

# CHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

## COURSE OF STUDY AND SCHEME OF EXAMINATION OF DIPLOMA PROGRAM IN ELECTRICAL ENGINEERING

### SEMESTER – III

S No.	Board of Study	Subject Code	Subject	Period per week			Scheme of Examination					Total Marks	Credit L+(T+P)/2
				L	T	P	Theory			Practical			
							ESE	CT	TA	ESE	TA		
1	Electrical	224311 (24)	Elements of Electrical Engineering	3	1	-	100	20	10	-	-	130	4
2	Electrical	224312 (24)	Electrical Drawing	3	3	-	100	20	10	-	-	130	5
3	Mech.	224313 (37)	Fundamentals of Mechanical Engineering	4	1	-	100	20	10	-	-	130	5
4	Electronics	224314 (28)	Basic Electronics	3	1	-	100	20	10	-	-	130	4
5	Electrical	224315 (24)	Electrical Circuit	4	1	-	100	20	10			130	5
6	Electrical	224321 (24)	Elements of Electrical Engineering Lab	-	-	3	-	-	-	50	20	70	2
7	Mechanical	224322 (37)	Fundamentals of Mechanical Engineering Lab	-	-	2	-	-	-	50	20	70	1
8	Elex. & Telc.	224323 (28)	Basic Electronics Lab	-	-	3	-	-	-	50	20	70	2
9	Electrical	224324 (24)	Electrical Circuit Lab	-	-	2	-	-	-	50	20	70	1
10	Electrical	224325 (24)	Electrical Workshop	-	-	2	-	-	-	50	20	70	1
Total				17	7	12	500	100	50	250	100	1000	30

L-Lecture

T-Tutorial

P- Practical

ESE-End Semester Exam

CT-Class Test ,

TA-Teachers Assessment

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI**

- 1. SEMESTER : III**  
**2. SUBJECT TITLE : ELEMENTS OF ELECTRICAL .**  
**3. ENGINEERING CODE : 224311 (24)**  
**4. BRANCH DISCIPLINE : ELECTRICAL ENGINEERING**  
**5. TEACHING AND EXAMINATION SCHEME**

Course Code	Teaching scheme (Hrs./week)				Scheme of Examination						Credit L+ $\frac{(T+P)}{2}$
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
224311 (24)	3	1	-	4	100	20	10	-	-	130	4
224321 (24)	-	-	3	3	-	-	-	50	20	70	2

**6. DISTRIBUTION OF MARKS AND HOURS:**

SL NO.	Chapter No.	Chapter Name	Hours	Marks
1	1	Basic Concepts of Electrical Engineering	6	10
2	2	Electrical Materials	12	15
3	3	Capacitors	10	20
4	4	Inductors	8	15
5	5	Magnetic Circuits	14	20
6	6	Electromagnetic Inductions	14	20
		Total	64	100

**7. DURATION OF END SEMESTER THEORY EXAMINATION ( 03- HRS.)**

**8. RATIONALE**

This course is under basic technology group is intended to enable the student understand the very basic facts, concepts and principles of electricity so that student will be able to apply the same for solving simple electric and magnetic circuit and which is the basic requirement to understand many other courses in this discipline.

## 9. DETAILED COURSE CONTENTS

### Chapter – 1 Basic Concepts of Electrical Engineering

- ?? Concept of current (D.C./A.C.)
- ?? Concept of voltage (D.C. /A.C.)
  - E.M.F.
  - Potential difference
  - Terminal voltage.
- ?? Concept of Resistance.
  - Properties.
  - Classification of resistors based on ohmic value & material.
  - Practical application of above types of resistors.
  - Use of a rheostat in laboratory.
- ?? Concept of conductor, insulator, semiconductor.

### Chapter – 2 Electrical Materials

- ?? Conducting materials & properties.
- ?? Insulating materials & properties.
- ?? Magnetic materials & properties.
- ?? Semi Conduction materials & properties.

