

CHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

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

SEMESTER – VI

S No.	Board of Study	Subject Code	Subject	Period per week			Scheme of Examination					Total Marks	Credit L+(T+P)/2
							Theory			Practical			
				L	T	P	ESE	CT	TA	ESE	TA		
1	Electrical	224611 (24)	Electric Traction	3	1	-	100	20	10	-	-	130	4
2	Electrical	224612 (24)	Switchgear and Protection	3	1	-	100	20	10	-	-	130	4
3	Electrical	224613 (24)	Electrical Installation Maintenance and Testing	3	1	-	100	20	10	-	-	130	4
4	Electrical	224614 (24)	Utilization of Electrical Power	3	1	-	100	20	10	-	-	130	4
5	Mechanical Engg.	200615 (37)	Entrepreneurship Development	4	1	-	100	20	10	-	-	130	5
6	Electrical	224621 (24)	Project-Industry based	-	-	5	-	-	-	50	20	70	3
	Electrical	224622 (24)	Electric Traction Lab	-	-	3	-	-	-	50	20	70	2
7	Electrical	224623 (24)	Switchgear and Protection lab	-	-	3	-	-	-	50	20	70	2
9	Electrical	224624 (24)	Electrical Installation Maintenance and Testing Lab	-	-	2	-	-	-	50	20	70	1
	Electrical	224625 (24)	Utilization of Electrical Power Lab	-	-	2	-	-	-	50	20	70	1
Total				16	5	15	500	100	50	250	100	1000	30

L-Lecture
ESE-End Semester Exam

T-Tutorial
CT-Class Test ,

P- Practical
TA-Teachers Assessment

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

1. SEMESTER : VI
2. SUBJECT TITLE : ELECTRIC TRACTION
3. CODE : 224611 (24)
4. BRANCH DISCIPLINE : ELECTRICAL ENGINEERING
5. 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		
224611 (24)	3	1	-	-	100	20	10	-	-	130	4
224622 (24)	-	-	3	-	-	-	-	50	20	70	2

6. DISTRIBUTION OF MARKS AND PERIODS:

SL NO.	Chapter No.	Chapter Name	Periods	Marks
1	1	Overview of Electrical Traction System In India	4	10
2	2	Systems of Track Electrification	20	30
3	3	Traction Mechanics	20	30
4	4	Operation and Control of Electric Traction System	10	15
5	5	Electric locomotive maintenance	10	15
		Total	64	100

7. RATIONALE

This course is under applied technology group is intended to enable the student understand the facts, concepts, principles and procedures related to the electric traction so that he can acquire supervisory skills, which will help him to discharge his role as a supervisor when he starts working in the industry. The field visits are emphasized that better understanding of the subject can be imparted.

8. DETAILED COURSE CONTENTS

Chapter – 1 Overview of Electrical Traction System In India

- ?? Electric Drive – strengths and limitations
- ?? Choice of traction system in India

Chapter – 2 Systems of Track Electrification

- ?? Description of various systems D.C., 1-phase low frequency A.C., 1-phase high frequency at 3-phase A.C. and composite system.
- ?? 25 K.V. 1 phase A.C., 50 Hz systems – strengths and limitations.
- ?? Problems associated with A.C. traction system. Current & voltage unbalance.
- ?? Comparison between A.C. and D.C. systems.

Chapter – 3 Traction Mechanics

- ?? Speed time curve
- ?? Simplified speed time curve
- ?? Average speed and schedule speed
- ?? Tractive effort
- ?? Specific energy consumption, Factors affecting specific energy consumption
- ?? Mechanics of train movement
- ?? Coefficient of adhesion, factors affecting the coefficient of adhesion.

Chapter – 4 Operation and Control of Electric Traction System

- ?? Control of DC traction system
- ?? Remote control system equipment and network
- ?? General principle of operation
- ?? Supervisory and alarm facilities
- ?? Frequency allocation.

