

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

DIPLOMA PROGRAMME IN ELECTRONICS & TELE-COMMUNICATION ENGINEERING

Semester – III

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.	Electronics & Telecomm Engg..	228311 (28)	Electronic Devices & Circuits	4	1	-	100	20	20	-	-	140	5
2.	Electronics & Telecomm Engg..	200312 (28)	Digital Electronics	3	1	-	100	20	20	-	-	140	4
3.	Electronics & Telecomm Engg..	200313 (28)	Electrical & Electronics Measurement	3	1	-	100	20	20	-	-	140	4
4.	Electronics & Telecomm Engg..	228314 (28)	Network Analysis	4	1	-	100	20	20	-	-	140	5
5.	Computer Engineering	200315 (22)	Computer Hardware, Installation & Maintenance	3	1	-	100	20	20	-	-	140	4
6.	Electronics & Telecomm Engg..	228321 (28)	Electronics Devices & Circuits Lab	-	-	2	-	-	-	50	10	60	1
7.	Electronics & Telecomm Engg..	200322 (28)	Digital Electronics Lab	-	-	3	-	-	-	50	10	60	2
8.	Electrical Engineering	200323 (24)	Electrical & Electronics Measurement Lab	-	-	2	-	-	-	50	10	60	1
9.	Electronics & Telecomm Engg..	228324 (28)	Network Analysis Lab	-	-	2	-	-	-	50	10	60	1
10.	Computer Engineering	200325 (22)	Computer Hardware, Installation & Maintenance Lab	-	-	4	-	-	-	50	10	60	2
TOTAL				17	5	13	500	100	100	250	50	1000	29

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

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

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

- A) SEMESTER : III
 B) SUBJECT TITLE : ELECTRONIC DEVICES & CIRCUITS
 C) CODE : 228311 (28)
 D) BRANCH/DISCIPLINE : Electronics & Tele-communication
 E) RATIONALE :

Any electronic trade has its basis on a certain number of components and some basic standard circuits. These common circuits are applied in all sections of the Electronics Technology. A good understanding of the basic functions of all these components and circuits will be a solid platform to enter into the more complex and specialized field of Electronics engineering.

Emphasis has been given on the characteristics and applications of semiconductor devices/components. In the case of basic standard circuits, the focus has been made on the interaction of active and passive components and overall performance according to the stated requirements.

The laboratory course fundamentally aims at familiarizing the students with various semiconductor devices, components and their specific application in shaping, switching, rectification, amplification and oscillation. In addition to this, the students will also be trained in electronic measurement techniques by operating measuring instruments.

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		
228311 (28)	4	1	-	100	20	20	-	-	140	5
228321 (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	Semiconductor Diodes	08	12
2	2	Rectifier & Filter Circuit	08	10
3	3	Bipolar Junction Transistor (BJT)	12	15

Sl. No.	Chapter No.	Chapter Name	Hours	Marks
4	4	Field Effect Transistor (FET)	08	08
5	5	Unijunction Transistor (UJT)	06	07
6	6	Amplifiers	10	12
7	7	Amplifier characteristics	08	08
8	8	Oscillator & Multivibrators	10	14
9	9	Special devices	10	14
		Total	80	100

H) DETAILED COURSE CONTENTS:

Chapter – 1 : Semiconductor Devices

- ✍ PN Junction Diode: concept of barrier potential, Forward & Reverse biasing, V.I. Characteristic, Applications
- ✍ Zener diode: Symbol, working principle, application & characteristics
- ✍ Zener diode as shunt regulator

Chapter – 2 : Rectifier & Filter Circuit

- ✍ Need of rectification
- ✍ Types of rectifier circuit; Half Wave, Full Wave & Bridge rectifier circuit
- ✍ Derivation of input & output voltages, PIV, Ripple factor.
 - H.W. rectifier
 - F.W. Center tapped rectifier
 - F.W. bridge rectifier
- ✍ Filter Circuits- RC filter, LC filter & ? -circuit

Chapter – 3 : Bipolar Junction Transistor (BJT)

- ✍ Basic structure
- ✍ Types: PNP & NPN
- ✍ Parameters
- ✍ Transistor configuration; CE, CC and CB & voltage current notations
- ✍ Regions of transistor operation; active, cutoff & saturation.
- ✍ Current gain; Alpha and Beta
- ✍ Transistor characteristics in different configurations.
- ✍ Switching action of transistor
- ✍ Transistor biasing
- ✍ Classification of transistor according to applications
- ✍ Trouble shooting tips

Chapter – 4 : Field Effect Transistor (FET)

- ✍ Structure and symbolic diagrams of N-channel & P-channel FET, MOSFET & CMOSFET
- ✍ FET operation
- ✍ FET static characteristics.
- ✍ VDS and ID Drain curves.
- ✍ FET parameters.