### Chapter – 3 Capacitors

- ?? Concept of capacitor formation, expression for capacitance.
- ?? Energy stored in capacitor.
- ?? Dielectric loss.
- ?? Dielectric materials used in capacitors, types of capacitors.
- ?? Effect of dielectric media on capacitance.
  - Electric field strength
  - Electric flux density.
  - Permittivity.
- ?? Expression for capacitance of parallel plate capacitor.
- ?? Series & parallel combination of capacitors.
- ?? Charging and discharging of capacitors (no derivation, only numericals)
- ?? Concept of inter-turn capacitance, line capacitance, capacitance in cables, overhead transmission & distribution lines.
- ?? A.C./D.C. capacitors and applications.

### Chapter – 4 Inductors

- ?? Different types of inductors Construction.
- ?? Rise and decay of current in an inductor (No derivation, only numericals)
- ?? Energy stored in inductor (No derivation, only numericals)
- ?? Inductance in A.C. and D.C. circuits.

### Chapter – 5 Magnetic Circuits

- ?? Concept of magnetic flux.
- ?? Concept of electromagnetism.
  - Magnetomotive force.

- Magnetic field strength
- Permeability.
- Reluctance.
- ?? Magnetic leakage, leakage coefficient.
- ?? Magnetic circuits
  - Uniform magnetic circuits.
  - Series & parallel circuits.
- ?? Comparison of electric & magnetic circuits.

## Chapter – 6 Electromagnetic Induction

- ?? Review of Faraday’s laws of electromagnetic induction.
- ?? Induced E M.F’s.
- ?? Fleming’s R.H. rule; direction of induced E.M.F.
- ?? Concept of self and mutual inductances.
- ?? Expression for self and mutual inductances.
  - Application of Faraday’s laws.
- ?? Interaction between two or more magnetic field.
- ?? Force on a current carrying conductor placed in a magnetic field.
- ?? Fleming’s L.H. rule.
- ?? Numericals on above.

## 10. 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 numerical home and classroom assignments would prove more useful to develop the analytical skills. As this will be the first exposure to an electrical laboratory, the procedure of lab practices should be in more detail including the safe practices to be followed.

## 11. SUGGESTED LEARNING RESOURCES

- a) Textbooks mentioned in the references.
- b) Laboratory manuals.

## 12. SUGGESTED REFERENCES

S. No.	Title	Ed./ Year	Author/ Publisher
1.	Electrical Appliances	1995	Ajwani, J.M. R.B. Publications, New Delhi
2.	Study of Electrical Appliances & Devices	3 <sup>rd</sup> , 1991	Bhatia, K.B. Khanna Publishers, Delhi
3.	Principles of Electrical Engineering	1997	Bhattacharya, Tata -McGraw-Hill, New Delhi
4.	Electrical Devices & Circuits	1 <sup>st</sup> , 1991	Bogart, T.F., Universal Book Staff, New Delhi
5.	Electrical Technology	6 <sup>th</sup> , 1987	Cotton, H., ELBS, London
6.	Electrical Application Servicing	1 <sup>st</sup> .	Crouse ,William H., McGraw

S. No.	Title	Ed./ Year	Author/ Publisher
		1980	Hill, New York
7.	Electrical Engineering Vol. I & II	1 <sup>st</sup> , 1980	Dawes, Chester, McGraw Hill, Book Co. New York
8.	Principles of Electrical engineering	2 <sup>nd</sup> , 1984	Del Toro, Vincent, Prentice Hall of India, New Delhi
9.	Elementary Electrical Engineering	18 <sup>th</sup> , 1992	Gupta, M.L. New Heights, New Delhi
10.	Preventing Electrical Fires & Failures	2001	Hattangadi, A.A., Tata -McGraw- Hill, New Delhi
11.	Electrical Technology	6 <sup>th</sup> , 1987	Hughes, E. & Smith, I.M. ELBS/Longmans, London
12.	Electrical Technology	1 <sup>st</sup> , 1990	Hughes, Edward, Longman, London
13.	Basic Electrical Engineering	1990	Mittle, V.N. Tata McGraw-Hill, New Delhi
14.	A Textbook of Electrical Technology	13 <sup>th</sup> , 1981	Theraja, B.L. & Theraja, A.K., Chand and Co. New Delhi

