CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI

Diploma in EEE

Semester : THIRD

S. No	Board of Study	Course Code	Course	Periods per Week (in hrs)			Scheme of Examination						Credit L +(T+P)/2
							Theory			Practical		Total Marks	
				L	T	P	ESE	CT	TA	ESE	TA		
1.	EEE	225311 (25)	Electrical & Electronic Measurements	3	1		100	20	10			130	4
2.	EEE	225312 (25)	Communication Systems	4	1		100	20	10			130	5
3.	Electrical	224315 (24)	Electrical Circuit	4	1		100	20	10			130	5
4.	ET & T	224314 (28)	Basic Electronics	3	1		100	20	10			130	4
5.	ET & T	200312 (28)	Digital Electronics	3	1		100	20	20			140	4
6.	EEE	225321 (25)	Electrical & Electronic Measurements Lab	-	-	3	-	-	-	50	20	70	2
7.	EEE	225322 (25)	Communication Systems Lab	-	-	3	-	-	-	50	20	70	2
8.	Electrical	225323 (24)	Electrical Circuit Lab	-	-	2	-	-	-	50	20	70	1
9.	ET & T	225324 (28)	Basic Electronics Lab	-	-	3	-	-	-	50	20	70	2
10.	ET & T	225325 (28)	Digital Electronics Lab	-	-	3	-	-	-	50	10	60	2
Total				**17**	**05**	**14**	**500**	**100**	**60**	**250**	**90**	**1000**	**31**

L : Lecture hours, T: Tutorial Hours, P : Practical Hours
ESE : End of Semester Exam, CT: Class Test, TA: Teachers Assessment

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

SEMESTER : III
SUBJECT TITLE : ELECTRICAL & ELECTRONIC MEASURMENTS
CODE : 225311 (25)
BRANCH DISCIPLINE : ELECTRICAL & ELECTRONICS ENGINEERING

TEACHING AND EXAMINATION SCHEME

Course code	Teaching scheme (Hrs./week)				Scheme of Examination						Credit [L+(T+P)] 2
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
225311 (25)	3	1	-	4	100	20	10	-	-	130	4
225322 (25)	-	-	3	3	-	-	-	50	20	70	2

1. DISTRIBUTION OF MARKS AND HOURS:

S.N.	Chapter No.	Chapter Name	Hours	Marks
1	1	Introduction to Measurement	7	12
2	2	Basic Concepts of Electrical Measuring Instruments	7	12
3	3	Current & Voltage Measurement	7	12
4	4	Measurement of Circuit Components (R, L, C) & AC Bridges	10	13
5	5	Measurement of Power & Energy	10	15
6	6	Instrument Transformer	8	12
7	7	**Cathode Ray Oscilloscope**	7	12
8	8	**Display devices & recorders**	8	12
		TOTAL	**64**	**100**

1. RATIONALE

This course is under basic technology group is intended to enable the student understand the facts, concepts, principles and test procedure of the measurement of electrical quantities and circuit parameters and also the circuits analysis. This course will also help to build in the student the analytical skills that will enable him/her in doing and guiding, estimating investigation which in turn will help him/her to discharge the role as a supervisor or as a entrepreneur.

2. DETAILED COURSE CONTENTS

Chapter – 1

Introduction to Measurement

- Measuring systems, Block Diagram
- Requirements
- Classification of measuring instruments (Indicating, recording & Integrating types)
- Accuracy, sensitivity, Types of errors

Chapter – 2

Basic Concepts of Electrical Measuring Instruments

- Necessity of different torques and arrangement of torque producing system
- General description of PMMC, moving iron, induction type, dynamometers type instruments

Chapter – 3

Current & Voltage Measurement

- Principle of current and voltage measurement
- Galvanometer
- Ammeter, Voltmeter
- Extension of current range, voltage range
- Calibration of ammeter and voltmeter

Chapter – 4

Measurement of Circuit Components (R, L, C) & AC Bridges

- Measurement of resistance
  -Ammeter/Voltmeter method, Potentiometer method, Kelvin's double bridge method, Wheatstone bridge method
- Measurement of Inductance (Self Inductance)
  - Ammeter / Voltmeter Methods
  - General Four arms bridge network method
  - Maxwell's bridge method
- Measurement of capacitance method
  - Wein Bridge method

Chapter-5

Measurement of Power & Energy

- Principle of Power Measurement & Energy and effect of power factor
- Types of Watt meters & Energy meters
- Extension of Watt meter range
- Measurement of Single Phase power & Energy
- Measurement of Three Phase power using two wattmeter method
- Measurement of Three Phase power using three wattmeter method

