DIPLOMA COURSES IN ENGINEERING / TECHNOLOGY

(SEMESTER SYSTEM)

(Implemented from 2020 - 2021)

N – SCHEME

R E G U L A T I O N S*

**Applicable to the Diploma Courses other than Diploma in Hotel Management & Catering Technology.*

1. Description of the Course:

a. Full Time (3 years)

The Course for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters* and the First Year is common to all Engineering Branches.

b. Sandwich (3½ years)

The Course for the Sandwich Diploma in Engineering shall extend over a period of three and half academic years, consisting of 7 semesters* and the First Year iscommon to all Engineering Branches. The subjects of three years full time diploma course being regrouped for academic convenience.

During 4th and/or during 7th semester the students undergo industrial training for six months/ one year. Industrial training examination will be conducted after completion of every 6 months of industrial training.

c. Part Time (4 years)

The course for the Part Time Diploma in Engineering shall extend over a period of 4 academic years containing of 8 semesters*, the subjects of 3-year full time diploma courses being regrouped for academic convenience.

**** Each Semester will have 16 weeks duration of study with 35 hrs. / Week for Regular Diploma Course and 18 hrs. / Week for Part-Time Diploma Course.***

The Curriculum for all the 6 Semesters of Diploma courses (Engineering & Special Diploma Courses viz. Textile Technology, Leather Technology, Printing Technology, Chemical Technology etc.) have been revised and revised curriculum is applicable for the candidates admitted from 2020 — 2021 academic years onwards.

2. Condition for Admission:

Condition for admission to the Diploma courses shall be required to have passed inthe S.S.L.C Examination of the Board of Secondary Education, Tamil Nadu.

(OR)

The Anglo-Indian High School Examination with eligibility for Higher Secondary Course in Tamil Nadu.

(OR)

The Matriculation Examination of Tamil Nadu.

(OR)

Any other Examinations recognized as equivalent to the above by the Board of Secondary Education, Tamil Nadu.

Note: In addition, at the time of admission the candidate will have to satisfy certainminimum requirements, which may be prescribed from time to time.

3. Admission to Second year (Lateral Entry):

A pass in HSC (academic) or (vocational) courses mentioned in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board with eligibility for university Courses of study or equivalent examination& should have studied the following subjects.

A pass in 2 Years ITI with appropriate Trade or Equivalent examination.

Sl. No	Courses	H.SC Academic	H.SC Vocational		Industrial Training Institutes Courses
		Subjects Studied	Subjects Studied		
			Related subjects	Vocational subjects	
1.	All the Regular and Sandwich Diploma Courses	Physics and Chemistry as compulsory along with Mathematics / Biology	Mathematics / Physics / Chemistry	Related Vocational Subjects Theory& Practical	2 years course to be passed with appropriate Trade

2.	Diploma Course in Modern Office Practice	English & Accountancy English & Elements of Economics English & Elements of Commerce	English & Accountancy, English & Elements of Economics, English & Management Principles& Techniques, English & Typewriting	Accountancy & Auditing, Banking, Business Management, Co-operative Management, International Trade, Marketing &Salesmanship, Insurance& Material Management, Office Secretary ship.	

- For the Diploma Courses related with Engineering/Technology, the related / equivalent subjects prescribed along with Practicals may also be taken for arriving the eligibility.
- Branch will be allotted according to merit through counseling by the respective Principal as per communal reservation.
- For admission to the Textile Technology, Leather Technology, Printing Technology, Chemical Technology and Modern Office Practice Diploma courses the candidates studied the related subjects will be given first preference.
- *Candidates who have studied Commerce Subjects are not eligible for Engineering Diploma Courses.*

4. Age Limit : No Age limit.

5. Medium of Instruction: English

6. Eligibility for the Award of Diploma:

No candidate shall be eligible for the Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3 academic years in any institution affiliated to the State Board of Technical Education and Training, Tamil Nadu, when joined in First Year and two years if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Courses are as given below:

Diploma Course	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years
Sandwich	3½ Years	6½ Years
Part Time	4 Years	7 Years

This will come into effect from N Scheme onwards i.e. from the academic year 2020-2021.

7. Subjects of Study and Curriculum outline:

The subjects of study shall be in accordance with the syllabus prescribed from time totime, both in theory and practical subjects.

The curriculum outline is given in Annexure– I.

8. Examinations:

Board Examinations in all subjects of all the semesters under the scheme of examinations will be conducted at the end of each semester.

The internal assessment marks for all the subjects will be awarded on the basis of continuous internal assessment earned during the semester concerned. For each subject 25 marks are allotted for internal assessment. Board Examinations are conducted for 100 marks and reduced to 75.

The total marks for result are 75 + 25 = 100 Marks.

9. Continuous Internal Assessment:

For Theory Subjects:

The Internal Assessment marks for a total of 25 marks, which are to be distributed asfollows:

i) Subject Attendance 5 Marks

(Award of marks for subject attendance to each subject Theory/Practical will be as perthe range given below)

80%	-	83%	1 Mark
84%	-	87%	2 Marks
88%	-	91%	3 Marks
92%	-	95%	4 Marks
96%	-	100%	5 Marks

ii) **Test Marks** **10 Marks**

2 Tests each of 2 hours duration for a total of 50 marks areto be conducted. Average of these two test marks will be taken and the marks to be reduced to: **05 Marks**

The Test – III is to be the Model Examination covering all the five unitsand the marks obtained will be reduced to: **05 Marks**

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	Unit – I & II	End of 6th week	50	2 Hours
Test II	Unit – III & IV	End of 12th week	50	2 Hours
Test III	**Model Examination:** Covering all the5 Units. (Board Examinations-question paper-pattern).	End of 16th week	100	3 Hours

From the Academic Year 2020 – 2021 onwards.

Question Paper Pattern for the Test -I and Test–II is as follows. The tests should be conducted by proper schedule. Retest marks should not be considered for internal assessment.

Without Choice:

Part A Type questions:	6 Questions ×1 mark	06 marks
Part B Type questions:	7Questions ×2marks	14 marks
Part C Type questions:	2 Questions ×15 marks	30 marks
	Total	**50 marks**

iii) Assignment **5 Marks**

For each subject Three Assignments are to be given each for 20 marks and theaverage marks scored should be reduced for 5 marks.

iv) Seminar Presentation **5 Marks**

The students have to select the topics either from their subjects or general subjects which will help to improve their grasping capacity as well as their capacity to express the subject in hand. The students will be allowed to prepare the material for the given topic using the library hour and they will be permitted to present seminar (For First andSecond Year, the students will be permitted to present the seminar as a group not exceeding six members and each member of the group should participate in the presentation. For the Third Year, the students should present the seminar individually.) The seminar presentation is mandatory for all theory subjects and carries5 marks for each theory subject. The respective subject faculty may suggest topics to the students and will evaluate the submitted materials and seminar presentation. (2½ marks for the material submitted in writing and 2 ½ marks for the seminar presentation). For each subject minimum of two seminars are to be given and the average marks scored should be reduced to 5 marks.

All Test Papers, Assignment Papers / Notebooks and the seminar presentation written material after getting the signature with date from the students must be kept in safe custody in the department for verification and audit. It should be preserved for one semester after publication of Board Exam results and produced to the flying squadand the inspection team at the time of inspection/verification.