- ~~/~~ FET applications.
- ~~/~~ Comparison of FET and BJT

Chapter – 5 : Unijunction Transistor (UJT)

- ~~/~~ Structure & symbol
- ~~/~~ Working principle
- ~~/~~ Characteristics of UJT
- ~~/~~ Equivalent circuit
- ~~/~~ UJT Application
- ~~/~~ UJT as relaxation oscillator

Chapter – 6 : Amplifiers

- ~~/~~ Transistor as an Amplifier
- ~~/~~ Load line analysis (ac & dc)
- ~~/~~ CE, CB, CC amplifier
- ~~/~~ Multistage Amplifiers

Chapter – 7 : Amplifier characteristics

- ~~/~~ Distortion in amplifiers
- ~~/~~ Frequency response of amplifier
- ~~/~~ Feed back amplifier; current & voltage series feedback amplifier
- ~~/~~ Darlington pair
- ~~/~~ Trouble-shooting tips

Chapter – 8 : Oscillator & Multivibrators

- ~~/~~ Principle of oscillator
- ~~/~~ Barkhausen circuit criteria for oscillation
- ~~/~~ Types of oscillators
 - Phaseshift oscillator
 - Resonance circuit LC oscillator
 - Wein bridge oscillator
 - Colpits oscillators
 - Hartley oscillators
 - Crystal oscillators
- ~~/~~ Multivibrators
 - Astable Multivibrators
 - Mono stable Multivibrators
 - Bistable Multivibrators

Chapter – 9 : Special devices

Special purpose diodes:

- Tunnel diode,
- Schottky,
- Varactor, Photo,
- LED,
- Switching (step recovery),
- Gunn diode,
- PIN diode,
- Laser diode

~~✓~~ Special amplifier:

- Power amplifier (Audio Power),
- Push pull amplifier,
- Class C tuned amplifier

D) INSTRUCTIONAL STRATEGIES:

The implementation strategy to teach this course should be a good mix of various teaching methods like lecture, question answers, assignments and lab work. Small mini- projects should be made for understanding subject concept clear and interesting.

J) LEARNING RESOURCES.

(a) Reference Books:

Sl. No.	Title	Author, Publisher, Edition & Year
1.	Electronic Devices and Applications	Nair, Prentice-hall, New- Delhi,
2.	Electronic Devices and Circuit Theory	Boylestad & Nashelsky, Prentice-hall, New- Delhi, 8 th Edition
3.	Electronic Devices and Circuits	Bell, Prentice-hall, New- Delhi, 4 th Edition
4.	Principle of Electronics	Mehta V.K, S. Chand & Co. Ltd, 4 th 2000
5.	Electronics principles	Malvino, Tata McGraw Hill, New Delhi, 3 rd 1995
6.	Functional Electronics	K.V. Ramanan
7.	Engineering Electronics	John D. Dyder
8.	Electronic Devices & circuits	Mottershead, Allen, Prentice Hall, India, New Delhi 22 nd 2000
9.	Integrated Electronics	Millian & Halikyas
10	Electronic devices & circuits, volume- I	G.K. Mittal, Khanna Publishers, New Delhi, 22 nd 1999
11.	Laboratory manual for electronic devices and circuits	Bell, Prentice-hall, New- Delhi, 4 th Edition
12.	Electrical Devices & Circuits	Bogart, T.F., Universal Book Staff, New Delhi, 1 st , 1991

(b) Others:

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

LIST OF PRACTICALS / TUTORIALS:

1. Plot the V-I characteristics of a
 - (i) Silicon Diode
 - (ii) Germanium Diode
2. Verify the action of diode as a
 - (i) Positive Clipper
 - (ii) Negative Clipper
3. Verify the action of diode as a
 - (i) Positive Clamper
 - (ii) Negative Clamper
4. Verify the V-I characteristics of a zener diode.
5. Set up the circuit and verify the waveforms of
 - (i) H.W. rectifier
 - (ii) F.W. (Centre tapped) rectifier
 - (iii) Bridge rectifier.
6. Observe the output waveform of a rectifier circuit with
 - (i) Capacitor filter
 - (ii) L – Inductive filter.
7. Obtain the input and output transistor characteristics for CB configuration.
8. Obtain the input & output transistor characteristics for CE configuration
9. Obtain the input & output transistor characteristics for CC configuration
10. Verify the operation of BJT & FET as a switch.
11. Verify the V-I characteristics of a UJT.
12. Observe the characteristics of a
 - (i) Current series feedback amplifier.
 - (ii) Voltage series feedback amplifier.
13. Verify the action of UJT as a relaxation oscillator.
14. Setup an RC phase shift oscillator and analyse its' operation.
15. Setup the circuit and observe the action of bistable Multivibrators & obtain the output waveform.
16. Setup the circuit and observe the action of monostable Multivibrators & obtain the output waveform.
17. Setup the circuit and observe the action of astable Multivibrators & obtain the output waveform.