Chapter-- 5 Electric locomotive maintenance

- ?? Need & types of maintenance
- ?? Method of reducing maintenance cost
- ?? Maintenance record

9. SUGGESTED IMPLEMENTATION STRATEGIES

1. Lecture session with question and answer
2. Use of audio visual aids
3. Assignments on various topics.

Moreover, when teaching this course, some of the actual devices need to be brought to the class and demonstrated to the students

10. SUGGESTED LEARNING RESOURCES

- a) Textbooks mentioned in the references.
- b) Laboratory manuals
- c) Periodicals like, news magazines, journals etc.

11. SUGGESTED REFERENCES

S.No.	Title	Ed./ Year	Author/ Publisher
1	Electrical power	1992	Gupta J. B.; Kataria & Sons Pub. New Delhi
2	Utilisation of electrical energy & Electric Traction	1983	Gupta J. B.; Katson Pub. New Delhi
3	A Course in Electrical power	1987	Soni, M.L. et al; Dhanpat Rai & Sons, New Delhi
4	Generation, Distribution & utilisation of electrical energy	6 th 1991	Wadhwa, C.L./ Wiley Eastern Ltd., New Delhi

SUBJECT TITLE – ELECTRIC TRACTION LAB

Practical Code: 224622 (24)
Periods: 48

12. PRACTICAL EXPERIENCES

Visit to the railway maintenance section of Indian Railways followed by report of

- a) Operation of the electrical system
 - b) Control room operations
 - c) Switchgear and protection
 - d) Maintenance of locomotive and other equipment
 - e) Power supply, return supply and wiring system.
2. Study of different current collectors in AC and DC system
 3. Study of metro DC traction system
 4. Study of PSI system

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

1. SEMESTER : VI
2. SUBJECT TITLE : SWITCHGEAR AND PROTECTION
3. CODE : 224612 (24)
4. BRANCH DISCIPLINE : ELECTRICAL ENGINEERING
5. 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		
224612 (24)	3	1	-	-	100	20	10	-	-	130	4
224623 (24)	-	-	3	-	-	-	-	50	20	70	2

6. DISTRIBUTION OF MARKS AND PERIODS:

SL NO.	Chapter No.	Chapter Name	Periods	Marks
1	1	Principles of Protection	8	15
2	2	Over Voltage Protection	10	15
3	3	Protective Relays	14	20
4	4	Instrument Transformers	8	15
5	5	Circuit Interrupting Devices	14	20
6	6	Protection Schemes	10	15
		TOTAL	64	100

7. RATIONALE

In power stations and sub-stations applications of switchgear and various protective schemes applied to various electrical equipment/machines, busbars, feeders, transmission lines/ distribution lines etc. are essential to minimize normal and abnormal faults and for safety of human beings. This course is intended to develop in the students the skill in operating various controls and switchgear used in power systems. He/she needs to make remedial measures for faults/abnormalities in machines/equipment in power system using appropriate diagnostic instruments/devices.

8. DETAILED COURSE CONTENTS

Chapter – 1 Principles of Protection

- ?? Line diagram of a power system and its elements
- ?? Faults and abnormalities, their causes, types and effects
- ?? Functions of basic elements of a protective system
- ?? Backup protection and its types
- ?? Importance of neutral earthing
- ?? Methods of neutral earthing and its advantages

Chapter – 2 Over Voltage Protection

- ?? Causes and effects of over voltages
- ?? Methods of reducing over voltages
- ?? Types ,Operating principles, applications of lightning arrestor
- ?? Surge absorber

Chapter – 3 Protective Relays

- ?? Concept of protective relaying
- ?? Classification of relays and their selection
- ?? Construction and working principle of relays electromagnetic, induction, reverse power, differential, distance, IDMT, & thermal relay
- ?? Basic terms related to relays pick-up value, reset value and operating current.
- ?? Settings of various types of relays
- ?? Causes of failure of primary relaying
- ?? Use & types of backup relays in power system

Chapter – 4 Instrument Transformers

- ?? Instrument transformers used for protection
- ?? Polarity marking of CT & PT and their specifications
- ?? Connection diagram of CT & PT in a 1-phase and 3-phase protective systems

Chapter – 5 Circuit Interrupting Devices

- ?? Necessity and types of interruption devices like ACB, OCB, AB Switch, SF6 and vacuum circuit breakers& their working principle
- ?? Line diagram of a protective system showing different circuit interrupting devices
- ?? Arc formation in CB& methods of arc extinction
- ?? Terms related to circuit interruption wave form
- ?? Requirement and types of isolators
- ?? Difference between isolators & CB
- ?? Types of fuses and their characteristic