A. For Practical Subjects:

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows:

a) Attendance :**5Marks**

(Award of marks same as theory subjects)

b) Procedure/ observation and tabulation/
Other Practical related Work : **10Marks**

c) Record writing : **10Marks**

TOTAL : **25Marks**

* All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Board examinations.
* The observation notebook / manual should be maintained for 10 marks. The observation notebook / manual with sketches, circuits, program, reading and calculation written by the students manually depends upon the practical subject during practical classes should be evaluated properly during the practical class hours with date.
* The Record work for every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 10 marks for each exercise as per the above allocation.
* At the end of the Semester, the average marks of all the exercises should be calculated for 20 marks (including Observation and Record writing) and the marks awarded for attendance is to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)

* Only regular students, appearing first time must submit the duly signed bonafied record notebook/file during the Practical Board Examinations.

All the marks awarded for Assignments, Tests, Seminar presentation and Attendanceshould be entered periodically in the Personal Theory Logbook of the staff, who is handlingthe theory subject.

The marks awarded for Observation, Record work and Attendance should be entered periodically in the Personal Practical Logbook of the staff, who is handling the practical subject.

10. Communication Skill Practical, Computer Application Practical and Physical Education:

The Communication Skill Practical and Computer Application Practical with more emphasis are being introduced in First Year. Much Stress is given to increase theCommunication skill and ICT skill of students.

As per the recommendation of MHRD and under Fit India scheme, the Physicaleducation is introduced to encourage students to remain healthy and fit by including physical activities and sports.

11. Project Work and Internship:

The students of all the Diploma Courses must do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. To encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e., institution wise, region wise and state wise. **The Project work must be reviewed twice in the same semester. The project work is approved during the Vsemester by the properly constituted committee with guidelines.**

a) Internal assessment mark for Project Work &Internship:

Project Review I	. . .	**10 marks**
Project Review II	. . .	**10 marks**
Attendance	. . .	**05 marks** (Award of marks same as theory subject pattern)
Total	. . .	**25 marks**

Proper record should be maintained for the two Project Reviews and preserved for one semester after the publication of Board Exams results. It should be produced to the flying squad and the inspection team at the time of inspection/verification.

b) Allocation of Marks for Project Work & Internship in Board Examinations:

Demonstration/Presentation	25 marks
Report	25 marks
Viva Voce	30 marks
Internship Report	20 marks
Total	**100* marks**

*Examination will be conducted for 100 marks and will be converted to 75 marks.

c) Internship Report:

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V semester during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year "Project Work & Internship" for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centers / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format must be submitted by individual student during the Project Work &Internship Board examination.

12. Scheme of Examinations:

The Scheme of examinations for subjects is given in Annexure - II.

13. Criteria for Pass:

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the subjects prescribed in the curriculum.

2. A candidate shall be declared to have passed the examination in a subject if he/she secures not less than 40% in theory subjects and 50% in practical subjects out of the total prescribed maximum marks including both the Internal Assessment and theBoard Examinations marks put together, subject to the condition that he/she securesat least

3. a minimum of 40 marks out of 100 marks in the Board Theory Examinations and a minimum of 50 marks out of 100 marks in the Board Practical Examinations.

14. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2023onwards (Joined first year in 2020 -2021) will be done as specified below.

First Class with Superlative Distinction:

A candidate will be declared to have passed in **First Class with Superlative Distinction** if he/she secures not less than 75% of the marks in all the subjects and passes all the semesters in the first appearance itself and passes all subjects withinthe stipulated period of study 2 / 3/ 3½/ 4 years [Full time (lateral entry)/Full Time/Sandwich/Part Time] without any break in study.

First Class with Distinction:

A candidate will be declared to have passed in **First Class with Distinction** if he/she secures not less than 75% of the aggregate marks in all the semesters put together and passes all the semesters except the I and II semester in the first appearance itself and passes all subjects within the stipulated period of study 2 / 3/ 3½/ 4 years [Full time (lateral entry)/Full Time/Sandwich/Part Time] without any break in study.

First Class:

A candidate will be declared to have passed in **First Class** if he/she secures not less than 60% of the aggregate marks in all the semesters put together and passes all the subjects within the stipulated period of study 2 / 3/ 3½/ 4 years [Full time (lateral entry)/Full Time/Sandwich/Part Time] without any break in study.

Second Class:

All other successful candidates will be declared to have passed in **Second Class.**

The above classifications are also applicable for the Sandwich / Part-Time students who pass out Final Examination from October 2023 /April 2024 onwards (both joined First Year in 2020 - 2021)

15. Duration of a period in the Class Timetable:

The duration of each period of instruction is1 hour and the total period of instruction hours excluding interval and lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical).

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N – SCHEME

ANNEXURE – I

CURRICULUM OUTLINE

1030 DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING (FULL TIME)

III Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4040310	Electronic Devices and Circuits	5	-	-	5
4030320	Electrical Circuit Theory	6	-	-	6
4030330	Electrical Machines -1	5	-	-	5
4040340	Electronic Devices and Circuits Practical	-	-	4	4
4030350	Electrical Circuits and Machines Practical	-	-	4	4
4030360	Electrical Workshop Practical	-	-	4	4
4030370	Wiring & Winding Practical	-	-	4	4
		16	-	16	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

IV Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030410	Electrical Machines -II	5	-	-	5
4030420	Measurements, Instruments and Transducers	5	-	-	5
4040430	Analog and Digital Electronics	4	-	-	4
4020620	E-Vehicle Technology and Policy	4	-	-	4
4030450	Electrical Machines and Instrumentation Practical	-	-	5	5
4040460	Analog and Digital Electronics Practical	-	-	5	5
4030470	Electrical Circuits and Simulation Practical	-	-	4	4
		18	-	14	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

V Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030510	Generation Transmission and Switchgear	5	-	-	5
4040520	Micro Controller and its Applications	5	-	-	5
Elective I Theory					
4030511	Control of Electrical Machines	5	-	-	5
4030512	Programmable Logic Controllers	5	-	-	
4030513	Renewable Energy Sources	5	-	-	
Elective I Practical					
4030514	Control of Electrical Machines Practical	-	-	5	5
4030515	Programmable Logic Controller Practical	-	-	5	
4030516	Renewable Energy Sources Practical	-	-	5	
4030540	Computer Aided Electrical Drawing Practical	-	-	4	4
4040550	Microcontroller and its Applications Practical	-	-	4	4
4040570	Entrepreneurship and Startups	-	-	4	4
		15	-	17	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

Common to all Departments

VI Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030610	Distribution and Utilization	6	-	-	6
4030630	Energy Conservation and Audit	4	-	-	4
Elective II Theory					
4030621	Power Electronics	5	-	-	5
4030622	Bio-Medical Instrumentation	5	-	-	
4030623	Computer Hardware and Networks	5	-	-	
4030640	Electrical Estimation and Costing Practical	-	-	5	5
Elective II Practical					
4030624	Power Electronics Practical	-	-	6	6
4030625	Bio-Medical Instrumentation Practical	-	-	6	
4030626	Computer Hardware and Networks Practical	-	-	6	
4020660	Project Work and Internship	-	-	6	6
		15	-	17	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