Chapter – 6 **Instrument Transformer**

- Introduction to Instrument Transformer
- Introduction to current transformer (CT)
- Introduction to potential transformer (PT)
- Uses of CT & PT

Chapter –7 **Cathode Ray Oscilloscope**

- Need of CRO
- Block diagram of general purpose CRO
- CRT
- Electrostatic and Magnetic deflection
- X & Y Amplifiers
- Control on CRO
- Applications of CRO
  - Measurement of Voltage, Current, Frequency & Phase difference

Chapter – 8 Display devices & recorders

- **Displays**
  - Analog indicators/displays
  - Digital indicators/displays
    (LED, LCD, Alpha numeric, Dot Matrix, Seven segment)
- **Recorders**
  - Analog recorders, Graphic recorder, Strip Chart recorder
  - XY recorder

SUGGESTED IMPLEMENTATION 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 numerical will be useful. Home and classroom assignments would prove more useful to develop the analytical skills.

SUGGESTED LEARNING RESOURCES

A) Textbooks mentioned in the references.

B) Instruction manuals and brochures from instrument suppliers

C) Periodicals like magazines, journals etc.

D) OHP transparencies.

SUGGESTED REFERENCES

S. N.	Title	Ed./ Year	Author/ Publisher
1.	Instrumentation for Engineering Measurements	5th , 1986	Cerni & Foster; Tata McGraw Hill, New Delhi
2.	Electronic instrumentation & measurement techniques	3rd, 1989	Cooper, W.D. & Helfrick, A.D., New Delhi: Prentice Hall of India
3.	Instrumentation for Engineering Measurements	1st , 1984	Dally, J.W. et al; John Wiley & Sons, New York
4.	Instrumentation, Measurement & Feedback	1st, 1994	Jones; McGraw Hill, New York
5.	Electronic Instrumentation	2nd , 1987	Malvino; Tata McGraw Hill, New Delhi
6.	Electrical & electronic measurement & instruments	1st, 1994	Rambhadran, S,;Delhi: Khanna Publishers
7.	Electronic Measurements & Instrumentation	2nd 1988	Rao & Sutrave; Nirali Prakashan, Pune
8.	A course in electrical & electronic measurements and instrumentation	4th , 1987	Sawhney, A.K., Delhi: Dhanpat rai & sons
9.	A course in Electrical & Electronic Measurements & Instruments	11th ,2 000	Sawhney; Dhanpat Rai & Sons, Delhi
10.	Electrical measurements & measuring instruments	1st, 1994	Suryanarayana, New Delhi, Tata McGraw Hill

BRANCH DISCIPLINE: ELECTRICAL & ELECTRONICS ENGINEERING (Dip)

SUBJECT TITLE – ELECTRICAL & ELECTRONICS MEASUREMENTS LAB

Practical Code: 225321 (25)
Total Hours: 48

PRACTICAL EXPERIENCES

a) Study of different meters, such as: Ammeter, voltmeter, wattmeter & energy meter.
b) .Measurement of electrical quantities by low range meter along with
   i. Shunt & multiplier
   ii. C.T. & P.T.
c) Measurement of active & reactive power in 3-phase balance load circuit by one wattmeter method.
d) Measurement of active & reactive power in 3-phase unbalance load circuit by two-wattmeter method. Effect of load PF.
e) Calibration of energy meter at various P.F. by
   (1) Standard energy meter
   (2) Meter test bench
f) Study of Maximum demand indicator KVA, KWH & KVAR meter
g) Measurement of low & medium resistance by Wheastone bridge.
h) Measurement of low resistance by Kelvin double bridge.
i) Measurement of earth resistance by Earth Tester.
j) Measurement of insulation resistance by Megger.
k) Use of potentiometer for the measurement of Resistance and emf
m) Calibration of DC voltmeter and ammeter by potentiometer

n) Use of Multimeter.
o) Study of displays- LED, LCD, Alpha numeric , etc.
p) Study of Recorders- Analog, Strip Chart, X-Y recorder
q) Study of CRO- measurement of Voltage, Current & Frequency

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

SEMESTER : III
SUBJECT TITLE : Communication Systems
CODE : 225312 (25)
BRANCH DISCIPLINE : ELECTRICAL & ELECTRONICS ENGINEERING (Dip)

