>	<b>5</b>	<b>11</b>	<b>500</b>	<b>100</b>	<b>90</b>	<b>250</b>	<b>60</b>	<b>1000</b>	<b>30</b>

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

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

Note : **One month** Industrial Training **will be organized after 4<sup>th</sup> semester examination and it's evaluation will be done in 5th semester.**

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI**

- A) **SEMESTER** : **IV**  
 B) **SUBJECT TITLE** : **INDUSTRIAL MANAGEMENT**  
 C) **CODE** : 200415 (37)  
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**  
 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		
200415 (37)	4	-	-	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) SUGGESTED DISTRIBUTION OF MARKS AND HOURS:**

Sl. No.	Chapter No.	Chapter Name	Hours	Marks
1	1	Management & System Thinking Concepts	6	10
2	2	Materials Management	10	10
3	3	Production Planning And Control.	6	10
4	4	Project Planning Using Network Techniques	6	10
5	5	Industrial Relations	6	10
6	6	Supervision And Leadership	6	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	64	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).

### **D) 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 :**

<b>Sl. No.</b>	<b>Title</b>	<b>Author, Publisher, Edition &amp; Year</b>
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

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## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

- A) **SEMESTER** : **IV**  
 B) **SUBJECT TITLE** : **ANALOG ELECTRONICS**  
 C) **CODE** : 228412 (28)  
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**  
 E) **RATIONALE** : This Course deals with the analog components and ICs used for Industrial Applications such as automation, PLC, technology, AC and DC Drives. The functional behaviors and typical circuits using analog devices are greatly emphasized. After going through this course, the students will be able to develop understanding of all typical circuits using analog devices / ICs and to generate the skills to use such circuits which are widely used in Automation and Communication industries.

**F) TEACHING AND EXMINATION 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		
228412 (28)	4	1	-	100	20	20	-	-	140	5
228421 (28)	-	-	2	-	-	-	50	10	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	Introduction to OPAMPS	10	8
2	2	Analog signal conditioning	15	12
3	3	Comparators & converters	20	30
4	4	Voltage regulators	15	20
5	5	Special application circuits	20	30
		<b>Total</b>	<b>80</b>	<b>100</b>

**H) DETAILED COURSE CONTENTS:**

**Chapter – 1 : Introduction to OP-AMPS**

- ✍ Working principle of basic differential amplifier, characteristics of differential amplifier, Different modes of operation
- ✍ OP-AMPS- IC configuration, characteristics, parameters, block diagram, functions of each block, various IC packages, pin configurations of OP-AMPS Ics, ideal characteristics of an OP-AMPS, features of data sheet

- ~~✍~~ Electrical parameters- input offset voltage, input resistance, CMRR, slew rate, gain, bandwidth
- ~~✍~~ Negative feedback amplifiers.

## **Chapter – 2 : Analog signal conditioning**

- ~~✍~~ Linear application- principle of analog signal conditioning circuits used for linear application, inverting and non-inverting amplifiers, OP-AMP as voltage follower, OP-AMP as adder, OP-AMP as subtractor, OP-AMP as integrator, OP-AMP as differentiator, I to V converter and V to I converter, scaling amplifiers, AC/DC amplifiers, difference between AC/DC amplifier
- ~~✍~~ Non-linear applications- principle, features and use of OP-Amps circuits
  1. Instrumentation amplifier- circuit diagram of instrumentation amplifier and its working
  2. Sample/hold circuit- need of sample/hold circuit, explanation of circuit
  3. Precision rectifiers- significance of Precision rectifiers, working of Precision rectifiers
  4. Active filters- meaning of active filters, classification of active filters as low pass; high pass and band pass, circuits of LPF, HPF and BPF

## **Chapter – 3 : comparators and converters**

- ~~✍~~ Comparators
  - Mode of operation, characteristics and applications
  - Functions of a comparator
  - Zero crossing detectors
  - Schmitt trigger; Threshold voltage, Hysteresis curve
  - Oscillators; wein bridge, phase shift, relaxation
- ~~✍~~ Converters-
  - Voltage to frequency converter; basic principle and its circuit diagram
  - Frequency to voltage converter; basic principle and its circuit diagram
  - A/D Convertors; basic principle & circuit diagram
  - D/A Convertors; basic principle & circuit diagram