ANNEXURE II

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N – SCHEME

SCHEME OF EXAMINATION

1030 DIPLOMA IN ELETRICAL AND ELETRONICS ENGINEERING (FULL TIME)

THIRD SEMESTER

Subject Code	SUBJECT	EXAMINATION MARKS			Min. Marks for PASS	Exam Hours
		Internal Assessment Marks	Board Exam Marks	Total Marks		
4040310	Electronic Devices and Circuits	25	75	100	40	3
4030320	Electrical Circuit Theory	25	75	100	40	3
4030330	Electrical Machines - I	25	75	100	40	3
4040340	Electronic Devices and Circuits Practical	25	75	100	50	3
4030350	Electrical Circuits and Machines Practical	25	75	100	50	3
4030360	Electrical Workshop Practical	25	75	100	50	3
4030370	Wiring & Winding Practical	25	75	100	50	3

1030 DIPLOMA IN ELETRICAL AND ELETRONICS ENGINEERING (FULL TIME)

III Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4040310	Electronic Devices and Circuits	5	-	-	5
4030320	Electrical Circuit Theory	6	-	-	6
4030330	Electrical Machines -1	5	-	-	5
4040340	Electronic Devices and Circuits Practical	-	-	4	4
4030350	Electrical Circuits and Machines Practical	-	-	4	4
4030360	Electrical Workshop Practical	-	-	4	4
4030370	Wiring & Winding Practical	-	-	4	4
		16	-	16	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

IV Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030410	Electrical Machines -II	5	-	-	5
4030420	Measurements, Instruments and Transducers	5	-	-	5
4040430	Analog and Digital Electronics	4	-	-	4
4020620	E-Vehicle Technology and Policy	4	-	-	4
4030450	Electrical Machines and Instrumentation Practical	-	-	5	5
4040460	Analog and Digital Electronics Practical	-	-	5	5
4030470	Electrical Circuits and Simulation Practical	-	-	4	4
		18	-	14	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

V Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030510	Generation Transmission and Switchgear	5	-	-	5
4040520	Micro Controller and its Applications	5	-	-	5
Elective I Theory					
4030511	Control of Electrical Machines	5	-	-	5
4030512	Programmable Logic Controllers	5	-	-	
4030513	Renewable Energy Sources	5	-	-	
Elective I Practical					
4030514	Control of Electrical Machines Practical	-	-	5	5
4030515	Programmable Logic Controller Practical	-	-	5	
4030516	Renewable Energy Sources Practical	-	-	5	
4030540	Computer Aided Electrical Drawing Practical	-	-	4	4
4040550	Microcontroller Practical	-	-	4	4
4040570	Entrepreneurship and Startups	-	-	4	4
		15	-	17	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

Common to all Departments

VI Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030610	Distribution and Utilization	6	-	-	6
4030630	Energy Conservation and Audit	4	-	-	4
Elective II Theory					
4030621	Power Electronics	5	-	-	5
4030622	Bio-Medical Instrumentation	5	-	-	
4030623	Computer Hardware and Networks	5	-	-	
4030640	Electrical Estimation and Costing Practical	-	-	5	5
Elective II Practical					
4030624	Power Electronics Practical	-	-	6	6
4030625	Bio-Medical Instrumentation Practical	-	-	6	
4030626	Computer Hardware and Networks Practical	-	-	6	
4020660	Project Work and Internship	-	-	6	6
		15	-	17	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

DEPARTMENT OF ELETRICAL AND ELETRONICS ENGINEERING

LIST OF ELECTIVE SUBJECTS

Note: Select the Elective Theory and Related Practical subjects.

V Semester

Elective I Theory					
4030511	Control of Electrical Machines	5	-	-	5
4030512	Programmable Logic Controllers	5	-	-	
4030513	Renewable Energy Sources	5	-	-	
Elective I Practical					
4030514	Control of Electrical Machines Practical	-	-	5	5
4030515	Programmable Logic Controller Practical	-	-	5	
4030516	Renewable Energy Sources Practical	-	-	5	

VI Semester

Elective II Theory					
4030621	Power Electronics	5	-	-	5
4030622	Bio-Medical Instrumentation	5	-	-	
4030623	Computer Hardware and Networks	5	-	-	
Elective II Practical					
4030624	Power Electronics Practical	-	-	6	6
4030625	Bio-Medical Instrumentation Practical	-	-	6	
4030626	Computer Hardware and Networks Practical	-	-	6	

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N – SCHEME

ANNEXURE – I

CURRICULUM OUTLINE

3030: DIPLOMA IN ELETRICAL AND ELETRONICS ENGINEERING (PART TIME)

THIRD SEMESTER

Subject Code	Subject	HOURS PERWEEK			
		Theory	Tutorial/ Drawing	Practical	Total
4040310	Electronic Devices and Circuits	4	-	-	4
4030320	Electrical Circuit Theory	4	-	-	4
40015	Engineering Graphics - I	-	4	-	4
40001	Communication Skill Practical	-	-	3	3
4040340	Electronic Devices and Circuits Practical	-	-	3	3
TOTAL		**8**	**4**	**6**	**18**

FOURTH SEMESTER

Subject Code	Subject	HOURS PERWEEK			
		Theory	Tutorial/ Drawing	Practical	Total
4030330	Electrical Machines -1	4	-	-	4
4030350	Electrical Circuits and Machines Practical	4	-	-	4
40025	Engineering Graphics - II	-	4	-	4
40002	Computer Application Practical	-	-	3	3
4030360	Electrical Workshop Practical	-	-	3	3
TOTAL		**8**	**4**	**6**	**18**

FIFTH SEMESTER

Subject Code	Subject	HOURS PERWEEK			
		Theory	Tutorial/ Drawing	Practical	Total
4030410	Electrical Machines -II	4	-	-	4
4030420	Measurements, Instruments and Transducers	3	-	-	3
4030510	Generation Transmission and Switchgear	4	-	-	4
4030450	Electrical Machines and Instrumentation Practical	-	-	4	4
4030370	Wiring & Winding Practical	-	-	3	3
TOTAL		**11**	**-**	**7**	**18**

SIXTH SEMESTER

Subject Code	Subject	HOURS PERWEEK			
		Theory	Tutorial/ Drawing	Practical	Total
4040430	Analog and Digital Electronics	4	-	-	4
4030610	Distribution and Utilization	4	-	-	4
4030630	Energy Conservation and Audit	4	-	-	4
4040460	Analog and Digital Electronics Practical	-	-	3	3
4030470	Electrical Circuits and Simulation Practical	-		3	3
TOTAL		**12**	**-**	**6**	**18**

SEVENTH SEMESTER

Subject Code	Subject	HOURS PERWEEK			
		Theory	Tutorial/ Drawing	Practical	Total
4040520	Micro Controller and its Applications	4	-	-	4
Elective-I Theory					
4030511	Control of Electrical Machines	3			3
4030512	Programmable Logic Controllers				
4030513	Renewable Energy Sources				
4030540	Computer Aided Electrical Drawing Practical	-	-	3	3
4040550	Microcontroller Practical	-	-	3	3
Elective-I Practical					
4030514	Control of Electrical Machines Practical			3	3
4030515	Programmable Logic Controller Practical				
4030516	Renewable Energy Sources Practical				
4040570	Entrepreneurship & Startups	-	-	2	2
TOTAL		**7**	**-**	**11**	**18**