Chapter – 6 Protection Schemes

- ?? Abnormalities and faults in a power system and its effects
- ?? Protection schemes for alternator
- ?? Protection against prime mover failure and unbalance loading
- ?? Protection of transformers
- ?? Protection of transmission line and feeders
- ?? Protection of induction motors

9. SUGGESTED IMPLEMENTATION STRATEGIES

Some sections of this course like relays and instrument transformers could be taught in the classrooms by actually bringing the real things and explaining the various aspects. Some of the other aspects like circuit interrupting devices could be taught in the classrooms showing photographs and transparencies and taking them for field visits later. This will enhance the understanding.

10. SUGGESTED LEARNING RESOURCES

- a) Textbooks mentioned in the references.
- b) Laboratory manuals
- c) Laboratory workbook, worksheet etc.

11. SUGGESTED REFERENCES

S. No.	Title	Ed./ Year	Author/ Publisher
5	Power System Protection and Switchgear	1994	Badriram/ Tata McGraw-Hill, New Delhi
6	Switchgear and Protection	1991	Deshpande/ Tata McGraw-Hill, New Delhi
7	Electrical Power System	1996	Mehta, V.K., Khanna Publishers, New Delhi
8	Testing, Commissioning, Operation and Maintenance of Electrical Equipment	3 rd 1996	Rao, S. Tata McGraw-Hill, New Delhi
9	Operation And Maintenance of Electrical Equipment, Vol I & II	2 nd 1994	Rao. B.V.S./Wheeler Publishing, New Delhi
10	Power System Protection Static Relays with Microprocessor applications	2 nd 1995	Rao. S/ Tata McGraw-Hill, New Delhi
11	Electrical Power	1995	Uppal, S.L., Khanna Pub. New Delh9

12. PRACTICAL EXPERIENCES

- a) Use overload relay and obtain it's time-current characteristic
- b) Use Buchholz relay for transformer protection
- c) Use thermal overload relay for protection of motor and set the relay property
- d) Check the polarity of CT & PT and connect it with the relay
- e) Apply the balance current protection scheme using appropriate switch gear
- f) Find the fusing factor of a given fuse material
- g) Operate air break switch in a simulated condition
- h) Read and interpret the protection scheme for an alternator in power station (from blue print and visit)
- i) Read and interpret various protective scheme used for transmission lines and feeders (from blue print and visit)
- j) Draw schematic diagram of protective schemes for 66KV, 132KV, 220KV sub station (after visit)
- k) Visit a substation and prepare its technical report emphasizing on control side.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

1. **SEMESTER** : **VI**
2. **SUBJECT TITLE** : **ELECTRICAL INSTALLATION
MAINTENANCE & TESTING**
3. **CODE** : **224613 (24)**
4. **BRANCH DISCIPLINE** : **ELECTRICAL ENGINEERING**
5. **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		
224613 (24)	3	1	-	-	100	20	10	-	-	130	4
224624 (24)	-	-	2	-	-	-	-	50	20	70	1

6. DISTRIBUTION OF MARKS AND PERIODS:

SL NO.	Chapter No.	Chapter Name	Periods	Marks
1	1	Installation	6	10
2	2	Commissioning	7	10
3	3	Earthing	7	10
4	4	Insulation testing & maintenance	7	10
5	5	Preventive maintenance & Environmental pollution prevention	8	15
6	6	Trouble Shooting	7	10
7	7	Electrical Accident & Safety measures	7	10
8	8	Testing & Maintenance of relays & Circuit breakers	8	15
9	9	Hot Line Maintenance	7	10
		TOTAL	64	100

7. RATIONALE

This subject is very important as most of the technician to get employment in electricity board, Industries etc. are required to install, test & commission the electrical equipments further required to maintain the same, the syllabus of this subject is aimed to develop the abilities in the areas of installation testing commissioning & maintenance of electrical equipments.

The practices of preventive maintenance which have been included in the syllabus will help the student in the field follow the programme of preventive maintenance thus avoid the undue shut downs of the system. A component of environmental pollution being very important finds a place in this subject.