## **Chapter – 4 : Voltage regulators**

- ~~✍~~ Need of regulator, monolithic voltage regulator and its pin, regulator ICs like; 723, 78XX and other LMXXX series ( special features)
- ~~✍~~ Basic low and high voltage regulators
- ~~✍~~ Applications of 3-pin regulators

## **Chapter – 5 : Special applications circuits**

- ~~✍~~ Timers –introduction to 555 timer, functional block diagram of timer, operating modes as mono, bi and astable, 555 as wave generators like; square, saw tooth and triangle, pulse width and duty cycle of a pulse signal, working of a wave generation circuit , pin diagram & implementation.
- ~~✍~~ PLL- block diagram of PLL, lock and capture range, PLL transfer characteristics & its significance, types of PLL and its applications.

## **D) SUGGESTED INSTRUCTIONAL STRATEGIES:**



A good practice and exercise is required to enable students to have complete knowledge on the subject and various measurement techniques.

## J) SUGGESTED LEARNING RESOURCES.

### (a) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1	Users Manual linear IC Trainer HIL 2941	HCL limited
2	Operational Amplifiers and linear ICs	By R.F. Coughlin/F.F. Driscall (PHI)
3	Op-Amps and linear ICs Publisher	R.A. Gayakward Hall Indian Ltd. New Delhi, 3 <sup>rd</sup> , 1987
4	Siemens trainer manuals	
5	OP-AMPS & Linierar Intgrated Circuits	K.R. Botkar, Kahanna Publication, New Delhi, 3 <sup>rd</sup> , 1994
6	Micro - Electronicsd	Millman (TMH) , New Delhi, 2 <sup>nd</sup> , 1990
7	OP-AMP	Graeme & Toby, Wiley Eastern, New York, 2 <sup>nd</sup> , 1980
8	OP-AMP	G.B. Clayton, Wiley Ester Ltd. New York, 2 <sup>nd</sup> , 1988

### (b) Others:

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

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## Course: Analog Electronics, Lab

**CODE : 228421 (28)**

**Hours: 32**

### LIST OF PRACTICALS / TUTORIALS:

- (1) Measurement of Different Characteristics of an OP-AMP loop configuration
  - (a) Output resistance "Ro"
  - (b) Diff. Input Resistance "Ri"
- (2) Measurement of Differential Characteristics of an OP-AMP loop configuration
  - (a) Voltage Gain
  - (b) Unity Gain Bandwidth

- (3) Measurement of Differential Characteristics of an OP-AMP
  - (a) Input offset voltage
- (4) Offset Nullification with:
  - (a) External Biasing for Inverting OP-AMP
  - (b) External Biasing for Non-Inverting OP-AMP
- (5) Inverting Amplifier
  - (a) AC Analysis
  - (b) DC Analysis
  - (c) Unity Gain
- (6) Non-Inverting Amplifier
  - (a) AC Analysis
  - (b) DC Analysis
  - (c) Unity Gain Buffer
- (7) OP-AMP as:
  - (a) Adder
  - (b) Subtractor
  - (c) Multiplier
  - (d) Divider
- (8) OP-AMP as:
  - (a) Integrator
  - (b) Differentiator
  - (c) Inverter
  - (d) Buffer
- (9) OP-AMP as Active Filter:
  - (a) Low pass filter
  - (b) High pass filter
  - (c) Band pass filter
- (10) Wave- shaping:
  - (a) Astable Multivibrator using OP-AMP
  - (b) Astable Multivibrator using Timer IC.
  - (c) Monostable multivibrator using timer IC.
- (11) Signal generator using OP-AMP / Timer IC
  - (a) Triangular wave generator
- (12) Schmitt Trigger. OP-AMP and Timer IC
  - (a) Saw tooth wave generator