EIGHTH SEMESTER

Subject Code	Subject	HOURS PERWEEK			
		Theory	Tutorial/ Drawing	Practical	Total
4020620	E-Vehicle Technology and Policy	4			4
Elective-II Theory		4			4
4030621	Power Electronics				
4030622	Bio-Medical Instrumentation				
4030623	Computer Hardware and Networks				
4030640	Electrical Estimation and Costing Practical			4	4
Elective-II Practical				3	3
4030624	Power Electronics Practical				
4030625	Bio-Medical Instrumentation Practical				
4030626	Computer Hardware and Networks Practical				
4020660	Project Work and Internship			3	3
TOTAL		**8**	**-**	**10**	**18**

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N – SCHEME

ANNEXURE – I

CURRICULUM OUTLINE

2020 DIPLOMA IN MECHANICAL ENGINEERING (SANDWICH)

III Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4040310	Electronic Devices and Circuits	5	-	-	5
4030320	Electrical Circuit Theory	6	-	-	6
4030330	Electrical Machines -1	5	-	-	5
4040340	Electronic Devices and Circuits Practical	-	-	4	4
4030350	Electrical Circuits and Machines Practical	-	-	4	4
4030360	Electrical Workshop Practical	-	-	4	4
4030370	Wiring & Winding Practical	-	-	4	4
		16	-	16	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education		-	-	-	2
TOTAL					**35**

IV Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030410	Electrical Machines -II	4	-	-	4
4030450	Electrical Machines and Instrumentation Practical	-	-	3	3
4020491	Industrial Training - I	-	-	-	NA
		4		3	7
Extra / Co-Curricular activities					
Library		-	-	-	-
TOTAL					7

V Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030420	Measurements, Instruments and Transducers	4			4
4040430	Analog and Digital Electronics	4			4
4020620	E Vehicle Technology and Policy	4			4
4030510	Generation Transmission and Switchgear	4			4
	Elective Theory I	4			4
4030450	Electrical Machines and Instrumentation Practical			3	3
4040460	Analog and Digital Electronics Practical			3	3
4030470	Electrical Circuits and Simulation Practical			3	3
	Elective Practical I			3	3
		20		12	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education*		-	-	-	2*
TOTAL					**35**

- Physical Education hour will be allocated after regular working hour.

VI Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4030440	Energy Conservation and Audit	4			4
4040520	Micro Controller and its Applications	5			5
4030610	Distribution and Utilization	5			5
	Elective Theory II	4			4
4030540	Computer Aided Electrical Drawing Practical			3	3
4040550	Microcontroller Practical			3	3
	Elective Practical II			4	4
4040570	Entrepreneurship and startups			4	4
		18		14	32
Extra / Co-Curricular activities					
Library		-	-	-	1
Physical Education*		-	-	-	2*
TOTAL					**35**

- Physical education hour will be allocated after regular working hour.

VII Semester

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory hours	Drawing hours	Practical hours	Total hours
4020660	Project Work and Internship			6	6
4020791	Industrial Training II				NA
Extra / Co-Curricular activities					
Library		-	-	-	1
TOTAL					**7**

DEPARTMENT OF ELECTRICAL AND ELCTRONICS ENGINEERING

LIST OF ELECTIVE SUBJECTS

Note: Select the Elective Theory and Related Practical subjects.

V Semester

Elective I Theory					
4030511	Control of Electrical Machines	4	-	-	4
4030512	Programmable Logic Controllers	4	-	-	
4030513	Renewable Energy Sources	4	-	-	
Elective I Practical					
4030514	Control of Electrical Machines Practical	-	-	3	3
4030515	Programmable Logic Controller Practical	-	-	3	
4030516	Renewable Energy Sources Practical	-	-	3	

VI Semester

Elective II Theory					
4030621	Power Electronics	4	-	-	4
4030622	Bio-Medical Instrumentation	4	-	-	
4030623	Computer Hardware and Networks	4	-	-	
Elective II Practical					
4030624	Power Electronics Practical	-	-	4	4
4030625	Bio-Medical Instrumentation Practical	-	-	4	
4030626	Computer Hardware and Networks Practical	-	-	4	

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

(To be Implemented for the Students admitted from the year 2020 - 2021 onwards)

Course Name : All Branches of Diploma in Engineering and Technology

Subject Code : 4040310

Semester : III Semester

Subject title : ELECTRONIC DEVICES AND CIRCUITS

TEACHING AND SCHEME OF EXAMINATION

No of weeks/ semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /Week	Hours /Semester	Internal Assessment	Board Examination	Total	
ELECTRONIC DEVICES AND CIRCUITS	5	80	25	100*	100	3 Hrs

*** Examination will be conducted for 100 marks and it will be reduced to 75 marks.**

TOPICS AND ALLOCATION OF HOURS

UNIT	TOPIC	Hrs
I	Filters, Zener diode and Opto-electronic devices	14
II	Bipolar Junction Transistor, Field Effect Transistor and UJT	16
III	Feedback, Amplifiers and Oscillators	16
IV	Special Semiconducting Devices (SCR, DIAC AND TRIAC)	14
V	Wave shaping Circuits	13
	Tests and Model Exam	7
Total		80

RATIONALE:

Every Electronics Engineer should have sound knowledge about the components used in Electronics Industry. This is vital in R&D Department for chip level troubleshooting. To meet the industrial needs, diploma holders must be taught about the most fundamental subject, Electronic Devices and Circuits. By studying this subject, they will be skilled in handling all types of electronic devices and able to apply the skill in electronics system.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to:

- Know the importance of Filters
- Know the construction, working principle and applications of Zener diode
- Know the construction, working principle and applications of Optoelectronic devices
- Know the biasing methods of Transistors and their applications
- Study the performance of special devices like UJT, FET
- Study the Concept of Feedback, different types of Negative feedback connections
- Know the Types of Transistor amplifiers, Transistor oscillators and their applications
- Study the performance of Special semiconducting devices like SCR, DIAC, and TRIAC
- Explain the concept of wave shaping circuits, Bistable Multivibrator and Schmitt trigger
- Study the working principle of Clippers, Clampers, Voltage Multipliers and their applications

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**FILTERS, ZENER DIODES AND OPTO-ELECTRONIC DEVICES** **1.1: FILTERS** Definition - Types - Capacitor filter - Inductor filter - L section filter - Pi section and RC filter - Comparison and Applications of Filters	5
	1.2: ZENER DIODE Construction, Working principle and Characteristics of Zener Diodes- Zener Breakdown-Avalanche breakdown- Zener diode as a Voltage regulator.	5
	1.3: OPTO-ELECTRONIC DEVICES Definition - Types - Symbol, Working, Characteristics and Applications of LED, 7 Segment LED - Photo diode, Photo transistor and Opto- coupler.	4
II	**BIPOLAR JUNCTION TRANSISTOR (BJT), FIELD EFFECT TRANSISTOR (FET) AND UNI JUNCTION TRANSISTOR (UJT)** **2.1: BIPOLAR JUNCTION TRANSISTOR** Transistor biasing: Need for biasing - Types- Fixed bias, Collector to base bias and Self bias (Operation only, no derivation of circuit elements and parameters)– Define: Stability factor - Operation of Common Emitter Transistor as an Amplifier and as a switch.	7
	2.2: FIELD EFFECT TRANSISTOR (FET) Construction – Working principle–Classification - Drain and Transfer Characteristics -Applications–Comparison between FET and BJT - FET amplifier (common source amplifier).	5
	2.3: UNIJUNCTION TRANSISTOR (UJT) Construction- Equivalent Circuit-Operation-Characteristics- UJT as a relaxation oscillator.	4
III	**FEEDBACK, AMPLIFIERS AND OSCILLATORS** **3.1: FEEDBACK** Concept - effects of negative feedback-Types of negative feedback connections - Applications	6
	3.2: AMPLIFIERS Transistor amplifiers - Types - RC coupled amplifier - Working and Frequency response characteristics –Working of Common Collector Amplifier (Emitter follower)	6