List of practices has been prepared in such a way the student will be able to acquire and develop the desired electrical skills for job.

8. DETAILED COURSE CONTENTS

Chapter – 1 Installation

?? Types of heavy Electrical equipment, unloading accessories precautions for unloading, installation of small and large machines of both static and rotating type. Installation of pole mounted transformer.

Chapter – 2 Commissioning

Tests required before commissioning procedure to be adopted for commissioning the electrical equipment in respect of:

?? Mechanical fixture and alignment.

?? Electrical tests.

?? Initial precautions for starting.

Chapter – 3 Earthing

?? Reasons of Earthing.

?? Earthing system earth lead and its size.

?? Permissible earth resistance for different installations.

?? Improvement of earth resistance

?? Double earthing earth resistance measurement.

Chapter – 4 Insulation testing and maintenance

?? Instruments used for measuring insulation resistance.

?? Reasons for deterioration of insulation resistance.

?? Improving insulation resistance.

?? Drying insulation.

?? Measurement of internal temperature of winding

?? Vacuum impregnation/ filtering of insulating oil.

?? Testing of insulating oil.

Chapter—5 Preventive maintenance & Environmental pollution prevention

?? Concepts of preventive maintenance.

?? Advantages preventive maintenance schedule for transformer induction motor.

?? Transmission line

?? Circuit breaker and underground cable.

?? Preventive measures to control environmental pollution results due to production of smokes gases.

?? Flow of waste material and atomic reactions in research stations.

?? Plants electrical & electronic equipments and accessories.

Chapter—6 Trouble Shooting

?? Normal performance of equipment

?? Trouble shooting internal and external faults

?? Instruments and accessories for trouble shooting

- ?? Trouble shooting charts.
- Chapter—7 Electrical Accident & Safety measures**
- ?? Electrical accidents,
 ?? Safety regulation,
 ?? Treatment of shock,
 ?? Fire extinguishers.
- Chapter—8 Testing & Maintenance of relays & Circuit breakers**
- ?? Testing of relays; Factory test, commissioning test and preventive periodic maintenance test,
 ?? Testing of circuit breakers, Voltage test, type test,
 ?? Preventive maintenance of circuit breaker.
- Chapter—9 Hot Line Maintenance**
- ?? Meaning and advantages
 ?? Special type of non-conducting material used for preparing tools,
 ?? Tools for hot line maintenance.

9. SUGGESTED IMPLEMENTATION STRATEGIES

The implementation strategy to teach this course should be a good mix of various teaching methods like lecture, question answer, assignment and lab work.

This course is intended to develop the testing and maintenance skills very much required by the industry. Therefore more practical exercises need to be given to the students.

10. SUGGESTED LEARNING RESOURCES

- a) Textbooks mentioned in the references.
- b) Catalogue, manuals.

SUGGESTED REFERENCES

S.No.	Title	Ed./ Year	Author/ Publisher
1	Electrical Installation work	(Vth metric edition)	T.G. Francis/ E.L.B.S.
2	Electrical Installations Maintenance & fault location workbook.	-	T.T.T.I. (W.R.) Bhopal
3	Preventive maintenance Electrical equipment	-	Charles J. Hurburt
4	Commission of Electrical Plant	-	RCH Richardson
5	Operation and maintenance of Electrical Equipments	Vol. I & Vol. II	BVS Rao/ Asia Publishing or Media Promoter Publishers Pvt. Bombay
6	Electrical Maintenance & Repairs	-	J.I. Watts/ McMillars, London
7	Troubles in Electrical Equipments	-	N.E. Stafford/ McGraw Hills Publications
8	A Text Book of Electrical Installation work	Vol. 2	R.A. Mee/ MacDonald London
9	Electrical Maintenance & Repairs	-	P.P. Gipta/ Dhanpat Rai & Cons Publications

10	Estimating Commissioning and maintenance of Electrical equipment	-	S. Rao/ Khanna Publications
11	Fundamentals of maintenance of Electrical Equipment	-	Bhatia/ Khanna Publications
12	Relevant IS		

SUBJECT TITLE – ELECTRICAL INSTALLATION MAINTENANCE & TESTING LAB

**Practical Code: 224624 (24)
Periods: 32**

11. PRACTICAL EXPERIENCES

The following experiments may be demonstrated either in institute or in field.