- (b) Ramp generator
- (13) Preparation of Adjustable timer using OP-AMP
- (14) Oscillator using OP-AMP:
  - (a) Wein Bridge Oscillator
  - (b) R.C. Phase Shift Oscillator.
- (15) Clamper and chopper operation
  - (a) Positive and Negative clamper
  - (b) Positive and Negative clipping
- (16) Sample and Hold circuit operation
- (17) Precision Rectifier using an OP-AMP and voltage regulations.
- (18) Measurement VCD sensitivity linearity & free running frequency.
- (19) Phase lock loop as frequency multiplier.
- (20) Calculate the duty cycle of PWM.
- (21) 4 bit D/A converter addition experiments.
- (22) A/D Converter.

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## CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

- A) **SEMESTER** : **IV**  
 B) **SUBJECT TITLE** : **PRINCIPLES OF COMMUNICATION**  
 C) **CODE** : **228413 (28)**  
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**  
 E) **RATIONALE** : The knowledge of the basic principles and procedures used in electronic telecommunications will equip the students for lateral and vertical mobility when he/she enters the field of work. Concepts such as modulations, transmitters, receivers, basic telephony, advance telephony, modern trunk dialing and exchange that are widely used in the field of communications are dealt in this course.

**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		
228413 (28)	4	1	-	100	20	20	-	-	140	5
228422 (28)	-	-	2	-	-	-	50	10	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	Communication System	10	10
2	2	Amplitude & Frequency modulation	16	15
3	3	Radio receiver & Transmitter	16	20
4	4	Pulse Modulation	16	20
5	5	Telephony	16	25
6	6	Troubleshooting	06	10
		<b>Total</b>	<b>80</b>	<b>100</b>

**H) DETAILED COURSE CONTENTS:**

- ~~✍~~ **Chapter – 1** : **Communication System**  
~~✍~~ Information, Transmitter, Channel, Noise, Receiver, Modulation, Need of Modulation, Bandwidth Requirements, External Noise, Internal Noise, Noise Figure, S/N ratio.  
~~✍~~ **Chapter – 2 Amplitude & Frequency Modulation**  
~~✍~~ Generation & Description, Representation, Frequency Spectrum, Demodulation, Pre-emphasis & De-emphasis in FM, SSB & DSB, Simple Numerical  
**Chapter – 3 : Radio Reciever & Transmitter :**

Radio Receiver types : Tuned radio frequency, Superhetroodyne Receiver  
 AM Receivers : RF section & characteristics, frequency changing & tracking, intermediate frequency & IF amplifier, detection & automatic gain control, Simple Numerical  
 FM Receivers : Block diagram, amplitude limiters, basic FM demodulator, radio detector, radio transmitter block diagram description.

**Chapter – 4 : Pulse Modulation :**

Pulse modulation : Introduction types, Sampling theorem & nyquist rate,  
 Pulse Amplitude modulation (PAM), Pulse Width modulation (PWM), Pulse Position modulation(PPM) Generation & demodulation.  
 Pulse Code modulation (PCM) , Quantization, Generation, demodulation, effects of noise, companding, Advantages & application  
 Multiplexing : Time division multiplexing(TDM) & Frequency Division multiplexing (FDM)

**Chapter – 5 Telephony :**

☞ Concept of telephony, pulse & tone device like push button telephones KTS, EPABX, FAX machine moderns, brief description of devices, construction & working. Switching :- Time and space switches (elementary idea). CLIP, CALL FORWARD, CALL, WAITING, distinctive ring facilities how they are offered & processed in modern telephony basic circuits used to clip & provide call features. CDOT, common features.  
 ☞ STD, ISD, voice calls processed by internet packages like net phone, PC to voice etc., monitoring of calls through PCO billing monitors,

**Chapter 6 : Troubleshooting**

Troubleshooting of Radio receiver, Alingment & tracking of various stages of a radio receiver (AM & FM).  
 Troubleshooting of Telephone handset.  
 Troubleshooting of EPBX