	3.3: OSCILLATORS **Transistor oscillators**–Conditions for oscillation (Barkhausen criterion)- Classifications– Hartley Oscillator– Colpitts Oscillator – RC Phase shift oscillator.	**4**
IV	**SPECIAL SEMICONDUCTING DEVICES (SCR, DIAC AND TRIAC)** **4.1:SCR (SILICON CONTROLLED RECTIFIER)** Symbol – Layered Structure – Transistor analogy - Working–VI characteristics– Applications - Comparison between SCR and Transistor **4.2: DIAC (Diode for Alternating Current)** Symbol – Layered structure - Working – VI characteristics- Applications **4.3: TRIAC (Triode for Alternating Current)** Symbol – Layered structure - Working – VI characteristics- Applications	**5** **5** **4**
V	**WAVE SHAPING CIRCUITS** **5.1: CLIPPERSAND CLAMPERS** Construction and working of Positive, Negative and biased Clippers - Construction and working of Positive and Negative Clamper **5.2: Voltage Multipliers** Construction and working of Voltage Doubler and Tripler. **5.3: Multivibrator and Schmitt Trigger** Construction – Working – Waveform of Astable and Monostable Multivibrator using Transistors and Schmitt Trigger using Transistors.	**5** **3** **5**

TEXT BOOKS:

1. Electronics Devices & Circuits by Salivahanan S,N.Suresh Kumar, A.Vallavaraj Tata McGraw Publication 3rdEdition 2016
2. Electronics Devices & Circuits by Jacob Millman and Halkias 3rd Edition, 2010, Tata McGraw– Hill publication

REFERENCE BOOKS:

1. Electronics Devices & Circuits by Salivahanan S,N.Suresh Kumar, A.Vallavaraj Tata McGraw Publication 3rdEdition 2016
2. Electronics Devices and circuit theory by Boyestad & Nashelsky, PHI, New Delhi 2009
3. Electronic Principles by Malvino, -Tata McGraw Hill Publication 2010.
4. Optical Fiber Communication by Gerd Keiser 5th Edition, Tata McGraw– Hill.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : Diploma in Electrical and Electronics Engineering

Subject Code : 4030320

Semester : III

Subject Title : ELECTRICAL CIRCUIT THEORY

TEACHING AND SCHEME OF EXAMINATION

No of weeks per Semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
ELECTRICAL CIRCUIT THEORY	**6**	**96**	**25**	**100***	**100**	**3 Hrs.**

*** Examinations will be conducted for 100 Marks, and it will be reduced to 75 Marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	DC Circuits	18
II	Circuit Theorems	18
III	Single Phase Circuits	18
IV	Three phase Circuits	18
V	Storage Batteries	17
	Test & Model Exam	7
	Total	96

RATIONALE:

- Electric circuit analysis is the process of finding the voltages across, and thecurrents through the components in the network. Many Techniques are available for calculating these values.
- Part of the course is deal with basics of Network Analysis, introduction to network elements and explains methods for finding voltage and current across any network Component with DC Source, Single Phase AC and Three Phase AC Sources.
- This Course aims at making the student to conversant with different techniques of solving the problems in the field of Electric Circuits and Analysis.

OBJECTIVES:

The students should be able to:

- Explain the concept of Resistance, Capacitance and analyze different Circuit Elements, Energy Sources and analysis of Networks by Kirchhoff's Laws.
- Analyze the concepts of Nodal and Mesh Analysis and Analyze different Theorems for DC Circuits.
- Analyze Single Phase Circuits using Resistor, Inductor & Capacitor Elements.
- Analyze Balanced Three Phase AC Circuits and perform the Three Phase Power Measurement Calculations.
- Explain the Concept of storage batteries, care, maintenance and applications.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**DC CIRCUITS** Basic Concepts of Current, EMF, Potential Difference, Resistance and Resistivity– Ohm's Law –Work, Power, Energy- Resistance in Series, Parallel and Series - Parallel Circuits — Kirchhoff's Laws — Concept of Capacitance - Capacitors in Series and in Parallel - Problems in the above Topics.	18
II	**CIRCUIT THEOREMS** Definitions of Node, Branch and Network – Mesh Equations–Nodal Equations–Star / Delta Transformations – Superposition Theorem – Thevenin's Theorem –Norton's Theorem – Maximum Power Transfer Theorem. (Problems in DC Circuits only)	18
III	**SINGLE PHASE CIRCUITS** Definitions of Sinusoidal Voltage and Current– Instantaneous, Peak, Average and Effective Values – Form Factor and Peak Factor (Derivation for Sine Wave) – Pure Resistive, Inductive and Capacitive Circuits –RL, RC, RLC Series Circuits – Impedance – Phase Angle – Use of 'J' Notations–Rectangular and Polar Coordinates - Phasor Diagram Power and Power Factor – Power Triangle – Apparent Power, Active and Reactive Power– Parallel Circuits (Two Branches Only)- Conductance, Susceptance and Admittance–Problems in all above topics. **RESONANCE** Concept of Series Resonance — Parallel Resonance (R, L & C)- Applications (No Problems)	10 8

IV	**THREE PHASE AC CIRCUITS** Three Phase AC Systems-Phase Sequence –Necessity of Three Phase System–Concept of Balanced and Unbalanced Load - Balanced Star & Delta Connected Loads–Relation between Line and Phase Voltages and Currents — Phasor Diagram Three Phase Power — Power Factor — Three Phase Power and Power Factor Measurement by Single Wattmeter and Two Wattmeter Methods–Problems in all Topics.	8 10
V	**STORAGE BATTERIES** Classification of cells – Construction, Chemical action and physical changes during charging and discharging of Lead Acid, Nickel Iron and Nickel Cadmium Cells – Advantages and Disadvantages of Nickel Ion and Nickel Cadmium Cells over Lead Acid Cell - indication of fully charged and discharged battery – defects and their remedies – capacity - AH efficiency and WH efficiency (no problems) – methods of charging - care and maintenance – applications – maintenance free batteries – Lithium Cells, Lithium - Ion Cells and Mercury Cells – Concept of Recharged Cell.	17

TEXTBOOK

S.No	Name of the Book	Author	Publisher
1.	Electric Circuit Theory	Dr.M.Arumugam	Khanna Publishers

REFERENCE BOOKS

S.No	Name of the Book	Author	Publisher
1.	Circuits and Networks Analysis and Synthesis	A Sudhakar Shyammohan S Palli	Tata McGraw Hill Education Private
2.	Electric Circuits	Mahamood Nahvi Joseph A Edminister	Schaum Publishing Company, Newyork

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : Diploma in Electrical and Electronics Engineering

Subject Code : 4030330

Semester : III Semester

Subject Title : ELECTRICAL MACHINES-I

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
ELECTRICAL MACHINES-I	5	80	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks, and it will be reduced to 75 marks.**

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	DC Generators	15
II	DC Motors	15
III	Single Phase Transformer	15
IV	Three Phase Transformer	15
V	Maintenance of DC Machines and Transformers	13
	Test & Model Exam	07
	Total	**80**

RATIONALE

- ✓ This subject is classified under core technology group which intends to teach the facts, concepts, principles of electrical machines, such as DC generators, DC motors, Brushless DC motor, Single & Three Phase Transformers and DC Electrical Source (battery).
- ✓ Students will be able to analyze the characteristics of DC Generators and Motors, Brushless Dc Motor, Single & Three Phase Transformer, Battery & Qualitative Parameters of these Static and Dynamic Machines. These Machines are used in Transmission, Distribution and Utilization Systems.
- ✓ Knowledge gained by students will be helpful in the study of advanced subjects like Utilization of Electrical Energy, Switchgear & Protection, Manufacturing Processes and Maintenance of Electrical Machines.