1. Maintenance of O.H. Lines.
2. Maintenance of switchgear OCB.
3. Maintenance of distribution transformer in distribution system.
4. Routine/ Preventive maintenance of induction motors in textile mills/ industrial establishment.
5. Shut down and energizing procedure.
6. Accident reports writing.
7. Prmit to work.
8. Fire extinguisher.
9. Insulation oil testing.
10. Earth resistance testing.
11. Test report of electrical installation.
12. Maintenance schedule.
13. Trouble shooting.
14. Report on hot line maintenance.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

1. **SEMESTER** : **VI**
2. **SUBJECT TITLE** : **UTILIZATION OF ELECTRICAL POWER**
3. **CODE** : **224614 (24)**
4. **BRANCH DISCIPLINE** : **ELECTRICAL ENGINEERING**
4. **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		
224614 (24)	3	1	-	-	100	20	10	-	-	130	4
224625 (24)	-	-	2	-	-	-	-	50	20	70	1

5. DISTRIBUTION OF MARKS AND PERIODS:

SL NO.	Chapter No.	Chapter Name	Periods	Marks
1	1	Principles of Selection of Electrical Drive System	10	20
2	2	Electric Heating System	16	20
3	3	Electric Welding System	16	20
4	4	Illumination	14	25
5	5	Power factor improvement	08	15
		TOTAL	64	100

7. RATIONALE

This course is under applied technology group is intended to enable the student understand the facts, concepts, principles and procedures related to the utilization of electric power so that he can acquire supervisory skills, which will help him to discharge his role as a supervisor when he starts working in the industry.

8. DETAILED COURSE CONTENTS

Chapter – 1 Principles of Selection of Electrical Drive System

- ?? Requirements of mechanical load
- ?? Review of the electrical motor operation
- ?? Duty cycle
- ?? Principles of selection of motor
- ?? Power transmission system
- ?? Procedure to select the motor i.e. type, size & rating
- ?? Procedure to operate & control the motor i.e. starting running braking, speed, load fluctuation

Chapter – 2 Electric Heating System

- ?? Principal, Advantages and Disadvantages of electric heating system
- ?? Modes of transfer of heat
- ?? Principle of the resistance, induction and dielectric heating
- ?? Principle of heat conversion in resistance, induction, dielectric heating
- ?? Types of Furnaces – Arc and Induction Furnaces

Chapter – 3 Electric Welding System

- ?? Concepts of the resistance, induction, arc metallic & carbon welding.
- ?? Principles of welding
- ?? Principle of TIG and MIG welding
- ?? AC and DC Arc Welding

Chapter – 4 Illumination

- ?? Electromagnetic Wave spectrum
- ?? Law of illumination
- ?? Definitions of terms used lighting
- ?? Types of lighting scheme and their calculation
- ?? Types of lamps and their uses and fittings

Chapter—5 Power factor improvement

- ?? Causes & ill effects of low power factor
- ?? Methods of improvement of power factor & its economics

9. SUGGESTED IMPLEMENTATION STRATEGIES

1. Lecture session with question and answer
2. Use of audio visual aids
3. Assignments on various topics.

Moreover, when teaching this course, some of the actual devices need to be brought to the class and demonstrated to the students

10. SUGGESTED LEARNING RESOURCES

- a) Textbooks mentioned in the references.
- b) Laboratory manuals
- c) Periodicals like, news magazines, journals etc.