**G. . SUGGESTED INSTRUCTIONAL STRATEGIES:**

- ☞ Lecture session with question and answer
- ☞ Use of audio visual aids
- ☞ Assignments on various topics
- ☞ Expert Lecture session from industry.
- ☞ Troubleshooting exercises
- ☞ Home assignment

**G. . SUGGESTED LEARNING RESOURCES.**

**(c) Reference Books:**

Sl. No.	Title	Author, Publisher, Edition & Year
1	Communication system	Singh & Sapre,
2	Principles of communication systems	Taub & Schilling, McGraw-Hill International, New York, 3 <sup>rd</sup> , 1986
3	Principles of telephony	,N.N. Biswas
4	Automatic Telephony	P.N. Das
5	Communication systems	Ahirrao D.D. & Jadhav N.S., Everest Publications Pune
6	Communication systems	George Kennedy

7	Radio Engineering	G.K.Mitthal
8	Electronics communication	Dennis Roddy& John Coolen
9	Communication System	Sanjiv Gupta

**(d) Others:**

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

**Course: Principles of Communication, Lab**

**CODE : 228422 (28)**  
**Hours: 32**

**LIST OF PRACTICALS / TUTORIALS:**

1. Perform amplitude modulation of a signal, plot the waveform and calculate modulation index
2. Perform frequency modulation of a signal and trace the frequency modulated waveform from CRO
3. Perform phase modulation of a signal and trace the phase modulated waveforms from CRO
4. Perform signal sampling and reconstruction techniques
5. Perform the TDM pulse amplitude modulation/demodulation & draw their waveform in the graph
6. Perform the division multiplexing pulse code modulation/demodulation
7. Perform the delta modulation techniques and plot the waveforms
8. Perform the adaptive delta modulation techniques and plot the waveforms
9. Perform the modulation & demodulation in ASK, draw its waveforms
10. Perform the modulation & demodulation in FSK, draw its waveforms
11. Perform the modulation & demodulation in PSK, draw its waveforms
12. Observe DSB/SSB AM transmitter waveforms and plot the graph
13. Observe DSB/SSB AM receiver waveforms and plot the graph
14. Study of EPABX machine
15. Study of FAX machine
16. Identify the various blocks & components of EPABX using a EPABX trainer
17. visit to telephone exchange
18. visit to mobile telephone exchange

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI**

- A) **SEMESTER** : **IV**  
 B) **SUBJECT TITLE** : **POWER ELECTRONICS**  
 C) **CODE** : 200414 (28)  
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**  
 E) **RATIONALE** : Power electronics is a subject that concerns the applications of electronic principles in to situation that are rated at power level rather than signal level. Many semiconductor devices such as SCR, DIAC, TRIAC, MOSFET and transistors are available for power applications. An effort is made in this course to provide understanding of the various power electronics applications to enable the students to acquire some core skills related to power electronics.

**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		
200414 (28)	4	1	-	100	20	20	-	-	140	5
200423 (28)	-	-	2	-	-	-	50	10	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	Power electronics devices	15	20
2	2	Phase Controlled Rectifier	12	16
3	3	Commutation Techniques	12	15
4	4	Chopper	10	12
5	5	Invertors and UPS	12	15
6	6	AC voltage controller	09	10
7	7	Cycloconverter	10	12
		<b>Total</b>	<b>80</b>	<b>100</b>

**H) DETAILED COURSE CONTENTS:**

## **Chapter – 1 : Power electronics devices**

- ~~✍~~ Introduction to thyristor family
- ~~✍~~ Use of data book
- ~~✍~~ Construction, working principle, symbol, characteristics and applications of SCR, UJT, DIAC, TRIAC, PUT, LASCR, IGBT, GTO
- ~~✍~~ Triggering methods, turn on- turn off characteristics of SCR, di/dt rating, dv/dt rating, Protection against dv/ dt, over voltage & over current protection, necessity of series and parallel combination & string efficiency of combination, firing circuit,

## **Chapter – 2 : Phase Controlled Rectifier**

- ~~✍~~ Half wave & full wave rectifiers, phase controlled Rectifier with R, RL& RL with free wheeling diode load., 3 phase half wave & full wave rectifier with Resistive load.
- ~~✍~~ Dual Converter: Introduction, working principle and speed control of DC motor using phase controlled Rectifier.