- A) **SEMESTER** : **III**
 B) **SUBJECT TITLE** : **DIGITAL ELECTRONICS**
 C) **CODE** : **200312 (28)**
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**
 E) **RATIONALE** : This course is classified under basic technology group is intended to enable the students to understand the facts, concepts, principles & procedures of digital techniques and their application used in digital circuits & systems. This subject concept will help in developing skills regarding small circuit implementation. It will also help students acquire investigation skill required for prototype testing.

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		
200312 (28)	3	1	-	100	20	20	-	-	140	4
200322 (28)	-	-	3	-	-	-	50	10	60	2

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	Number System & Codes	10	15
2	2	Boolean Algebra & Logic Gates	12	25
3	3	Combinational Circuits	09	15
4	4	Sequential Circuits	10	13
5	5	D/A and A/D Converters	08	12
6	6	Logic Families	07	10
7	7	Memories	08	10
		Total	64	100

H) DETAILED COURSE CONTENTS:

Chapter – 1 : Number system & Codes

- ✍ Number systems, Conversion between different number systems, complement of numbers i.e.1's, 2's, 9's, 10's
- ✍ Binary Codes: Weighted & Unweighted codes, Excess-3 Code, Gray Code, Ring code, Error Detection & Correction Codes, BCD Code
- ✍ .Binary Operations - Addition, Subtraction, Multiplication, Division

Chapter – 2 : Logic Gates & Boolean Algebra

- ✍ Logic Gates-AND, OR, NOT, EX-OR, EX-NOR, Universal Gates, Switching circuits
- ✍ Basic Boolean Functions, Boolean theorems, De Morgan's Theorems, function of duality, , Max-term, Min-term, SOP& POS,
- ✍ Simplification of Boolean Functions with Boolean algebra. Simplification with K-map up to 5 variables.

Chapter – 3 : Combinational Circuits

- ✍ Half Adder, Full Adder, Half Subtractor. Full Subtractor, 3 bit binary adder, 3 bit binary Subtractor. BCD adder, Magnitude comparator.
- ✍ Encoder, Decoder, Multiplexer, Demultiplexer.
- ✍ BCD to binary & binary to BCD decoder, BCD to Seven Segment decoder.

Chapter – 4 : Sequential Circuits

- ✍ Flip-Flop – Introduction to Flip Flop- RS F/F, JK F/F, D F/F, T F/F, Clock , Set, and Reset input of F/F
- ✍ clock triggering- positive & negative clock, Edge triggering, level triggering.
- ✍ Race around condition, Master Slave F/F (unclocked & clocked input), Counters – Introduction, Synchronous & Asynchronous counter, Ripple Counter, Up-down binary counter, Decade counter, BCD counter, Ring counter, Johnson counter. Designing of counters .
- ✍ Register – Introduction, Series in –parallel out, Series in-series out,. Parallel in-parallel out register, shift register, Designing of register

Chapter – 5 : D/A and A/D Converters

- ✍ Binary – weighted digital to analog converters
- ✍ Counter ramp analog to digital converter
- ✍ Successive approximation analog to digital converter.

Chapter – 6 : Logic Families

- ✍ Introduction to Logic IC Families- like 74 Series IC, 54 Series IC, 40 Series .
- ✍ Concept of TTL, RTL, DTL, ETL, C-MOS and comparison.

Chapter – 7 : Memories

- ✍ Introduction to Memories: Magnetic memory, Semi conductor memory, Static/Dynamic memories, RAM/ROM. Programmable ROM/EPROM/ EE ROM/EAROM.
- ✍ Storage devices-Magnetic disk : Floppy disk & Hard disk, Magnetic Drum, Magnetic Tape.

D) INSTRUCTIONAL STRATEGIES:

The implementation strategy to teach this course should be a good mix of the various teaching methods like lecture, question answer, assignment and lab. work. More drill and practice of numericals will be useful. Home and classroom assignments would prove more useful to develop the analytical skills.

J) LEARNING RESOURCES.