TEACHING AND EXAMINATION SCHEME

Course code	Teaching scheme (Hrs./week)				Scheme of Examination						Credit [L+(T+P)] 2
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
225312 (25)	4	1	-	5	100	20	10	-	-	130	5
225322 (25)	-	-	3	3	-	-	-	50	20	70	2

DISTRIBUTION OF MARKS AND HOURS:

S.No.	Chapter No	Chapter Name	Hours	Marks
1	1	**Introduction to Signals & Systems**	16	20
2	2	**A to D Conversion**	16	20
3	3	**Modulation of Signals**	16	20
4	4	**Radio Receiver and Transmitter**	16	20
5	5	**Data Transmission**	16	20
		Total	**80**	**100**

RATIONALE

The knowledge of the basic principles and procedures used in communication will equip the students for lateral and vertical mobility when he/she enters the field of work. Concepts such as modulations, transmitters, receivers, telephony, etc; those are widely used in the field of communication are dealt in this course.

DETAILED COURSE CONTENTS

Chapter – 1 **Introduction to Signals & Systems**

- Type of signals, signal Bandwidth, Channel
- Convolution of two signals
- Noise, Noise bandwidth, SNR
- Introduction to filtering
- Introduction to Fourier Transform (continuous & discrete)

Chapter – 2 **A to D conversion**

- Sampling of analog Signals, Sampling Theorem
- Sample & Hold Circuit
- Quantization of Signals, Quantization error
- Pulse Code Modulation(PCM)
- Difference between discrete signal and digitized signal

Chapter – 3 **Modulation of Signals**

- Amplitude Modulation & Demodulation, Amplitude Modulated waveforms ,% Modulation and recovery of signals
- Frequency Modulation & Demodulation, Frequency Modulated waveforms ,% Modulation and recovery of signals
- Pulse Modulation; PPM, PWM & PAM.

Chapter – 4 **Radio Receiver & Transmitter**

- Introduction to AM Transmitter
- AM receiver- Tuned Radio Frequency, Super Heterodyne
- RF & IF Amplifier, Automatic gain control(AGC)
- Introduction to FM transmitter & receiver

Chapter – 5 **Data Transmission**

- Multiplexing- TDM, FDM, Introduction to CDMA
- Digital Modulation Techniques- BPSK, BFSK, ASK

Advantages and disadvantages of Digital communication over Analog communication

SUGGESTED INSTRUCTIONAL STRATEGIES

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

SUGGESTED LEARNING RESOURCES

a) Textbooks mentioned in the references.
b) Instruction manuals/ Lab Manuals
c) Periodicals like magazines, journals etc.
d) Learning Packages

SUGGESTED LEARNING RESOURCES.

(a) 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, 3rd, 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

(b) Others:

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

BRANCH DISCIPLINE: ELECTRICAL & ELECTRONICS ENGINEERING (Dip)

Course: Communication Systems Lab **CODE : 225322 (25)**

Hours: 48

LIST OF PRACTICALS / TUTORIALS:

1. Study of A to D converter
2. Study of D to A converter
3. Perform amplitude modulation of a signal, plot the waveform and calculate modulation index
4. Perform frequency modulation of a signal and trace the frequency modulated waveform from CRO
5. Perform phase modulation of a signal and trace the phase modulated waveforms from CRO
6. Perform signal sampling and reconstruction techniques
7. Perform the TDM pulse amplitude modulation/demodulation & draw their waveform in the graph
8. Perform the division multiplexing pulse code modulation/demodulation
9. Perform the delta modulation techniques and plot the waveforms
10. Perform the adaptive delta modulation techniques and plot the waveforms
11. Perform the modulation & demodulation in ASK, draw its waveforms
12. Perform the modulation & demodulation in FSK, draw its waveforms
13. Perform the modulation & demodulation in PSK, draw its waveforms
14. Observe DSB/SSB AM transmitter waveforms and plot the graph
15. Observe DSB/SSB AM receiver waveforms and plot the graph

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

SEMESTER : III
SUBJECT TITLE : ELECTRICAL CIRCUIT
CODE : 224315 (24)
BRANCH DISCIPLINE : ELECTRICAL & ELECTRONICS ENGINEERING (Dip)

TEACHING AND EXAMINATION SCHEME

Course code	Teaching scheme (Hrs./week)				Scheme of Examination						Credit [L+(T+P)] 2
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
224315 (24)	4	1	-	5	100	20	10	-	-	130	5
225323 (24)	-	-	2	-	-	-	-	50	20	70	1

DISTRIBUTION OF MARKS AND HOURS:

S.No.	Chapter No	Chapter Name	Hours	Marks
1	1	Principles of CKTs	08	10
2	2	Analysis of Network using CKT principles	08	10
3	3	Network Theorem	16	25
4	4	Basic Concepts of A.C. Circuit	10	05
5	5	Complex number	08	05
6	6	Single Phase A.C. Circuit	15	25
7	7	Three Phase A.C. Circuit	15	20
		Total	**80**	**100**

RATIONALE

This is a core technology course. It describes the concepts & principles of solving electric & magnetic circuits. This knowledge will be required in the study of technology courses like electric machines, transmission & distribution, utilization & traction and switchgear & protection.