OBJECTIVES

Students will be able to:

1. Explain the concept Electromagnetism and Principles.

2. Know the constructional details and working principles of DC Machines and Transformers.

3. Evaluate the performance of DC Generators, Motors and Transformers.

4. Study the applications of DC Generator, Motor and Transformer for specific fields.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**DC GENERATORS** Review of electromagnetic induction – Faraday's laws –Lenz's law - Fleming's right hand rule – Principle of operation of D.C. generator – Construction of D.C. generator – Types of armature windings(No Winding diagram) – EMF equation(Simple problems) –Types of D.C. generators – No load and load characteristics of DC generators – Causes of failure to build-up voltage and remedy – armature reaction – methods of compensating armature reaction – process of commutation – methods of improving commutation. Load characteristics of DC generators – Applications of DC generators.	15
II	**DC MOTORS** Principle of operation of D.C. Motor – Fleming's left-hand rule – Construction Back emf – Torque equation – Types of DC motors –Torque-current, Speed-current, Speed- Torque characteristics of different DC motors – Speed control of DC motors– Field control and armature control – necessity of Starters– 3 Point and 4 Point starters –losses in D.C. Machines – Testing of D.C. Machines – Predetermination of efficiency of motor and generator by Swinburne's test – Problems in the above topics – Applications of D.C. Motors.	15
III	**SINGLE PHASE TRANSFORMER** Principle of operation – Constructional details of core and shell type Transformers – EMF Equation – Voltage ratio –Transformer on No load – Transformer Full load – Current ratio – Phasor diagram on no load and Full load at different power factors. O.C. test, S.C. test –Determination of equivalent circuit constants– Determination of voltage regulation and efficiency – Condition for maximum efficiency– All day efficiency – Problems on the above topics - polarity test–Parallel operation of Single Phase transformers– Auto transformer –principle – Applications of transformers – Energy Efficient Transformer – Dry Type Transformer & Amorphous Core Transformer.	15

IV	**THREE PHASE TRANSFORMER** Three phase Transformer – construction, types of connections of transformer. Parallel operation of three phase transformers – grouping of transformers – Pairing of transformers - Load sharing of transformers with equal and unequal ratings –Cooling of transformers – Various cooling arrangements – Transformer accessories – conservator, breather, explosion vent, bucholz relay – ON load and OFF load tap changer.	15
V	**MAINTENANCE OF DC MACHINES AND TRANSFORMERS** Maintenance – Importance, Preventive and Breakdown maintenance - Advantages of preventive maintenance - Causes of Sparking in Commutators – Defects in Commutators and Remedies – Resurfacing of Commutators and Brushes – Maintenance of Brush Holder – Staggering of Brushes, Brush Pressure - Defects in DC Armature winding – Maintenance of Earthing of DC Machines. Maintenance of Transformer Oil - Transformer oil tester – Acidity test, BDV Test - Earthing – Measurement of earth resistance.	13

TEXTBOOK

Sl.No.	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	A Textbook of Electrical Technology Volume II	B.L. Theraja	S.Chand & Co.New Delhi
2	Electrical Technology	Edward Hughes	Addision – Wesley International Student Edition

REFERENCE BOOK

Sl.No.	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	Elements of Electrical Engineering	Maria Louis	Prentice - Hall of India Pvt
2	Electrical Machines	Nagarath	TMH Publications
3	Electrical Machines	Bhattacharya	TMH Publications

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(To be Implemented for the students admitted from the year 2020 - 2021 onwards)

Course Name : All Branches of Diploma in Engineering and Technology

Subject code : 4040340

Semester : III

Subject title : ELECTRONIC DEVICES AND CIRCUITS PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No. of weeks/ Semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
ELECTRONIC DEVICES AND CIRCUITS PRACTICAL	4	64	25	100*	100	3 Hours

***Examination will be conducted for 100 marks and it will be reduced to 75 marks.**

RATIONALE:

Every Electronics Engineer should have sound knowledge about the components used in Electronics Industry. This is vital in R&D Department for chip level troubleshooting. To meet the industrial needs, diploma holders must be taught about the most fundamental subject, electronic devices and Circuits Practical. By doing practical experiments in this, they will be skilled in handling all types of electronic circuits and able to apply the skill in electronic systems.

OBJECTIVES:

On completion of the following experiments, the students must be able to

- Know the Cold Checking of Active and Passive Component
- Find out the Unknown Resistance value of a Resistor using Colour Coding
- Find out the Unknown Capacitance value of a Capacitor using Colour Coding
- Find out the Unknown Inductance value of an Inductor using Colour Coding
- Understand the concept, working principle and applications of PN Junction diode
- Understand the concept, working principle and applications of Zener diode
- Understand the concept, working principle and applications of BJT and FET
- Understand the concept, working principle and applications of UJT
- Understand the concept, working principle and applications of SCR
- Understand the concept, working principle and applications of DIAC and TRIAC
- Understand the concept, working principle and applications of Clippers and Clampers
- Understand the concept, working principle and applications of various types of Negative feedback amplifiers
- Understand the concept, working principle and applications of Astable Multivibrator

DETAILED SYLLABUS

Contents: Practical

Exercises

Note: At least 5 experiments should be done using Soldering board / Bread board

1. Construct a circuit to test the forward and reverse bias characteristics of a PN Junction Silicon diode. Find the value of its cut-in voltage
2. Construct a circuit to test the forward and reverse bias characteristics of a Zener diode. Find the value of its reverse breakdown voltage
3. Construct a Full wave (center tapped) rectifier and test its input and output waveforms with and without Capacitor filter. Find its maximum voltage.
4. Construct a Full wave (Bridge) rectifier and test its input and output waveforms with and without Capacitor filter. Find its maximum voltage.
5. Construct a Common Emitter Transistor circuit and test its input and output characteristic curves.
6. Construct a Common Source Field Effect Transistor circuit and test its drain and transfer characteristic curves.
7. Construct a circuit to test the Turning on and Turning off characteristics of SCR and find out the forward break over voltage, the value of Latching and Holding currents.
8. Construct a circuit to test the bidirectional characteristics of DIAC and plot its switching characteristics.
9. Construct a circuit to test the bidirectional characteristics of TRIAC and plot its switching characteristics.
10. Construct a Common emitter amplifier circuit and test its frequency response characteristics with and without Current series feedback introduced in it.
11. Construct a circuit to test the switching characteristics of Astable Multivibrator
12. Construct a circuit to test the negative resistance Characteristics of UJT.