(c) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1	Digital circuits and logic design	Lee, Prentice-Hall, 2004
2	Digital Electronics: An Introduction to theory and practice	Gothmann, Prentice-Hall, 2004
3	Digital Electronics	Morris Mano
4	Digital Fundamentals	T.L. Floyd
5	Digital Electronics	Malvino
6	Digital Electronics	R.P.Jain
7	Digital Principles and Applications	Malvino, Leach
8	Digital electronics	R.K.Gaur
9	Digital Electronics (A practical approach)	William Kleitz
10	Pulse & Digital Circuits And Applications	R. Venkatraman, Dhanpatrai & sons

(d) Others:

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

Course: DIGITAL ELECTRONICS, LAB

CODE : 200322 (28)

Hours: 48

LIST OF PRACTICALS / TUTORIALS:

1. Verify Truth Table of Logic Gates (AND, OR ,NOT ,NAND & NOR Gates).
2. Design Basic Gates Using NAND gates
3. Design Basic Gates Using NOR gates.
4. Verify Demorgan's theorem.
5. Design Half Adder. (a) Using AND/OR/NOT Gates. (b) Using NAND/NOR Gates.
6. Design full Adder.
7. Design Half subtractor.
8. Design full subtractor.
9. Verify the operation of magnitude comparator (7485 IC) .
10. Verify the Truth Table of RS Flipflop, JK F/F, D F/F & T type F/F.
11. Design 3/4 bit Counter & verify truth table.
12. Design Ripple 3/4 bit Counter & verify truth table.
13. Design a counter for given event counting.
14. Design Decade Counter & verify truth table.
15. Design shift Register & verify truth table.
16. Design a register such that it can be used as a serial/parallel shift register.

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- A) **SEMESTER** : **III**
 B) **SUBJECT TITLE** : **ELECTRICAL & ELECTRONIC MEASUREMENTS**
 C) **CODE** : **200313 (28)**
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**
 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 AND EXMINATION SCHEME:

Course Code	Periods/Week (In Hours) (Teaching Scheme)			Scheme of Examination						Credit $\frac{[L+(T+P)]}{2}$
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
200313 (28)	3	1	-	100	20	20	-	-	140	4
200323 (28)	-	-	2	-	-	-	50	10	60	2

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	Measurement Systems	10	10
2	2	Measurement of Circuit Component (R, L&C)	15	20
3	3	Instrument Transformer	10	20
4	4	Cathode Ray Oscilloscope	15	25
5	5	Displays and Recorders	14	25
		Total	64	100

H) DETAILED COURSE CONTENTS:

Chapter – 1 : Measurement Systems

~~///~~ Basic arrangements of Measurement System;

- Sensing Element.
- Signal conditioning element.
- Output element.

~~///~~ Basic parameters of Measuring Devices.

- Accuracy and Precision.
- Error (Gross, Systematic and Random).
- Linearity, Hysteresis, Resolution, Threshold.
- Repeatability, Reliability and Maintainability.
- Span.
- Calibration.

~~///~~ Standards and Units of Measurement;

- Primary Standards, Secondary Standards, International Standards, Working Standards.

~~///~~ Electrical Standards.

- Current Standard (Absolute Ampere), Capacitance Standard, Inductance Standard, Voltage Standard, IEEE Standards.

Chapter – 2 : Measurement of Circuit Components (R,L and C)

~~///~~ Inductance Measurement.

~~///~~ Self-Inductance Measurement.

- Ammeter and Voltmeter method.
- Three Voltmeter Methods.
- Three Ammeter Method.
- General Four arms bridge network method.
- Maxwells' bridge method, and other bridges used for Self-Inductance measurement & their application.

~~///~~ Mutual Inductance Measurement.

- Felici's Method.

~~///~~ Capacitance Measurement –

- Wein bridge method, and other bridges used for capacitance measurement and their specific applications.

~~///~~ Resistance Measurement :

- Ammeter voltmeter method, Potentiometer method, Kelvin's double bridge method, Wheatstone bridge method, Loss of charge method.

Chapter – 3 : Instrument Transformer

~~///~~ Need of Instrument Transformer.

~~///~~ Range Extension of Ammeter.

~~///~~ Range Extension of Voltmeter.

~~///~~ Advantages of Instrument Transformer.

~~///~~ Current Transformer and Potential Transformer, phase error, ratio error and burden.

~~///~~ Use of Current Transformer and potential transformer for range extension in high voltage and current circuits.

Chapter – 4 : Cathode Ray Oscilloscope

- Need of C.R.O. in electronic measurements.
 - Block diagram of a general-purpose cathode ray oscilloscope.
 - Cathode Ray Tube – Internal Structure, Electron Gun, Electrostatic Focusing, Electrostatic deflection, CRT screen, CRT gratitude.
 - Time base generator – necessity of time base signal.
- ~~///~~ Basic C.R.O. Circuits:
- Vertical (y) deflection system, Horizontal (x) deflection system, synchronization, Blanking Circuit, Intensity Modulation, Positioning Control, Focus Control, Intensity control, Calibration Circuit Astigmatism.
- ~~///~~ Application of CRO: Measurement of Voltage, Current, Frequency, Phase difference.
- ~~///~~ Special Purpose C.R.O.
- Multiple beam oscilloscopes.
 - Multiple trace Oscilloscope.
 - Storage type oscilloscope.