11. SUGGESTED REFERENCES

S. No.	Title	Ed./ Year	Author/ Publisher
1	Electrical power	1992	Gupta J. B.; Kat aria & Sons Pub. New Delhi
2	Utilization of electrical energy & Electric Traction	1983	Gupta J. B.; Katson Pub. New Delhi
3	A Course in Electrical power	1987	Soni, M.L. et al; Dhanpat Rai & Sons, New Delhi
4	Generation, Distribution & utilisation of electrical energy	6 th 1991	Wadhwa, C.L./ Wiley Eastern Ltd., New Delhi

SUBJECT TITLE – UTILIZATION OF ELECTRICAL POWER LAB

Practical Code: 224625 (24)
Periods: 32

12. PRACTICAL EXPERIENCES

1. Visit to the medium size manufacturing industry and observe the drive, arrangement, instrumentation & control system, procedures, instrumentation, tools, machines & sequencing of operation.
2. Write report. Draw the plant layout. State the principles of the operation and control of the manufacturing system.
3. Select the heating procedure for the study.
4. Select welding process, either visit or video demonstration.
5. Visit to the railway maintenance section and report of operation, control, switchgear and protection and maintenance of locomotive and other traction equipment, power supply, return supply and wiring system.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

1. **SEMESTER** : **VI**
2. **COURSE TITLE** : **ENTREPRENEURSHIP DEVELOPMENT**
3. **CODE** : **200615 (37)**
4. **BRANCH/DISCIPLINE** : **ELECTRICAL ENGINEERING**

5. **TEACHING AND EXMINATION SCHEME:**

Course Code	Periods/Week (In Hours)			Scheme of Examination						Credit L+(T+P)/2
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
200615 (37)	4	1	-	100	20	10	-	-	130	5

5. **DISTRIBUTION OF MARKS AND PERIODS:**

Sl. No.	Chapter No.	Chapter Name	Periods	Marks
1.	1.	Entrepreneurship Development	10	12
2.	2.	Forms of business organization	10	10
3.	3.	Institutional support for SSI	10	08
4.	4.	Planning a small scale industry	10	20
5.	5.	Management of small business firms	10	12
6.	6.	Project selection, formulation and appraisal	10	16
7.	7.	Problems of small industries	10	12
8.	8.	Entrepreneurial motivation training	10	10
		TOTAL	80	100

6. **RATIONALE**

It has been experienced in most parts of the world that entrepreneurship development is a means of rapid economic development vis-à-vis creation of gainful employment of masses. The myth that entrepreneurs are born and not made no longer holds good. Experiences of last few decades in India show that it is possible to develop entrepreneurs through planned efforts. These designed efforts are more essentially required in polytechnics where increasing unemployment has necessitated promoting self-employment/entrepreneurship as career option thereby creating more job providers than job seekers. This course focuses on inputs required for students to undertake entrepreneurial activities as career option.

7. DETAILED COURSE CONTENTS:

CHAPTER-1 Entrepreneurial Development

- Definition of entrepreneurship,
- Characteristics of entrepreneurs,
- Factors influencing entrepreneurship,
- Need for promotion of entrepreneurship and small business
- Entrepreneurial Environment
- Environmental analysis.
- Government policies for setting up new small enterprises
- Opportunities in service industries.

CHAPTER – 2 Forms of Business Organization

- Forms of ownership
- Sole Proprietorship
- Partnership
- Cooperative society
- Joint – stock company
- Private Limited Companies
- Public Limited Companies

CHAPTER – 3 Institutional support to SSI

- Institutional set up
- Industries centers,
- Industrial estates
- Institutional support at National level
- Institutional support at State level
- Commercial banks and financial institutions

CHAPTER – 4 Planning a SSI

- What is planning?
- Types of planning
- Importance of planning
- Steps in planning
- Steps in planning a SSI
- Technical dimensions for setting up an enterprise

CHAPTER-5 Management of Small Business Firm

- Functional areas of small business firm
- Fundamentals of Management
- Managerial effectiveness
- Essential data for effective control of small business

- ☞☞ Resource management
- ☞☞ Office management
- ☞☞ Employees Welfare & safety
- ☞☞ Factory rules and Labour Laws related to SSIs
- ☞☞ Sales Tax and Income Tax laws related to SSIs

CHAPTER-6 Project selection, Formulation & Appraisal

- ☞☞ Project selection & formulation
- ☞☞ Scope of project report
- ☞☞ Content & Format of Project report
- ☞☞ Need of Project Appraisal
- ☞☞ Steps of Project Appraisal

CHAPTER-7 Problems of Small industries

- ☞☞ Power shortages
- ☞☞ Project planning
- ☞☞ Finance
- ☞☞ Raw material
- ☞☞ Production constraints
- ☞☞ Marketing
- ☞☞ Personal constraints
- ☞☞ Regulations