**SUBJECT TITLE – ELEMENTS OF ELECTRICAL ENGINEERING, LAB**

**Practical Code: 224311 (24)**

**Total Hours: 48**

**13. PRACTICAL EXPERIENCES**

- a) Electrical engineering laboratory practices
  - Supply system & safety.
  - Introduction to various measuring instruments.
- b) Difference between EMF, terminal voltage & voltage drop in practice.
- c) Application of rheostat as Regulator.
- d) Potential divider.
- e) Behaviour of fuse under normal & abnormal (overload, short circuit) operating conditions.
- f) Effect of series & parallel connection of two lamps on current, voltage, power dissipated & energy consumed in a given circuit.
- g) Performance of various types of capacitors.
- h) Demonstration of Faraday's laws of electromagnetic induction.
- i) Demonstration of force experienced by a current carrying conductor placed in a magnetic field.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI**

**SEMESTER** : **III**  
**SUBJECT TITLE** : **ELECTRICAL DRAWING**  
**CODE** : **224312 (24)**  
**BRANCH DISCIPLINE** : **ELECTRICAL ENGINEERING**  
**TEACHING AND EXAMINATION SCHEME**

Course Code	Teaching scheme (Hrs./week)				Scheme of Examination						Credit $L+\frac{(T+P)}{2}$
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
224312 (24)	3	3	-	6	100	20	10	-	-	130	5

**DISTRIBUTION OF MARKS AND HOURS:**

Sl No	Chapter No	Chapter Name	Hours	Marks
1	1	Symbols and Codes	8	10
2	2	Mountings	15	15
3	3	Domestic Wiring	15	15
4	4	Instrument circuit	15	15
5	5	Constructional Features of Electrical Machines	20	20
6	6	Power System	15	15
7	7	Cables	8	10
		<b>TOTAL</b>	<b>96</b>	<b>100</b>

**RATIONALE**

This course is classified under basic technology group is intended to enable the student understand the various aspects of electrical engineering drawing which a diploma holder will be called upon to supervise and also do in certain cases. The practical exercises in electrical workshop is expected to develop the appreciation of using some of the basic tools, conductors, different types of switchgear, follow some of the safety precautions when handling electrical components and understand various types of electrical connections. The experiences here will develop some of the core competencies and skills required in discharging his/her duties effectively and efficiently and also guiding people working with him/her.

**DETAILED COURSE CONTENTS**

- Chapter – 1      Symbols and Codes**  
 ?? ISI Symbols in electrical engineering  
 ?? Conventions for circuit and schematic representation of electrical and electronic components, instruments and equipment
- Chapter – 2      Mountings**  
 ?? Different types of mountings  
 ?? Enclosures for electrical equipments  
 ?? Panel wiring with CB, isolator, synchroscope, regulator, etc  
 ?? Plate & Pipe earthing
- Chapter –3      Domestic Wiring**  
 ?? All types of light circuit  
 ?? Fluorescent tube & fan circuit wiring  
 ?? Intermediate switch circuit
- Chapter – 4      Instrument circuit**  
 ?? Connection of all types of meters (PMMC, Moving Iron, dynamo meter, Induction type.  
 ?? Extension of range using shunt, multiplier, CT, PT
- Chapter – 5      Constructional Features of Electrical Machines**  
 ?? Parts of a transformer, D.C. machines, alternators, induction motors, development diagram of windings of D.C. and A.C. machines  
 ?? AC & DC Motor starter
- Chapter – 6      Power System**  
 ?? Transmission line structure  
 ?? Bushings, insulators  
 ?? Overhead conductor joints  
 ?? Substation drawing, lightning arrestors
- Chapter – 7      Cables**  
 ?? Cross-section of Cables, Power cable laying, cable joints

## **SUGGESTED IMPLEMENTATION STRATEGIES**

The implementation strategy to teach this course should be through drawing exercises in classroom and home assignments. Through the practical exercises in electrical workshop the student should be made to use various types of switches, MCBs, ELCBs, modular LT distribution boards and connecting them for safe operation.