DETAILED ALLOCATION OF MARKS

S.NO	NAME OF THE ACTIVITY	MARK ALLOCATION
1	CIRCUIT DIAGRAM	25
2	CONNECTIONS	25
3	EXECUTION AND HANDLING OF EQUIPMENT	25
4	OUTPUT / RESULT	15
5	VIVA VOCE	10
	TOTAL	100

LIST OF EQUIPMENTS (FOR A BATCH OF 30 STUDENTS)

S.No	Name of the Equipment	Range	Required Quantity
1.	DC Regulated power supply	0-30V,1A	10
2.	High Voltage Power Supply	0-250V,1A	2
3.	Signal Generator	1MHz	4
4.	Dual trace CRO	20MHz/ 30MHz	5
5.	Digital Multimeter	-	10
6.	DC Voltmeter (Analog/Digital)	Different Ranges	15
7.	DC Ammeter (Analog/Digital)	Different Ranges	15

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : Diploma in Electrical and Electronics Engineering
Subject Code : 4030350
Semester : III Semester
Subject Title : ELECTRICAL CIRCUITS AND MACHINES PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
ELECTRICAL CIRCUITS AND MACHINES PRACTICAL	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks, and it will be reduced to 75 marks.**

RATIONALE:

- To impart Practical Knowledge to the Diploma Students and Practical Subjects are introduced for every corresponding Theory Subject.
- This Practical Course supports the aim and objective of Electrical Machines- I and Electrical Circuit Theory Subjects.

OBJECTIVES

On completion of this Practical Subject, the Students will be able to:

- Make the various Circuit connections in Machines Laboratory.
- Practically prove all the Theorems and Principles which are dealing with DC Current.
- Understand the Characteristics of Electrical Machines and to determine the Efficiency of the Machines.
- Test the performance of Transformer to find its Efficiency, Voltage Regulation and Characteristics.
- Study the various Speed Control Methods of DC Motor.

DETAILED SYLLABUS

ELECTRICAL CIRCUITS AND MACHINES PRACTICAL

LIST OF EXPERIMENTS:

CIRCUITS:

1. Verification of Super Position Theorem with two different DC Voltages for a common load.
2. Verification of Thevenin's Theorem with DC Supply
3. Measurement of Power
    a. using Ammeter and Voltmeter
    b. using Wattmeter for Single Phase Resistive Load.

MACHINES:

4. No load and FULL Load Characteristics of Self Excited DC Shunt Generator.
5. Load Characteristics of Self Excited DC Series Generator.
6. Load Test on DC Shunt Motor and Draw the Performance Curve.
7. Load Test on DC Series Motor and Draw the Performance Curve.
8. Predetermine the Efficiency of DC Machines by Swinburne's Test.
9. Speed Control of DC Shunt Motor by
    a. Armature Control Method
    b. Field Control Method
10. Load Test on Single Phase Transformer
11. Load Test on Three Phase Transformer
12. Predetermine the Efficiency and Regulation of Single-Phase Transformer by conducting O.C and S.C Tests

13. Find the Equivalent Circuit Constants of Single-Phase Transformer by conducting O.C and S.C Tests.
14. Connect two Single Phase Transformers for Parallel Operation.
15. a) Perform Breakdown Test And determine the Dielectric Strength of Transformer Oil
    b) Conduct Acidity Test on Transformer Oil.

DETAILLED ALLOCATION OF MARKS

S.NO	NAME OF THE ACTIVITY	MARK ALLOCATION
1	CIRCUIT DIAGRAM	**35**
2	CONNECTIONS AND PROCEEDING THE EXPERIMENT	**30**
3	READING/CALCULATION/GRAPH/RESULT	**30**
4	VIVA VOCE	**05**
5	TOTAL	**100**

LIST OF EQUIPMENTS (For a Batch of 30 Students)

S.No	LIST OF EQUIPMENTS	QUANTITY REQUIRED
1	DC Shunt Motor 3/5 KW (or more) with Loading Arrangement	2
2	DC Series Motor 3/5 KW (or more) with Loading Arrangement	1
3	DC Compound Motor 3/5 KW (or more) with Loading Arrangement	1
4	DC Shunt Generator 3/5 KW (or more) coupled with Prime Mover	1
5	DC Series Generator 3/5 KW (or more) coupled with Prime Mover	1
6	1 Phase Transformer 1KVA (or more) 220V/110V	3
7	3 Phase Transformer 1KVA (or more) 440V/220V	1
8	1 Phase Variac 15 amps	3
9	3 Phase Variac 15 amps	1
10	Dual Regulated Power Supply 0-30V/2A	2
11	Single Regulated Power Supply 0-30V / 2A	2
12	Single Phase Resistive Load 3/5 KW, 220V	2
13	Three Phase Resistive Load 3KW,415V	2
14	Tachometer Analog type	3

15	Rheostat – various ranges 50Ω/5A,100 Ω/5A, 300 Ω/2A, 600 Ω/2A (or equivalent)	4
16	AC Ammeter – various ranges 0-500mA, 0-1/2A, 0-5/10A,0-10/20A (or equivalent)	8
17	DC Ammeter – various ranges 0-500mA, 0-2A,0-5A,0-10A,0-15/30A (or equivalent)	8
18	DC Voltmeter – 0-5/10V, 0-30V, 0-300V	8
19	AC Voltmeter – 0-75V, 0-150V, 0-300V, 0-600V	8
20	Wattmeter – various ranges LPF 150/300/600V 2.5A/5A,1/2.5A	6
21	Wattmeter – various ranges UPF 75/150/300,5/10A	6
22	Wattmeter – various ranges UPF 150/300/600V 10/20A	6
23	Transformer oil tester kit, Acidity test kit	Each 1

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : Diploma in Electrical and Electronics Engineering

Subject Code : 4030360

Semester : III Semester

Subject Title : ELECTRICAL WORKSHOP PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No of weeks per Semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examination	Total	
ELECTRICAL WORKSHOP PRACTICAL	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks, and it will be reduced to 75 Marks.**

RATIONALE

- To impart practical knowledge to the Diploma Students for servicing of Domestic Appliances.
- This Subject is assigned to develop Skill on Assembling and test the Household ElectricalAppliances.

OBJECTIVES

At the end of the practical the students will be able to:

- ✓ Identify and use the tools used in servicing of Electrical Appliances.
- ✓ Assemble the various parts of Domestic Appliances.
- ✓ Make the Electrical Connections and test their performance.

DETAILED SYLLABUS

LIST OF EXPERIMENTS:

1. Familiarization of tools used for Electrical repair works and personal Protection Equipments.
2. Dismantling of Electrical Iron Box, identifying the parts, checking theconditions, assembling, and testing.
3. Dismantling of Mixer Grinder, identifying the parts, checking the conditions,assembling and testing.
4. Dismantling of Wet Grinder, identifying the parts, checking the conditions, assembling, and testing.
5. Assembling the accessories of Ceiling Fan, test the connections of winding& Capacitor and run the Fan with Speed Regulator.
6. Connect the Battery and Inverter to supply partial load in a Domestic Wiring during Mains Failure.
7. Assembling and testing of 15watts LED Light.
8. Battery Charging through Solar Panel. Connect Solar Panel to chargeBattery through Charge Controller.
9. Dismantling of Induction Heater, identifying the parts, checking theconditions, assembling, and testing
10. Dismantling of Microwave Oven, identifying the parts, checking theconditions, assembling and testing.