## **Chapter – 3 : Commutation Techniques**

- ~~✍~~ Types of commutation
- ~~✍~~ Natural commutation
- ~~✍~~ Forced commutation
- ~~✍~~ Series resonance/current commutation
- ~~✍~~ Voltage commutations
- ~~✍~~ Auxiliary thyristor for commutation
- ~~✍~~ External pulse commutation.

## **Chapter – 4 : Chopper**

- ~~✍~~ Concepts of choppers
- ~~✍~~ Types of chopper circuit (A-type to E-type)
- ~~✍~~ Jones chopper circuit
- ~~✍~~ Morgon chopper circuit

## **Chapter – 5 : Invertors and UPS**

- ~~✍~~ Working principle of inverter
- ~~✍~~ Inverter circuits using transistor and thyristor and their comparisons
- ~~✍~~ Series inverter using thyristor
- ~~✍~~ Parallel inverter using thyristor
- ~~✍~~ Use of pulses width modulation (PWM) circuit
- ~~✍~~ Concept of UPS
- ~~✍~~ Block diagram of UPS

## **Chapter – 6 : AC voltage controller**

- ~~✍~~ Types of voltage controller with R and RL load.
- ~~✍~~ Speed control of AC motor using AC voltage controller.

## **Chapter – 7: Cycloconverter**

- ~~✍~~ Operating principle of Cycloconverter
- ~~✍~~ Types of Cycloconverter
- ~~✍~~ 1phase to 1 phase Cycloconverter.
- ~~✍~~ 1phase to 3 phase Cycloconverter

## **I) SUGGESTED INSTRUCTIONAL STRATEGIES:**



When teaching this course, the actual power electronic devices need to be brought to the class and demonstrated to the students. The OHP could be used to magnify the silhouettes of the various components so that the students develop an appreciation of the actual shape of the various components.

**J) SUGGESTED LEARNING RESOURCES.**

**(e) Reference Books:**

Sl. No.	Title	Author, Publisher, Edition & Year
1	Power Electronics	Dubey, G.K.,
2	Power Electronics	Ramamurthy
3	Power Electronics	Rashid, M.H., Prentice Hall of India, New Delhi, 1990
4	Power Electronics	Sen, P.C., Tata McGraw Hill, New Delhi, 1999
5	Thyristor Engineering	Berde, M.S. Khanna Pub., New Delhi, 1990
6	Power Electronics	Bimbhra, P.S., Khanna Pub., New Delhi, 1996
7	Power Electronics	Vithayathil, Joseph, McGraw Hill, New York, 1994

**(f) Others:**

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

**Course: Power Electronics, Lab**

**CODE : 200423 (28)**

**Hours: 32**

**LIST OF PRACTICALS / TUTORIALS:**

1. Performance of thyristor, TRIAC & DIAC
2. Frequency calculation of pulse in UJT relaxation oscillator
3. Applications of TRIAC as AC load control
4. Performance of IGBT & GTO
5. Relaxation oscillator circuit using PUT
6. Design of snubber circuit
7. SCR commutating circuits

8. Chopper circuit using SCR
9. Parallel inverter using two thyristors
10. Study of Cycloconverter circuit using thyristors
11. Time delay relay circuit using UJT and thyristor

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**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI**

- A) **SEMESTER** : **IV**  
 B) **COURSE** : **PROGRAMMING IN 'C'**  
 C) **CODE** : 228415 (22)  
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**  
 E) **RATIONALE** : This Course intends to develop programming skills in the students, using a popular structured programming language 'C'. The students will learn the step-by-step procedure (i.e. Algorithm and flowcharting) in any program development process. The programming skills thus acquired using 'C' language can be used in developing programs for the scientific, research and business purposes.