## **SUGGESTED LEARNING RESOURCES**

- c) Drawing text books
- d) Laboratory manuals

## TUTORIAL

The following list of workshop experiences could be enriched further, so that some of the core skills are developed in the students.

- a) Assembly of single point house wiring for incandescent wiring, fans with electro-mechanical and electronics regulators.
- b) Assembly of single and double fluorescent tube wiring circuit
- c) Staircase wiring using two-way switches
- d) Godown wiring circuit
- e) Panel board wiring using MCBs, and ELCBs.
- f) Panel board wiring using phase changing devices

## SUGGESTED REFERENCES

S. No.	Title	Ed./ Year	Author/ Publisher
1	Geometrical and Machine Drawing	28 <sup>th</sup> , 1993	Bhatt, N.D.; Charoter Pub., Anand Gujarat
2	Elementary Engineering Drawing	32 <sup>nd</sup> , 1992	Bhatt, N.D.; Charoter Pub., Anand, Gujarat
3	Engineering Drawing	1996	Gujral and Shende, Khanna Pub. New.Delhi
4	Engineering Drawing	1995	Gupta, R.B. Satya Prakashan, Delhi

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**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
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**SEMESTER** : **III**  
**COURSE TITLE** : **FUNDAMENTALS OF MECHANICAL  
ENGINEERING**  
**CODE** : **224313 (37)**  
**TEACHING AND EXAMINATION SCHEME**

Course code	Teaching scheme (Hrs./week)				Scheme of Examination						Credit $\frac{L+(T+P)}{2}$
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
224313 (37)	4	1	-	5	100	20	10	-	-	130	5
224322 (37)	-	-	2	2	-	-	-	50	20	70	1

**7.0 DISTRIBUTION OF MARKS AND HOURS:**

SL NO.	Chapter No.	Chapter Name	Hours	Marks
1	1	Properties And Testing Of Materials	10	10
2	2	Materials	10	10
3	3	Metallurgical processes	08	10
4	4	Fluid Mechanics	12	15
5	5	Pump And Water Turbine	12	10
6	6	Power Transmission	08	10
7	7	Strength of Material	10	15
8	8	Thermodynamic	10	20
		<b>TOTAL</b>	<b>80</b>	<b>100</b>

**8.0 RATIONALE**

It is strongly felt that electrical technician should have basic knowledge of thermodynamics, strength of materials, hydraulics and manufacturing processes. As such the subject Fundamental of Mechanical Engineering is kept for electrical technician.

After going through the subject the electrical technician is expected to develop skill to use the above fields in the electrical engineering.

## DETAILED COURSE CONTENTS

<p><b>Chapter – 1</b></p>	<p><b>Properties And Testing Of Materials</b></p> <ul style="list-style-type: none"> <li>?? Introduction</li> <li>?? Mechanical properties-stress</li> <li>?? Strain</li> <li>?? Strength</li> <li>?? Elasticity</li> <li>?? Plasticity</li> <li>?? Ductility</li> <li>?? Toughness</li> <li>?? Brittleness</li> <li>?? Hardness</li> <li>?? Malleability</li> <li>?? Formability</li> <li>?? Weld ability</li> <li>?? Tensile strength</li> <li>?? Fatigue</li> <li>?? Stiffness</li> <li>?? Tenacity</li> <li>?? Modulus of elasticity</li> <li>?? Modulus of rigidity</li> <li>?? Endurance</li> <li>?? Poisson’s ratio</li> <li>?? Proportional limit</li> <li>?? Yield point</li> <li>?? Ultimate strength fabrication characteristics</li> <li>?? Destructive and non-destructive testing</li> <li>?? Stress-strain diagram</li> <li>?? Hardness tests</li> <li>?? Impact tests</li> </ul>
<p><b>Chapter – 2</b></p>	<p><b>Materials</b></p> <ul style="list-style-type: none"> <li>?? Introduction</li> <li>?? Ferrous materials cast iron</li> <li>?? Classification</li> <li>?? Wrought iron</li> <li>?? Steel-classification-Alloy steels Major alloying elements</li> <li>?? Stainless steel-low carbon medium carbon and high carbon steels</li> <li>?? Classification of alloy steels</li> <li>?? Tools steels</li> <li>?? Non-ferrous metals-copper properties</li> <li>?? Application and classification</li> <li>?? Brass –types bronze-types and applications</li> <li>?? Special alloys-high tensile brass German silver</li> <li>?? Monel metal</li> <li>?? Bearing alloys</li> </ul>