Chapter – 5 : Displays and Recorders

- ~~///~~ Displays:
- Analog indicators/displays
 - Digital indicators/displays
 - a) Cold cathode displays
 - b) Fluorescent displays
 - c) Light emitting diodes
 - d) Liquid crystal diodes
 - e) Alpha-numeric display
 - f) Dot matrix display
 - g) Seven segment display
- ~~///~~ Recorders :
- Analog Recorder, Graphic Recorder, Optical oscillograph, Strip Chart Recorder (Null & Galvanometer).
 - X-Y Recorder, Ultraviolet Recorder, Magnetic Tap Recorder.

I) 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.

(e) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1	Electronic Instrumentation & Measurement Techniques	Cooper W.D. & Helfride A.D., Prentice Hall of India, New Delhi.
2	Electronic instruments and instrumentation technology	Anand, Prentice Hall of India, New Delhi, 2004.
3	Electronic Instrumentation &	Bell, Prentice Hall of India, New Delhi,

Sl. No.	Title	Author, Publisher, Edition & Year
	Measurement	2004.
4	Instrumentation Measurement Devices & Systems	Rangan C.S., TMH Publications, New Delhi.
5	Electrical Measurement & Measuring Instruments	Golding & Widdis.
6	A Course in Electrical and Electronics & Instrumentation	Rambhadran S., Khanna Publishers, Delhi.
7	Electrical & electronic measurement and instrumentation	A.K. Shawney, 11 th edition, 2000
8	Electrical Measurements & Measuring Instruments	Sauryanarayana, Tata McGrawHill Publications, New Delhi.

(f) Others:

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

Course: Electrical & Electronics Measurements, Lab

CODE : 200323 (28)

Hours: 32

LIST OF PRACTICALS / TUTORIALS:

1. Self-inductance measurements:
 - Ammeter and Voltmeter method.
 - Voltmeter method.
 - Ammeter method.
2. Self-Inductance Measurement by General four-arms's bridge network method.
3. Self-inductance Measurement by – Maxwell's Bridges method.
4. Mutual Inductance Measurement by Felicia method.
5. Capacitance Measurement by Wein-bridge method.
6. Low-resistance Measurement by –
 - Ammeter Voltmeter method.
 - Potentiometer method.
 - Kelvin's double bridge method.
7. Medium Resistance Measurement by –Wheat Stone bridge method.

8. Ammeter range extension using shunts.
9. Voltmeter range extension using voltage multiplier circuit.
10. Study and use of C.T. & P.T.
11. Study of C.R.O.
12. Voltage measurement on C.R.O.
13. Current measurement on C.R.O.
14. Frequency measurement on C.R.O.
15. Phase difference measurement on C.R.O.
16. Study of Displays –Cold cathode displays, Fluorescent displays, Light emitting diodes, Liquid crystal diodes, Alpha-numeric display
Recorders –
Analog Recorder, Graphic Recorder, Strip Chart Recorder, X-Y Recorder.
17. Digital Instruments –
Digital Voltmeter, Digital Frequency Meter, Digital Panel Meter, Digital Storage Oscilloscope.

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

- A) **SEMESTER** : **Third**
 B) **SUBJECT TITLE** : **NETWORK ANALYSIS**
 C) **CODE** : **228314 (28)**
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**
 E) **RATIONALE** : This core subject is intended to enable the student understand the facts, concepts and principles of electrical and electronics engineering circuits and how to analyse them. Basic concepts will be clear and it will prove beneficial to student for coming semesters.

F) TEACHING AND EXAMINATION SCHEME:

Course Code	Periods/Week (In Hours) (Teaching Scheme)			Scheme of Examination					Credit $\frac{[L+(T+P)]}{2}$	
	L	T	P	Theory			Practical			Total Marks
				ESE	CT	TA	ESE	TA		
228314 (24)	4	1	-	100	20	20	-	-	140	5
228324 (24)	-	-	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	Network transformation	20	20
2	2	Resonance	12	20
3	3	Filters	12	20
4	4	Two port network	20	30
5	5	Laplace transformation	16	10
		Total	80	100

H) DETAILED COURSE CONTENTS:

Chapter – 1 : Network transformation

~~///~~ Mesh and node circuit analysis

~~///~~ Principle of duality

~~///~~ Reduction of a complicated N/W

~~///~~ Conversion between T and π section

~~///~~ Superposition theorem

- ~~///~~ Reciprocity theorem
- ~~///~~ Thevenin's theorem
- ~~///~~ Norton's theorems
- ~~///~~ Maximum power transfer theorem

Chapter – 2 : Resonance

- ~~///~~ Quality factor or Q factor
- ~~///~~ Series resonance.
- ~~///~~ Bandwidth and selectivity of series resonance circuit
- ~~///~~ Parallel resonance or antiresonance.
- ~~///~~ Band width and selectivity of the anti resonance circuit