DETAILED COURSE CONTENTS

Chapter – 1 PRINCIPLES OF CIRCUITS

- Ohms Law
- Series & parallel Resistive Circuits
- Kirchhoff's voltage law.
- Kirchhoff's current law.
- Sign convention.
- Application to simple circuits.

Chapter – 2 ANALYSIS OF NETWORK USING CIRCUIT PRINCIPLES

- Mesh current analysis.
- Node voltage analysis.
- (Numericals on D.C.)

Chapter – 3 NETWORK THEOREMS

1 Superposition theorem.
2 Thevenin's theorem.
3 Norton's theorem.
4 Source conversion.
5 Maximum power trasfer theorem.
6 Star delta trasformation.
7 (Numericals on D.C.)

Chapter – 4 BASIC CONCEPTS OF A.C. CIRCUITS

1 Sinusoidal A.C. voltage generation.
2 Definition of various terms used in sine wave.
3 Response of basic R,L and C elements to A.C.

Chapter – 5 COMPLEX NUMBERS

1 Rectangular form.
2 Polar form.
3 Rectangular to polar conversion.
4 Polar to rectangular conversion

Chapter – 6 SINGLE PHASE A.C. CIRCUITS

1 Series A.C. circuits. R-L, R-C, & R-L-C circuits. Impedance, reactance, phasor diagram. Impedance triangle. Power factor, Average power, Apparent power , Reactive power, Power triangle.
2 Series resonance, quality factor.
3 Parallel A.C. circuits. R-L, R-C, & R-L-C circuits.
4 Admittance, Susceptance, Solution by admittance methods, vector method, & complex algebra method.

Chapter – 7 **THREE PHASE A.C. CIRCUITS**

1 Generation of three phase emf.
2 Phase sequence polarity marking.
3 Connection of three phase windings. Star connection & Delta connection.
4 Line & phase quantities in star connected load.
5 Line & phase quantities in delta connected load.
6 Power in three phase system with balanced star, delta connected load.
7 Concept of unbalanced load.
8 Advantage of poly phase circuits.

SUGGESTED IMPLEMENTATION 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 numerical will be useful. Home and classroom assignments would prove more useful to develop the analytical skills.

SUGGESTED LEARNING RESOURCES

e) Textbooks mentioned in the references.
f) Instruction manuals and brochures from instrument suppliers
g) Periodicals like magazines, journals etc.
h) OHP transparencies.

1. SUGGESTED REFERENCES

1. Introductory circuit analysis by Boylested R.L.
2. Schaum Online series- Theory & problems of electric circuits by Edminister.
3. Basic Electrical Engineering by V.N.Mittal.
4. Circuits and Networks by Sudhakar.
5. Electrical Technology Vol-I by B.L.Theraja.
6. A Text Book Of Electrical Technology by V.K.Mehta.

BRANCH DISCIPLINE: ELECTRICAL & ELECTRONICS ENGINEERING (Dip)

SUBJECT TITLE – ELECTRICAL CIRCUIT LAB **Practical Code: 225323 (24)**

Total Hours: 32

PRACTICAL EXPERIENCES

1. Observe A.C. waveforms on CRO and find various quantities like:
   - Amplitude.
   - Average value.
   - R.M.S. value.
   - Frequency.
2. Observe response of pure resistance to A.C.
3. Observe response of pure Inductance to A.C.
4. Observe response of pure capacitance to A.C..
5. Determination of current & power factor in series R-L circuit. Draw phasor diagram.
6. Determination of current & power factor in series R-C circuit. Draw phasor diagram.
7. Determination of current & power factor in series R-L-C circuit. Draw phasor diagram..
8. Resonance in series R-L-C circuit.
9. Determination of current & power factor in parallel R-L circuit. Draw phasor diagram.
10. Determination of current & power factor in parallel R-C circuit. Draw phasor diagram.
11. Determination of current & power factor in parallel R-L-C circuit. Draw phasor diagram.
12. Resonance in parallel R-L-C circuit.
13. Show the wave form for three phase generation of voltage & show the relation by a phasor diagram.
14. Verify line & phase values for star connection.
15. Verify line & phase values for delta connection.
16. Polarity marking of coils/ windings.
17. Verify KVL and KCL for D.C. circuits.
18. Verify superposition theorem for D.C.
19. Verify Thevenin's and Norton's theorem for D.C.
20. Verify maximum power transfer theorem for A.C. & D.C.
21. Solving electrical circuits with software packages.