	<p>?? Aluminum-classification and application</p> <p>?? Zinc-properties</p> <p>?? Zinc alloys</p> <p>?? Tin properties-application</p> <p>?? Plastic-classification</p> <p>?? Application</p> <p>?? Lubricants-properties and selection</p>
<b>Chapter – 3</b>	<p><b>Metallurgical processes</b></p> <p>?? Introduction-various processes</p> <p>?? Secondary processes</p> <p>?? Application of powder metallurgy</p> <p>?? Advantages and disadvantages</p> <p>?? Welding-purpose</p> <p>?? Types forged welding</p> <p>?? Soldering</p> <p>?? brazing</p>
<b>Chapter – 4</b>	<p><b>Fluid Mechanics</b></p> <p>?? Hydrostatics- Fluids and their properties, Liquid pressure, Intensity of .Pascal’s law, Pressure head of liquid, Total pressure, Concept of atmospheric and gauge pressure, Absolute pressure</p> <p>?? Fluid flow- types of flow, Bernoulli’s theorem statement and application, U tube manometer, Venturi meter, pitot tube, orifice meter, Cc,Cv &amp; Cd, simple problem related to Bernoulli’s theorem</p>
<b>Chapter – 5</b>	<p><b>Pump And Water Turbine</b></p> <p>?? Pump – Reciprocating pump, centrifugal pump, compression between Reciprocating &amp; centrifugal pump</p> <p>?? Turbines- purpose, type, construction and working of Pelton wheel, Francis and Keplan turbine</p> <p>?? Hyde Power Plant- it’s construction and working processes</p>
<b>Chapter – 6</b>	<p><b>Power Transmission</b></p> <p>?? Importance of power transmission, model of power transmission and it’s application, belt and rope drive systems, power transmission by gears and chains, role of coupling and journal in power, transmission simple problem related with belt drive velocity ratio, max. power transmission through belt drive.</p>
<b>Chapter – 7</b>	<p><b>Strength of Material</b></p> <p>? Definition of bending, shear force and bending moment, S.F. &amp; B.M. diagrams for cantilever, simply supported and over hanging beams with point &amp; U.D.L. Theory of simple bending, bending stresses in beams, moment of resistance, section modulus, theory of pure torsion of circular shaft, polar modulus, torsional rigidity classification of frames, stresses in frames.</p>

<b>Chapter – 8</b>	<b>Thermodynamic</b> ? Properties of gases, Charle’s law, Boyle’s law, characteristic equation for perfect gas, 1 <sup>st</sup> & 2 <sup>nd</sup> law of thermodynamics, enthalpy and entropy, Various processes like isobaric , isothermal, isentropic throttling process polytropic process. Ideal heat engine cycles, thermal efficiency, I. HP and B HP , Basic steam power cycle, Classification of boiler, boiler mountings and accessories. Modern high pressure boiler , Internal combustion engine introduction, classification and working principle of 2 stroke and 4 stroke cycle engine .
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### 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

- e) Textbooks mentioned in the references
- f) Laboratory manuals
- g) Some electronics engineering magazines.

### SUGGESTED REFERENCES

Sl No	NAME OF BOOKS	AUTHOR/ PUBLISHER
1	Manufacturing Process	Herbert W Yankee (Prentice Hall)
2	Thermodynamics	R Yadav (Central Book Dept.)
3	Hydraulics & Hyd. M/cs	R.S. Khurmi (S. Chand & Co)
4.	Strength of Materials	R.S. Khurmi (S.Chand & Co)
5	A Text- Book of Mechanical Technology	R.S. Khurmi (S Chand & Co)