LIST OF EQUIPMENTS (FOR A BATCH OF 30 STUDENTS)

S.No	LIST OF EQUIPMENTS	QUANTITY REQUIRED
1.	Tools: Screwdriver, Cutting pliers, Wire Stripper, Hammer, Spanner set, Line Tester, Nose pliers.	Each2set
2.	Personal Protective Equipments: Safety helmet, Google, Safety gloves, Nose mask, Ear plug, Safety Belt.	Each2Set
3.	Automatic Iron Box	2
4.	Wet Grinder	2
5.	Mixer Grinder	2
6.	Ceiling Fan	2
7.	LED Light, PCB, Driver Circuit and Outer Cover	10
8.	Lead Acid Battery	2
9.	Inverter	2
10.	Solar Photo Voltaic Module	2
11.	Charge controller	2
12.	Microwave oven	1
13.	Multi meter	8
14.	Induction Heater	1

DETAILED ALLOCATION OF MARKS

S.No.	NAMEOFTHE ACTIVITY	MARKS ALLOCATED
1.	Connection Diagram	25
2.	Tools Required	20
3.	Dismantling and Assembling Procedure	30
4.	Testing	20
5.	Viva Voce	05
	TOTAL	**100**

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : Diploma in Electrical and Electronics Engineering

Subject Code : 4030370

Semester : III Semester

Subject Title : WIRING & WINDING PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No of weeks per Semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
WIRING & WINDING PRACTICAL	4	64	25	100*	100	3 Hrs.

*** Examinations will be conducted for 100 marks, and it will be reduced to 75 marks.**

RATIONALE

To provide concept and hands on experience in Electrical Wiring and Winding including different Wiring Systems, Installation Methods and Basic Winding Preparation. Each topic in the syllabus serves as guide for students to deal with the process of connecting various accessories for the distribution of Electrical Energy from the Meter Board.

OBJECTIVES

At the end of this Practical Course the Students should be able to:

- Execute the Emergency Alarm Circuit
- Execute the wiring for Single Phase Service Connection with necessary items.
- Execute the wiring of Three Phase Supply using 3 Rotary Switches, MCB and DB tochange the Phases by connecting Single Phase Lamp Load
- Execute the wiring to controlling the intensity of Lamp by six places by using two 2-Way Switches and 4 Intermediate Switches.
- Execute the wiring to connect a Single-Phase Motor with Main Switch, D.O.L Starterand M.C.B
- Execute The Wiring to Connect A 3 Phase Induction Motor with Main Switch, Star / Delta Starter and E.L.C.B.
- Execute the wiring to control lamps (Sodium Vapor Lamp, Mercury Vapor Lamp, Fluorescent Lamp)
- Execute the wiring for Test Board with necessary items.
- Execute the Go down /Tunnel wiring
- Prepare winding for Transformer and No Volt Coil.
- Give end connections for 3 Phase Induction Motor Winding.
- Testing of faulty Ceiling Fan.

DETAILED SYLLABUS

Contents: Practical

Name of the Topics:

WIRING

1. Emergency alarm wiring with 3 Bells and 3 Pushbuttons.
2. House Wiring for a Service Connection with Single Phase Digital Energy Meter Cutout, Main Switch, 4 Way D.B, Indicator Lamp.
3. Wiring and Testing of 3 Phase Supply using 3 Rotary Switches, MCB and DB to change the Phases by connecting Single Phase Lamp Load.
4. Controlling a Lamp by Six Places by using Two, 2-Way Switches& Four Intermediate Switches.
5. Wiring of Single-Phase Motor using Single Phase Main Switch, D.O.L Starter and MCB
6. Wiring of Three Phase Induction Motor with Main Switch,Star/Delta Starter and ELCB.
7. Wiring of Sodium Vapor and Mercury Vapor Lamp.
8. Wiring and troubleshooting the Fluorescent Tube light.
9. Design and implement a Test Board with Indicator Lamp, FuseUnit to Test Electrical Appliances.
10. Go down / Tunnel wiring using 4 Lamps.

WINDING

1. Design, construct and test a 230/12-0-12 Volt, 500mA Transformer.
2. Design No Volt Coil for a 230/440 AC Contactor.
3. Demonstrate the end connection for a 3 Phase Induction MotorWinding for a 2 Poles / 4Pole Operations.
4. Dismantling a faulty Ceiling Fan and identify the fault, run the fanafter rectifying the fault.

DETAILED ALLOCATION OF MARKS

S. No	NAME OF ACTIVITY	MARK ALLOCATION
1.	Wiring diagram / Design	30
2.	Execution	40
3.	Result	25
4.	Viva-voce	05
	Total Marks	**100**

LIST OF EQUIPMENTS (FOR A BATCH OF 30 STUDENTS)

S.NO.	DESCRIPTION	SPECIFICATION	QTY
1.	SPST Flush Type Switch	250V/5A	10
2.	Intermediate Switch	250V/5A	10
3.	Rotary Switches	500V/32A	6
4.	Three Phase Control Panel Board	500V/32A	2
5.	Batten Lamp Holder	-	10
6.	Round Block	-	20
7.	Switch Board	20cm*15 cm	4
		10cm*10cm	15
8.	M.C.B.	250V/10A ,2 pole	6
		440V/32A	3
9.	Push Button Switch	250V/5A	5
10.	2 Plate Ceiling Rose	250V/5A	10
11.	Electric Bell	250V/5A	3
12	Single Phase D.P.I.C. Main Switch	250V/16A	3
13.	Single Phase D.O.L. Starter	250V/10A	1
14.	Three Phase T.P.I.C. Main Switch	500V/30A	2
15.	Star / Delta Starter	440V/5HP	1
16.	E.L.C.B.	30mA/100mA	1
17.	Single Phase, Digital Energy Meter	250V/15A,50HZ	1
18.	Cut out	16A	1
19.	Single Phase, 4 Way Distribution Box	250V/15A	2
20.	Mercury Vapor Lamp with accessories		1 Set
21.	Sodium Vapor Lamp with accessories		1 Set
22.	Fluorescent Tube Light with Electronic Choke and Holder	40W	2 Set
23.	Two Way Flush Type Switch	250V/5A	15
24.	Wooden Box	30 cm*15cm	4
25.	PVC Pipe	¾”/1″	Req.Qty
26.	Saddle Clips	¾”/1 ″	Req.Qty
27.	Copper Wire	2.5Sq.Mm, 1.5Sq.Mm	Req.Qty
28.	1” Junction Box	1 way,2way,3way	Req.Qty
29.	Screws		Req.Qty
30.	Bare Copper Wire	2.5 Sq.Mm	Req.Qty
31.	Lamps (C.F.L. or Incandescent)	Different ratings	Req.Qty
32.	EI60 Type Stampings Of 0.35 Mm Thickness	-	55

33.	Readymade Bobbins (EI60/21)	-	Req.Qty
34.	Enameled Copper Wire	26SWG 36SWG 37SWG 38SWG	Req.Qty
35.	Varnish	-	Req.Qty
36.	Winding Machine	-	1
37.	Ceiling Fan	-	2
38.	Single Phase Induction Motor	0.5 HP/50HZ,240V	1
39.	Three Phase Squirrel Cage Induction Motor	3HP, 500 V, 50 Hz	1
40.	Gauge Plate for Measurement of SWG	-	1
41.	Winding Study Motor (3Φ Squirrel Cage Type)	-	1