**F) TEACHING AND EXAMINATION 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		
228415 (22)	4	2	-	100	20	20	-	-	140	5
228424 (22)	-	-	2	-	-	-	50	10	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	Introduction To 'C' Programming	2	9
2	2	Operations & Expression	4	13
3	3	Input & Output Statements	4	12
4	4	Control Statements	8	11
5	5	Control Loop Statements	10	10
6	6	Arrays & Strings	10	13
7	7	Functions & Micro	15	13
8	8	Structure ,Union and Enumerations	13	10
9	9	Pointers	14	9
		<b>Total</b>	<b>80</b>	<b>100</b>

## H) DETAILED CONTENT

### **Chapter – 1 : Introduction to `C' Programming**

?? Introduction

- History and features of C, Algorithms, Flowcharts, structured programming Concepts

### **Chapter – 2 : Operations & Expression**

?? Character set of C

?? Operators and Expressions

- Arithmetic, Relational, Logical assignment operators, variables, onstants, data types, expressions, data type conversion, key words, hierarchy of operators.

### **Chapter – 3 : Input & Output Statements**

?? `C' Programme structure, Type declaration, Input and Output, (printf, scanf, getchar, putchar, getch, putch), Conversion specifiers in format control string, Library functions (Math functions)

### **Chapter – 4 : Control Statements**

?? Unconditional branching: goto statement

?? Conditional branching statements: if statement, if- else, Nested if' Multiple branching statements: switch case statement.

### **Chapter – 5 : Control Loop Statements**

?? Loop Statements: `for' statement, while statement, `do-while' statement, `break-continue' statement.

### **Chapter – 6 : Arrays & Strings**

?? Arrays:

- Concept of one dimensional, two dimensional and
- Multi-dimensional array, array declaration, Array and initialization, operations on one and two-dimensional arrays.

?? String Manipulations

- Strings, get, puts, string operations, string function (concatenation, comparison, length of a string).

### **Chapter – 7 : Functions And Macros**

?? Library and User-Defined Functions

- Concepts of library functions, user-defined
- Functions, local and global variables, storage class,
- Parameter passing mechanisms simples and Conditional Macros and Its exapansions

### **Chapter – 7 : Structure ,Union And Enumerations**

?? Definition, Declaration and Implementations

### **Chapter – 8 : Pointers**

?? Definition, Declaration and Implementations

## D) SUGGESTED IMPLEMENTATION STRATEGIES

The teachers are expected to give assignments to develop programs to the students soon after the completion of the concerned topic. The number of assignment will depend upon the availability of time. Sample question on the topic covered can be given to the students to make the teaching/learning process more effective. The programs that the teachers give to the students either in the classroom or as a take home assignment can be problems related to the other Courses taught in the discipline, like from mathematics/physics/mechanics/fundamental of electrical engineering etc.

The program that will be developed by the students should be general, interactive and structured. At the completion of this course the students are expected to understand the syntax and semantic of 'C' Language and develop proficiency in programming skills.

## J) SUGGESTED LEARNING RESOURCES

### a) Reference Books

S. No.	Title	Author, Publisher & Address, Edition,Year of Publication,
1.	The Spirit of C	Mullish Cooper, Jaico Publishing House, 121, N.G. Road, Mumbai, 2000
2.	Programming in C	Balagurusamy ,Tata Mc-Graw hill Publishing Company Ltd., New Delhi, IInd Edition 2000.
3.	Let us Learn 'C'	Yashwant Kanetkar ,BPB Publications, B- 14, Connaught Place, New Delhi, IIIrd - Edition,2000.
4.	Programming with C	ata Mc-Graw hill Publishing Company Ltd., New Delhi, IInd- Edition, 2000.
5.	Programming with C++	D.Ravichandran ,Tata Mc-Graw hill Publishing Company Ltd., New Delhi, Latest Edition.