**COURSE TITLE: FUNDAMENTALS OF MECHANICAL ENGINEERING, LAB**

**Practical Code: 224322 (37)**

**Total Hours: 32**

**PRACTICAL EXPERIENCES**

1. Study of universal testing machine
2. Study of hardness tester & impact testing m/c.
3. To perform tensile and compression test on U.T.M.
4. To Prepare joint by welding, Soldering and brazing
5. Study of reciprocating pump.
6. Study of centrifugal pump.
7. Determination of discharge through venturimeter .
8. Study of fire tube & water tube boiler .
9. Study of 2 / 4 stroke Petrol engine
10. Study of 2 / 4 stroke Diesel engine
11. Study of water turbine – impulse / reaction

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
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SEMESTER : III  
 SUBJECT TITLE : BASIC ELECTRONICS  
 CODE : 224314 (28)  
 BRANCH DISCIPLINE : ELECTRICAL ENGINEERING

**TEACHING AND EXAMINATION SCHEME**

Course code	Teaching scheme (Hrs./week)				Scheme of Examination						Credit $L+\frac{(T+P)}{2}$
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
224314 (28)	3	1	-	4	100	20	10	-	-	130	4
224323 (28)	-	-	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
		<b>TOTAL</b>	<b>64</b>	<b>100</b>

**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)  $\pi$ -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  $\beta$  (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

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

## SUGGESTED REFERENCES

S. No.	Title	Ed./ Year	Author/ Publisher
15.	Electronic Circuits & Systems.	1 <sup>st</sup> , 1988	Bapat, Tata McGraw Hill; New Delhi
16.	Basic Electronics & Linear circuits	2 <sup>nd</sup> , 1988	Bhargava & Gupta, Tata McGraw Hill; New Delhi
17.	Digital Electronics	1 <sup>st</sup> . 2000	Bignell, James & Donovan Robert; Delmar, Thomson Learning, Singapore, www.delmar.com
18.	Practical Semiconductor Data manuals.	1 <sup>st</sup> , 1997	BPB Publications; New Delhi
19.	Op Amps & Linear Integrated Circuits	1 <sup>st</sup> . 2001	Fiore, James M.; Delmar, Thomson Learning, Singapore, www.delmar.com
20.	Electronic Circuits & Applications	8 <sup>th</sup> , 1994	Grob, McGraw Hill International Ltd.
21.	Electronic Principles	3 <sup>rd</sup> , 1995	Malvino, Tata McGraw Hill; New Delhi
22.	Principles of Electronics	4 <sup>th</sup> , 2000	Mehta ,V.K., S. Chand & Co. Ltd
23.	Electronic Devices & Circuits - Vol. 1	22 <sup>nd</sup> , 1999	Mithal, G.K., Khanna Publishers; New Delhi
24.	Electronic Devices and Circuits - An Introduction	22 <sup>nd</sup> , 2000	Mottershead, Allen, Prentice Hall India, New Delhi
25.	Transistor selector data manual	1 <sup>st</sup> ,	Towers International, BPB

S. No.	Title	Ed./ Year	Author/ Publisher
		1990	Publications.; New Delhi
26.	Laboratory Manual and Teacher Guide in Basic Electronics	1 <sup>st</sup> , 2001	TTTI, Bhopal and DTE, Goa

## SUBJECT TITLE – BASIC ELECTRONICS LAB

Practical Code: 224323 (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**

**SEMESTER** : **III**  
**SUBJECT TITLE** : **ELECTRICAL CIRCUIT**  
**CODE** : **224315 (24)**  
**BRANCH DISCIPLINE** : **ELECTRICAL 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		
224315 (24)	4	1	-	5	100	20	10	-	-	130	5
224324 (24)	-	-	2	-	-	-	-	50	20	70	1

**DISTRIBUTION OF MARKS AND HOURS:**

.	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
		<b>Total</b>	<b>80</b>	<b>100</b>

**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

- 7 Superposition theorem.
- 8 Thevenin's theorem.
- 9 Norton's theorem.
- 10 Source conversion.
- 11 Maximum power transfer theorem.
- 12 Star delta transformation.
- 13 (Numericals on D.C.)