Chapter – 3 : Filters

- ~~///~~ Decibel and neper :- Definations
- ~~///~~ Filter fundamental, pass and stop band
- ~~///~~ Constant K low pas filter
- ~~///~~ Constant K high pass filter
- ~~///~~ Band pass & band elimination filter
- ~~///~~ M derived filter
- ~~///~~ M derived low pass filter
- ~~///~~ Attenuators

Chapter – 4 : Two port network

- ~~///~~ Short circuit admittance parameters.
- ~~///~~ Open circuit impedance parameter
- ~~///~~ Z parameters, Y parameter's
- ~~///~~ Transmission parameter
- ~~///~~ Inverse transmission parameter
- ~~///~~ Hybrid parameter
- ~~///~~ Condition for reciprocity of two port network
- ~~///~~ T section representation of a two port network
- ~~///~~ Pai section representation of a two part network
- ~~///~~ Image impedance
- ~~///~~ Symmetrical network
- ~~///~~ Ladder network
- ~~///~~ Bridge T para T and lattice network

Chapter – 6 : Laplace transformation

- ~~///~~ Intial condition in elements
- ~~///~~ A procedure for evaluating initial condition
- ~~///~~ The laplace transformation
- ~~///~~ Laplace transform of elementary function
- ~~///~~ Application of laplace transform for transient and steady state behaviour of RL, RC and RLC circuits.
- ~~///~~ Introducing ideas about N/W synthesis.

D) SUGGESTED INSTRUCTIONAL STRATEGIES:

It should include good methods like lecture, question answer, assignment and lab work. Drill and practice numerical home & classroom assignments would prove more useful to develop the analytical skills.

J) SUGGESTED LEARNING RESOURCES.

(g) Reference Books :

Sl. No.	Title	Author, Edition & Year	Publisher,
1	Networks lines and fields	John D. Ryder	
2	Network analysis	G.K. Mithal	
3	Network analysis	M.E. Van Valkenburg	
4	Network analysis	V.K. Atre	
5	Network analysis	Sanjeev Gupta	

(h) Others:

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

Course: Network Analysis, Lab

CODE : 228324 (28)

Hours: 32

LIST OF PRACTICALS / TUTORIALS:

1. Test a 2000 mfd condenser with the help of a multimeter and to comment on the movement of the pointer.
2. Apply the kirchoffslaw for finding current in a complex electrical circuit.
3. Apply the thevening theorem for finding current in a complex electrical circuit.
4. Verify the Norton's sheorem.
5. Verify the theorems
 - Super position theorems
 - Maximum power transfer theorem force circuits
6. Observe the wave shape of anintegrating ckt on the CRO.
7. Observe the wave shape of a differentiating ckt.
8. Use the filter circuit in musical light system.
9. Develop a ckt for simple project based on N/W analysis.
10. Measurement of capacitance of a condenser without using R.L.C. bridge.

11. Function of
 - Low pass filter
 - High pass filter
 - Band pass filter
12. Find different electrical parameter in R.L.:R.C.:R.L.C. series circuits and draw the phasor diagram and
 - Determine current and P.F. in each case
 - Determine and observe the resonance condition.
13. Find different electrical parameter in R-C & R-L-C parallel circuit and draw the phasor diagram.
 - Find power and P.F. of the circuit
 - Observe parallel resonance condition

- A) **SEMESTER** : **Third**
 B) **SUBJECT TITLE** : **COMPUTER HARDWARE,
INSTALLATION & MAINTENANCE**
 C) **CODE** : 200315 (22)
 D) **BRANCH/DISCIPLINE** : **Electronics & Tele-communication**
 E) **RATIONALE** : The aim of this course is to develop some level of specialization in students of electronics & telecommunication engineering. It is often expected from the passouts of *electronics and telecommunication* engineering diploma programme to troubleshoot the common faults in computers that usually occur. Today large numbers of computers are being procured for different purposes. However, there are only few trained personnel in the market who are capable of maintaining computer systems similar to the way TV sets are repaired. Keeping this scenario in mind, if the size of the industry where the polytechnic passouts get employed is small or if he/she is a self entrepreneur who has just started a business, then there is a high potential of using the training in this course for employment as well as for supporting his/her own business.

This course is intended to make the student to be aware of the different parts of computer system, their functions, common faults in computers and develop troubleshooting skills of a typical computer systems.