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

SEMESTER : III
SUBJECT TITLE : BASIC ELECTRONICS
CODE : 224314 (28)
BRANCH DISCIPLINE : ELECTRICAL AND ELECTRONICS ENGINEERING

TEACHING AND EXAMINATION SCHEME

Course code	Teaching scheme (Hrs./week)				Scheme of Examination						Credit L+(T+P) 2
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
224314 (28)	3	1	-	4	100	20	10	-	-	130	4
225324 (25)	-	-	3	3	-	-	-	50	20	70	2

DISTRIBUTION OF MARKS AND HOURS:

Sl No	Chapter No	Chapter Name	Hours	Marks
1	1	Introduction to semiconductor devices	12	15
2	2	Rectifiers & Filters	10	15
3	3	Feedback Amplifiers	10	15
4	4	Multistage Amplifiers	8	15
5	5	Tuned Amplifiers	8	15
6	6	Oscillators	8	15
7	7	Pulse & Switching Circuits	8	10
		TOTAL	**64**	**100**

RATIONALE

This course is classified under basic technology group and is intended to enable the student understand the principles and operation of rectifiers, filters, amplifiers oscillators and different pulse & switching circuits and their applications in electronics systems. This can help the student in acquiring investigation skill when he/she will be working at the supervisory level and will help in discharging his/her duties effectively.

DETAILED COURSE CONTENTS

Chapter – 1 Introduction To Semiconductor Devices

- PN junction diode- concept of barrier potential, forward & reverse biasing,V-I characteristics & applications
- Zener Diode- Symbol, working principle, characteristics & applications
- Transistor- Basic structure, PNP & NPN types, transistor configuration, characteristics, switching action, transistor biasing and applications.

Chapter – 2 **Rectifiers & Filters**

- Half wave rectifiers.
- Full wave rectifiers (Center-tap & Bridge).
- Ripple factor, PIV, rectification efficiency, comparison, merits and demerits of different types of rectifier.
- D.C. improvement techniques - a) RC filter b) LC filter c) π-filter.
- Zener Diode as Shunt regulator.
- Transistor Series regulator (using single transistor)

  Complete D.C. Power Supply Circuit (using series regulator comparator & current limiter stage.)

Chapter – 3 **Feedback Amplifiers**

- *Concept of feedback, Block diagram of feedback systems, feedback factor β (Beta).*
- Types of feedback, strengths and limitations of negative feedback.
- Feedback connections- voltage-series, voltage-shunt, current-series, current shunt.
- Single stage amplifier – working, effect of negative feedback.
- Emitter follower circuit – effect of negative feedback.
- Feedback with & without bypass capacitor in single stage CE amplifier.

Chapter – 4 **Multistage Amplifiers**

- General block diagram of multi-stage amplifier, necessity of multistage amplifiers.
- Different coupling methods – working, frequency response, applications and comparison of: a) RC coupled, b) LC coupled,

  c) Direct-coupled, and d) Transformer coupled amplifiers.

Chapter – 5 **Tuned Amplifiers**

- Concept of resonance circuit
- Concept of tuned amplifier
- Single-tuned voltage amplifier, its frequency response and limitation.
- Double-tuned voltage amplifier, its frequency response and limitation.

  Concept of staggered tuning.

Chapter – 6 **Oscillators**

- Principle of Oscillations; Barkhausen Criteria.
- Working of RC Oscillators – phase-shift and Wien bridge; LC Oscillators - tuned collector, tuned base, Hartley and Colpitt's; Crystal Oscillator.

Chapter – 7 **Pulse & Switching Circuits**

- Diode and transistor as a switch.
- Wave shaping circuits – clipper, clamper, differentiator and integrator using passive components.
- Multivibrators – Bistable, Monostable and Astable type circuit.

SUGGESTED IMPLEMENTATION STRATEGIES

In totality 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. However, for this subject some small mini-projects (appearing in some good do-it-yourself magazines like 'Electronics for you' etc.) that could be done in the home or in the lab could be attempted.