### Chapter – 4 BASIC CONCEPTS OF A.C. CIRCUITS (

- 14 Sinusoidal A.C. voltage generation.
- 15 Definition of various terms used in sine wave.
- 16 Response of basic R,L and C elements to A.C.

### Chapter – 5 COMPLEX NUMBERS

- 17 Rectangular form.
- 18 Polar form.
- 19 Rectangular to polar conversion.
- 20 Polar to rectangular conversion

### Chapter – 6 SINGLE PHASE A.C. CIRCUITS

- 21 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.
- 22 Series resonance, quality factor.
- 23 Parallel A.C. circuits. R-L, R-C, & R-L-C circuits.
- 24 Admittance, Susceptance, Solution by admittance methods, vector method, & complex algebra method.

## Chapter – 7

### THREE PHASE A.C. CIRCUITS

- 25 Generation of three phase emf.
- 26 Phase sequence polarity marking.
- 27 Connection of three phase windings. Star connection & Delta connection.
- 28 Line & phase quantities in star connected load.
- 29 Line & phase quantities in delta connected load.
- 30 Power in three phase system with balanced star, delta connected load.
- 31 Concept of unbalanced load.
- 32 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

- k) Textbooks mentioned in the references.
- l) Instruction manuals and brochures from instrument suppliers
- m) Periodicals like magazines, journals etc.
- n) 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.

**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  
 COURSE TITLE : ELECTRICAL WORKSHOP PRACTICE  
 COURSE CODE : 224325 (24)  
 BRANCH DISCIPLINE : ELECTRICAL 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		
224325 (24)	-	-	2	2	-	-	-	50	20	70	01

**RATIONALE**

This course is classified under basic technology group is intended to enable the student understand the various aspects of electrical workshop practice which a diploma holder will be called upon to supervise and also do in certain cases. The practical exercises in electrical workshop is expected to develop the appreciation of using some of the basic tools, conductors, different types of switchgear, follow some of the safety precautions when handling electrical components and understand various types of electrical connections. The experiences here will develop some of the core competencies and skills required in discharging his/her duties effectively and efficiently and also guiding people working with him/her.

The electrical workshop practice part is accomplished through practical experiences for which appropriate assessment criteria will have to be developed by the teacher depending upon the experience.

**PRACTICAL EXPERIENCES (Marks – 50)**

The following list of workshop experiences could be enriched further, so that some of the core skills are developed in the students.

- a) Assembly of single point house wiring for incandescent wiring, fans with electro-mechanical and electronics regulators.
- b) Assembly of single and double fluorescent tube wiring circuit
- c) Staircase wiring using two-way switches
- d) Godown wiring circuit
- e) Panel board wiring using MCBs, ELCBs.
- f) Panel board wiring using phase changing devices
- g) Using coil-winding machines to build small transformers.
- h) Dismantling and assembling of fractional horse power motors.
- i) Dismantling and assembling of home appliances like:
  - i. Electric food processors

- ii. Electric iron
- iii. Electric toasters
- iv. Electric room heaters

**TERM –WORK (Marks – 20)**

- 1 Assemble small transformers
- 2 Assembling and operating a fluorescent lamp circuit
- 3 Assembling and operating a two way lamp/fan circuit
- 4 Assembling and operating a godown wiring circuit
- 5 Assembling and operating a fractional horsepower motor
- 6 Assembling and operating an electric iron.

**SUGGESTED REFERENCES**

<b>S. No.</b>	<b>Title</b>	<b>Ed./ Year</b>	<b>Author/ Publisher</b>
a)	Sheet Metal Shop Practice	1991	Bruce & Meyer, McGraw Hill, New Delhi
b)	Workshop Technology, Vol. I & II	1992	Chapman.A.J.; Anmol Publications New Delhi
c)	Workshop Technology, Vol. I & II	1994	Gupta and Kaushik; New heights Publishers, New Delhi
d)	Workshop Technology, Vol. I & II	1993	Hazra Choudhary; Metro Potation Book Co.; Mumbai
e)	Welding Technology	1992	Rossi; McGraw Hill, New Delhi
f)	Structural steel fabrication and erection	1994	Saxena S.K.& Asthana R.B. Somaiya Publication, Mumbai

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