CHAPTER-8 Entrepreneurial Motivation Training

- ☞☞ Achievement Motivation
- ☞☞ Creative thinking
- ☞☞ Risk taking abilities

8. SUGGESTED INSTRUCTIONAL STRATEGIES:

- ☞☞ **Lecture Method.**
- ☞☞ **Industrial visits.**
- ☞☞ **Simulation**
- ☞☞ **Role play**
- ☞☞ **Interaction with successful entrepreneurs**
- ☞☞ **Demonstration.**
- ☞☞ **Games**

9. SUGGESTED LEARNING RESOURCES:

(a) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1.	Starting your own Business, A step-by-step Blue print for the First-time Entrepreneur	Stephen C. Harper, Mc Craw-Hill
2.	Harward Business Review on Entrepreneurship	Harvard Business School Press
3.	Entrepreneurship Development in small scale proceedings of National Seminar, DCSSI, New Delhi	Patel V.G.
4.	Entrepreneurship : Strategies & Resources	Abrams Grant Pass, Oregon: Oasis Press
5.	The Business Planning Guide	David H. Bangs Upstart Publishing Company, In Chicago
6.	Entrepreneurship development in India	Dr. C.B. Gupta Dr. N.P. Srinivasan Sultan Chand & Sons

10. LIST OF TEAM WORK

Team Work will consist of collecting following information by the students:

1. Collect State industrial policy
2. Report of interaction with successful entrepreneurs/industrial visits
3. Prepare list of opportunities for business, service and industrial ventures
4. Whom to approach for What?
5. Facilities and incentives available from various support agencies

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

1. SEMESTER : VI
2. COURSE TITLE : PROJECT- INDUSTRY BASED
2. CODE : 224621 (24)
3. BRANCH/DISCIPLINE : ELECTRICAL ENGINEERING

4. TEACHING AND EXMINATION SCHEME:

Course Code	Periods/Week (In Hours)			Scheme of Examination						Credit $L+(T+P)/2$
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
224621 (24)	-	-	5	-	-	-	50	20	70	3

5. RATIONALE

Project work is a consolidation of various problem statements, which has undertaken during the preceding semesters. Therefore, the given project is intended to integrate as many acquired skills as possible. The project work will not only consist of practical skills, but it could also consist of application of various cognitive skills as well as demonstration of certain desirable attitudes by the student relevant to the implementation of the chosen/given project.

6. SCHEDULE OF PROJECT WORK

For a period of one semester, the project work could contain the following broad schedule for implementing the project and writing the project report.

- a) Title of Project
- b) Project Description
- c) Methods of doing the project and choice of method adopted for doing this project.
- d) Action Plan
- e) Prototype design on paper
- f) Testing Methodology
 - ?? Resources Required
 - ?? Procedure in steps
 - ?? Precautions
 - ?? Observations and calculations
 - ?? Results
 - ?? Interpretation of results
 - ?? Conclusions
 - ?? References.

7. ASSESSMENT OF PROJECT WORK

Some broad criteria for assessing the project are given here. Minor modifications depending on the type of project could be done.

a. Process – 70% weightage

Criteria considered

i.	Preparation of action plan	- 5%
ii.	Selection of proper method	- 5%
iii.	Selection of proper resources	- 10%
iv.	Experimentation	- 30%
v.	Group working and leadership	- 10%
vi.	Following safe practices	- 5%
vii.	Recording in log-book	- 5%

b. Product – 30% weightage

Criteria considered

viii.	Completed project	-10%
ix.	Project report	-20%

7. SUGGESTED IMPLEMENTATION STRATEGIES

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

8. SUGGESTED REFERENCES

S.No.	Title	Ed./ Year	Author/ Publisher
1	<i>Design Suitable Learning Experiences for Laboratory Work and Direct Laboratory Experiences to Achieve Specified Aims - Competency-based Self-learning Module.No.4; REC-British Council India Project</i>	1999	Earnest, Joshua; Mathew, Susan S.; Shrivastava, M.K.; Banthiya, N.K.; TTTI, Bhopal