### b) Others:

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

**CODE : 228424 (22)**

**Hours: 32**

**LIST OF EXPERIMENTS/ DEMONSTRATIONS**

- i. Assignment to prepare general algorithms and flow chart.
- ii. Assignment to write character, operators symbols of C Language
- iii. Assignment to identify valid and invalid variables, constants and expressions
- iv. Programme based on Input/Output statements
- v. Program based on Arithmetic expression
- vi. Program based on Library functions
- vii. A Program based on goto statement
- viii. Two Programs based on 'if' and 'Nested if'
- ix. Program based on 'switch case' statement.
- x. At least one program based on each:
  - a. 'for' statement
  - b. 'while' statement
  - c. 'do-while' statement
  - d. break continue statement
- xi. One program based on one dimensional array
- xii. One program based on two dimensional array
- xiii. Three programs based on string operations
- xiv. Two programs based on functions.

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**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI,**

- A) **SEMESTER** : **IV**  
 B) **SUBJECT TITLE** : **MINOR PROJECT**  
 C) **CODE** : **228425 (28)**  
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**  
 E) **RATIONALE** : Minor project work is a consolidation of various small activities, which students has already performed during the preceding semesters. Therefore, the purpose of given minor nature project work is to integrate as many acquired task/skills as possible. This type of minor project work during the programme builds the confidence and ability to perform the major project work in final semester.

**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		
228425 (28)	-	-	3	-	-	-	50	20	70	2

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

**G) DETAILED MINOR PROJECT WORK CONTENTS:**

**Familiarisation of Various Electronic Components**

- ~~✍~~ Read the value of resistance/capacitor by observing colour coding.
- ~~✍~~ Familiarise various electronic components like:
- ~~✍~~ Semiconductors, SCR, Linear and digital IC’s.(pin identification of 555, 741, 723, 74 and 40 Series), Regulator IC’s.
- ~~✍~~ Use the data book to get the information of above mentioned components.

**Testing of Electronic Components**

- ~~✍~~ Test & measure various resistance by Multimeters.
- ~~✍~~ Measure the values of power capacitors and inductors by L.C.R. bridge.
- ~~✍~~ Use trainer, oscilloscope, function Generators and power supplies for basic Circuits (like Amplifiers, multi-vibrators Timing circuits etc.)
- ~~✍~~ Check digital and Linear IC’s. on bread Board with the help of data book (use logic prob)

**PCB Fabrication**

- ~~✍~~ Introduction to PCB.S
- ~~✍~~ PCB’s. lay-out
- ~~✍~~ Photo Printing
- ~~✍~~ Dying
- ~~✍~~ Post baking

- ~~///~~ Etching
- ~~///~~ Protection of Copper track.
- ~~///~~ Mechanical operation
- ~~///~~ Assembling and soldering of components on PCB.

### **Designing and Preparation of Small Electronic project**

- ~~///~~ Prepare the PCB of a project.
- ~~///~~ Fabricate cabinets.
- ~~///~~ Test the prepared project.
- ~~///~~ Demonstrate the function\working of the prepared project

### **D) SUGGESTED INSTRUCTIONAL STRATEGIES:**

- a) Project could be performed by group of two to five students.
- b) Project should integrate all problem statements, which could consist of practical skills, intellectual skills, interpersonal skills, market survey skills etc.
- c) Monitoring the project at every stage.
- d) Project guide should carry out progressive assessment for every stage of project.

### **J) SUGGESTED LEARNING RESOURCES**

#### **(g) Reference Books :**

<b>Sl. No.</b>	<b>Title</b>	<b>Author, Publisher, Edition &amp; Year</b>
1	The Design and drafting of Printed Circuit	Mr. Darryl Lindsey Bishop graphics
2	Printed Circuit Boards Design and technology	Walter & Bosshant STata Mc Graw Hill
3	Design suitable learning experiences for laboratory work and direct laboratory experiences to achieve specified aims – Competency-Based Self-Learning Module. No.4; REC-British Council India Project	Earnest, Joshua; Mathew, Susan S.; Srivastava, M.K.; Banthiya, N.K.; TTTI, Bhopal, 1999

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