SUGGESTED LEARNING RESOURCES

i) Textbooks mentioned in the references
j) Laboratory manuals
k) Some electronics engineering magazines.

SUGGESTED REFERENCES

S.N.	Title	Ed./Year	Author/ Publisher
11.	Electronic Circuits & Systems.	1st , 1988	Bapat, Tata McGraw Hill; New Delhi
12.	Basic Electronics & Linear circuits	2nd , 1988	Bhargava & Gupta, Tata McGraw Hill; New Delhi
13.	Digital Electronics	1st. 2000	Bignell, James & Donovan Robert; Delmar, Thomson Learning, Singapore, www.delmar.com
14.	Practical Semiconductor Data manuals.	1st , 1997	BPB Publications; New Delhi
15.	Op Amps & Linear Integrated Circuits	1st. 2001	Fiore, James M.; Delmar, Thomson Learning, Singapore, www.delmar.com
16.	Electronic Circuits & Applications	8th , 1994	Grob, McGraw Hill International Ltd.
17.	Electronic Principles	3rd , 1995	Malvino, Tata McGraw Hill; New Delhi
18.	Principles of Electronics	4th , 2000	Mehta ,V.K., S. Chand & Co. Ltd
19.	Electronic Devices & Circuits - Vol. 1	22nd , 1999	Mithal, G.K., Khanna Publishers; New Delhi
20.	Electronic Devices and Circuits - An Introduction	22nd ,2000	Mottershead, Allen, Prentice Hall India, New Delhi
21.	Transistor selector data manual	1st , 1990	Towers International, BPB Publications.; New Delhi
22.	Laboratory Manual and Teacher Guide in Basic Electronics	1st , 2001	TTTI, Bhopal and DTE, Goa

BRANCH DISCIPLINE: ELECTRICAL & ELECTRONICS ENGINEERING (Dip)

SUBJECT TITLE – BASIC ELECTRONICS LAB **Practical Code: 225324 (28)**

Total Hours: 48

PRACTICAL EXPERIENCES

Depending upon the time available, of the following list, two or three experiences could be undertaken in one laboratory session.

a) V-I characteristics of pn junction diode & Zener diode.
b) Input output characteristics of Transistors
c) Performance of Half Wave & Full Wave Rectifier with filters.
d) Performance of Bridge Rectifier with filter.
e) Performance of Zener Diode Shunt Regulator.
f) Performance of Series Voltage Regulator.
g) Use of multimeters, CRO, signal generations.
h) Effect of negative feedback on single stage amplifier.
i) Performance of Direct coupled amplifier.
j) Performance of RC coupled amplifier.
k) Performance of Single tuned amplifier.
l) Performance of Double tuned amplifier.
m) Performance LC Hartley and Colpitt's oscillator.
n) Performance RC phase shift oscillator.
o) Performance analysis of crystal oscillator.
p) Performance of Clipper.
q) Performance of Clamper.
r) Performance of Differentiator.
s) Performance of Integrator.
t) Performance of Bistable Multivibrator.
u) Performance of Monostable & Astable Multivibrator.

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

A) SEMESTER : III
B) SUBJECT TITLE : DIGITAL ELECTRONICS
C) CODE : 200312 (28)
D) BRANCH/DISCIPLINE : ELECTRICAL AND ELECTRONICS ENGINEERING (Dip)

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+(T+P) 2
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
200312 (28)	3	1	-	100	20	20	-	-	140	4
225325 (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		Number System & Codes	10	15
2		Boolean Algebra & Logic Gates	12	25
3		Combinational Circuits	09	15
4		Sequential Circuits	10	13
5		D/A and A/D Converters	08	12
6		Logic Families	07	10
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 Subtracter, 3 bit binary adder, 3 bit binary Subtracter. 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 conducter memory, Static/Dynamic memories, RAM/ROM. Programmable ROM/EPROM/ EE ROM/EAROM.
- Storage devices-Magnetic disk : Floppy disk & Hard disk, Magnetic Drum, Magnetic Tape.

I) 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 :

S.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)	Wiliam Kleltz
10	Pulse & Digital Circuits And Applications	R. Venkatraman, Dhanpatrai & sons

(d) Others:

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

BRANCH/DISCIPLINE: ELECTRICAL & ELECTRICAL ENGINEERING (DIP)

Course: DIGITAL ELECTRONICS, LAB **CODE : 225325 (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 registor such that it can be used as a serial/parallel shift registor.

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