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		
200315 (22)	3	1	-	100	20	20	-	-	140	4
200325 (22)	-	-	4	-	-	-	50	10	60	2

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	Basic Concept of Computer Hardware	4	6
2	2	Motherboard & Processor	7	10
3	3	Input Devices	4	10
4	4	Output Devices	4	10
5	5	Display Devices	6	10
6	6	Storage Devices	8	12
7	7	Installation	8	10
8	8	Virus – Antivirus & Fireballs	7	10
9	9	Maintenance & Trouble-Shooting	8	12
10	10	Other Peripherals & Interface Devices	8	10
		Total	64	100

H) DETAILED COURSE CONTENTS:

Chapter – 1 : Basic Concept of Computer Hardware

- ~~///~~ System Blocks of a Computer
- ~~///~~ Basic Architecture
- ~~///~~ Detailed Specification of a Computer

Chapter – 2 : Motherboard & Processor

~~///~~ MOTHER-BOARD

- Specification of Mother-Board
- Commercially Available Various Type of Motherboards
- Chipset & its importance
- Mother-Board Jumpers / Jumper Setting and its utility
- Panel Connections and indications

~~///~~ PROCESSOR

- Popular Processors
- Features of a processor
- Processor Sockets
- Cooling of Processor
- Socket Compatibility
- Precautions for handling a Processor

~~///~~ ADD ON CARDS

- AGP / XGP
- Sound-Blaster
- TV-Tuner
- FAX-MODEM
- Special Purpose Cards

~~///~~ INSERTION SLOTS & PORTS

- ISA / EISA Slot
- PCI / PCIMCA Slot

- AGP / XGP Slot
- IDE Slot
- RAM & External Cache Slot
- Serial / Parallel Ports
- Game / Joystick Port
- Display / VGA Connecting Port
- USB Port
- IR Port (Infra Red)

Chapter – 3 : Input Devices

~~///~~ BASICS OF INPUT DEVICES

~~///~~ TYPES OF INPUT DEVICES

- Key-Board
- Mouse
- Scanner (Flat Bed / Vertical Roller etc.)
- Light Pen
- Card Reader
- Camera (Web / Still / Video)

Chapter – 4 : Output Devices

~~///~~ BASICS OF OUTPUT DEVICES

~~///~~ TYPES OF OUTPUT DEVICES

~~///~~ PRINTERS

- Dot Matrix Printer (DMP)
- Heavy Duty Printer (HDP)
- Line Printer (LP)
- LASER Printer
- Inkjet / Desk-jet Printer
- Thermal Printer

~~///~~ MULTIFUNCTION PRINTERS

- 3-in-1 Printer
- 5-in-1 Printer

~~///~~ PLOTTERS

- Flat-Bed & Vertical Roller Plotter
- Inkjet Plotter
- Pen Plotter
- Laser Plotter

Chapter – 5 : Display Devices

~~///~~ ADAPTERS

- Type of Display Adapter
- CGA / VGA / SVGA / XGA / WXGA

~~///~~ TYPES OF DISPLAYS

- Display active Area
- CRT Display
- Active Matrix
- LCD / TFT Display

Chapter – 6 : Storage Devices



TYPE OF STORAGE

- Primary Storage Devices
- Secondary Storage System
- Standard Features of Storage Devices



HARD DISK DRIVE

- Features & Construction of HDD
- Parallel IDE / ATA Drive & specifications
- Serial IDE / ATA Drive & Specifications
- SCSI Drive
- Hard Disk Stacks



FLOPPY DISK DRIVE

- Features & Construction of FDD
- Types Floppy & Floppy Drives



CD / DVD - DRIVE

- Basic Features of CD
- Basic Features of DVD
- CD-Drive
- Read / Read-Write CD
- CD / DVD Burning Process
- Read / Read-Write CD-Drive
- Concept of Combo Drive
- Read / Read-Write DVD
- Read / Read-Write DVD-Drive



RAM / CACHE MEMORY

- Fundamental of RAM
- Various types of RAM
- RAM Organization & its functioning
- SIMM / DIMM
- SRAM / DRAM
- SDRAM / DDRAM
- Cache Memory
- Various types of Cache Memory
- Working Concept & Need of Cache

Chapter – 7 : Installation



INSTALLATION OF A SYSTEM

- Basic idea about any type of Installation
- BIOS Setup / POST
- Manual Configuration of BIOS
- Setting up USER / SUPERVISOR Password
- Disabling Password
- APCM



HDD PREPARATION

- SCANDISK
- FDISK & Partitioning of HDD
- FORMATTING of HDD



OPERATING SYSTEMS

- Selection Criteria of O/S
- O/S Installation
- Booting Process of the system

- Hard-Boot / Soft-Boot
- ~~///~~ APPLICATION S/W INSTALLATION
- ~~///~~ NETWORK (NIC) CONFIGURATION
- ~~///~~ MULTIMEDIA CONFIGURATION
- Sound-Blaster Card & Software Installation
- AGP / XGP Card & Software Installation
- TV-Tuner Card & Software Installation
- ~~///~~ FAX-MODEM (CARD) & SOFTWARE INSTALLATION

Chapter – 8 : Virus – Antivirus & Fireballs

- Concept and Various features of Viruses
- Types of Virus
- Antidote or Antivirus S/W
- Quarantine (For Infected File/s)
- Scanning & Virus Removal (From Infected Files)
- ~~///~~ FIREBALL PROTECTION
 - Concept and features
 - Security Features
 - Security Level
 - Need of Activation & Deactivation

Chapter – 9 : Maintenance & Trouble-Shooting

- ~~///~~ Common Faults In A Computer System & Symptoms
- ~~///~~ Normal Precautions & Preventive Maintenance
- ~~///~~ Diagnostic S/W & Tools
- ~~///~~ Routine Check-Up & Minor Maintenance.

Chapter – 10 : Other Peripherals & Interface Devices

- ~~///~~ DIGITAL PAD / INTERACTIVE BOARD
- ~~///~~ Mass Storage Devices
- ~~///~~ Raid Controllers & Utility
- ~~///~~ Usb Devices & Its Utility
- ~~///~~ Wireless Lan Card & Network
- ~~///~~ Bnluetooth / Buffelo Devices
- ~~///~~ Flash-Drive / Thumb Drive / Usb Hdd
- ~~///~~ Serial Port Printers
- ~~///~~ Universal Card Reader Etc.

D) SUGGESTED INSTRUCTIONAL STRATEGIES:

- a) The students should be demonstrated the possible faults that are encountered and he/she should be explained the process of rectification.
- b) More troubleshooting exercises should be given.
- c) Lecture session could be conducted directly in the computer laboratory for enhanced understanding.
- d) The course should be taught by taking help of various audio visual aids.
- e) Moreover, when teaching this course, the actual devices need to be brought to the class and demonstrated to the students.

J) SUGGESTED LEARNING RESOURCES:

(i) **Reference Books :**

Sl. No.	Title	Author, Publisher, Edition & Year
1	Troubleshooting, Maintaining & repairing PCs	Bigelow, Stephen J.; Tata McGraw-Hill, Ltd. New Delhi, 2 nd , 1999
2	How multimedia computer works	BPB Publication; New Delhi 7 th , 1998
3	IBM PC and C.K. Jones	B. Govindrajalu; Tata McGraw-Hill, Ltd. New Delhi 7 th , 2000
4	Assemble Your Own Computer	G.K. Gupta; G.T. Publication, Jaipur, 1 st , 1996
5	The Complete PC upgrade & Maintenance guide	Jain, Manish; BPB; New Delhi, 7 th , 1997
6	Modern -All About Monitors	Lotia , Nair; BPB Publication; New Delhi 2 nd , 1999
7	All about Keyboard and mouse	Lotia; BPB Publication; New Delhi. 2 nd , 1992
8	Complete PC upgrade & Maintenance guide	Minasi Mark; BPB Publication; New Delhi, 7 th , 1997
9	Upgrading and repairing PCs	Mueller, Scott; Prentice-Hall of India, New Delhi 8 th , 1998
10	A Complete Guide to SMPS for PC	Upadhyay; BPB Publication; New Delhi, 1 st , 1996

(j) **Others:**

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

Course: Computer Hardware, Installation & Maintenance Lab

CODE : 200325 (22)

Hours: 64

LIST OF PRACTICALS / TUTORIALS:

- a) Identify different elements of computer system.
- b) Identify different beep codes and error codes.
- c) Identification of different motherboards & CPU's .
- d) Configuration of slot 1 motherboard for setting up of a Pentium III processor.
- e) Troubleshooting symptom failures in motherboard.
- f) Troubleshooting symptom failures in FDD.
- g) Installation of memory modules (SIMMs, DIMMs); CMOS battery and-on cards.
- h) Installation & configuration of a display card (PCI –SVGA).

- i) Installation & configuration of Video Accelerator card (2D ; 3D) in AGP slot.
- j) Installation & configuration of a sound blaster card, sound and video mixing.
- k) Installation of Input devices.
- l) Installation of Deskjet., laser printer & printer consumables.
- m) Installation of Video Display Unit (VDU).
- n) Installation of Scanners.
- o) Portioning and formatting a hard disk using FDISK ; Disk manager.
- p) Installation and configuration of a IDE: SCSI CD-ROM drive.
- q) Installation and configuration of a DVD drive.
- r) Installation and configuration of a CD-writer, creating an audio CD using CD-writer and download MP-III songs from the Internet.
- s) Importing & exporting from different video formats like GIF, JPEG, TIF, PGA, CDR, PHV etc.
- t) Assembly, installation and configuration and troubleshooting of complete computer system along with input output devices and UPS.
- u) Installation of operating system.
- v) Installation of application softwares like MS-Office 2000 and Star Office.
- w) Installation of Diagnostic softwares.
- x) Installation of antivirus softwares.
- y) Preventive maintenance of computer system.
- z) Debugging computer system.
