DIPLOMA IN ENGINEERING AND TECHNOLOGY

(1040,3040)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER PATTERN

N – SCHEME

IMPLEMENTED FROM 2020 - 2021

CURRICULUM DEVELOPMENT CENTRE

DIRECTORATE OF TECHNICAL EDUCATION
CHENNAI-600 025, TAMIL NADU

DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

Syllabus Revision Committee

Chairperson

Tmt.G.LaxmiPriya IAS
Director
Directorate of Technical Education
Chennai – 600 025.

Coordinator

Tmt J Rama
Principal, Government Polytechnic College
R K Nagar, Chennai - 81

Convener

Tmt J Rama
Principal, Government Polytechnic College
R K Nagar, Chennai - 81

Members

1.	Dr.G.Geetha, Associate Professor, Anna University, Chennai-25	5.	Tmt.Rm.Shanthi, Senior Lecturer K.L.N memorial Polytechnic College Madurai
2.	Tmt.E.Kalpana, Senior Lecturer, P.T.Lee.Chengalvaraya Naicker Polytechnic College,Chennai -7	6.	Tmt.K.Vethapackiam Lecturer Government Polytechnic College Thoothukodi -628008
3.	Dr.M.Varathaguru Lecturer Government Polytechnic College Perundurai	7.	Dr.B.Suseela Lecturer Government Polytechnic College Perambalur-621104
4.	Thiru.S.Dhanasekaran M.E., Sub-Divisional Engineer, GSM BSS Tambaram BSNL Chennai Telephones	8.	Thiru.R.Vijayaraja M.E., Founder &CEO GemicatesTechnologiesPvt.Ltd., Ashok Nagar,Chennai-83

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 iscommon 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 Yearis common to all Engineering Branches. The subjects of three years full timediploma course being regrouped for academic convenience.

During 4th and/or during 7thsemester the students undergo industrial training forsix 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 DiplomaCourses and 18 hrs. / Week for Part-Time Diploma Courses.***

The Curriculum for all the 6 Semesters of Diploma courses (Engineering & Special Diploma Coursesviz. 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 year onwards.

2. Condition for Admission:

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

(Or)

The Anglo Indian High School Examination with eligibility for Higher SecondaryCourse 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 certain minimum requirements, which may be prescribed from time to time.

3. Admission to Second year (LateralEntry):

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	Maths / Physics / Chemistry	Related Vocational SubjectsTheory & Practical	2 years course to be passed with appropriate Trade
2.	Diploma Coursein Commercial Practice	English & Accountancy English & Elements of Economics English & Elements of	English & Accountancy, English & Elements of Economics, English & Management	Accountancy & Auditing, Banking, Business Management, Co-operative	-

		Commerce	Principles & Techniques, English & Typewriting	Management, International Trade, Marketing & Salesmanship, Insurance& Material Management, Office Secretaryship.	

- 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 Commercial 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
FullTime (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 to time, 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:

A. <u>For Theory Subjects:</u>

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

<u>i) Subject Attendance</u> **5 Marks**

(Award of marks for subject attendance to each subject Theory/Practical willbe as per the range given below)

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

<u>ii) Test #</u> **10 Marks**

2 Tests each of 2 hours duration for a total of 50 marks are to be conducted. Average of the 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 units and 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 Hrs
Test II	Unit – III & IV	End of 12th week	50	2 Hrs
Test III	**Model Examination:** Covering all the 5 Units. (Board Examinations-question paper-pattern).	End of 16th week	100	3 Hrs

From the Academic Year 2020 – 2021 onwards.

Question Paper Pattern forthe 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 Typequestions:	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 the average 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 and Second 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 carries 5 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 onesemester after publication of Board Exam results and produced to the flying squad and the inspection team at the time of inspection/verification.

B. <u>For Practical Subjects:</u>

The Internal Assessmentmark 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 note book / manual should be maintained for 10 marks. The observation note book / manual withsketches, circuits, programme, 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 have to submit the duly signed bonafiderecord note book/file during the Practical Board Examinations.

All the marks awarded for Assignments, Tests, Seminar presentation and Attendance should be entered periodically in the Personal Theory Log Book of the staff, who is handling the theory subject.

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

10. Communication Skill Practical, Computer ApplicationPractical 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 the Communication skill and ICT skill of students.

As per the recommendation of MHRD and under Fit India scheme, the Physical education 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 Courseshave to 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. In order 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 samesemester. The project work is approved during the V semester 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 Centres / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individualstudent 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 the Board Examinations marks put together, subject to the condition that he/she secures at least a minimum of 4*0 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 fromApril 2023 onwards (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 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 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 Time Table:

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).

******

BLANK PAGE

ANNEXURE I

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING SYLLABUS

N SCHEME

(Implemented from the Academic year 2020- 2021 onwards)

CURRICULUM OUTLINE

FULL TIME(1040)

THIRD SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040310	Electronic Devices and Circuits	5	-	-	5
4040320	Electrical Circuits and Instrumentation	6	-	-	6
4040330	Programming in 'C'	5	-	-	5
4040340	Electronic Devices and Circuits Practical	-	-	4	4
4040350	Electrical Circuits and Instrumentation Practical	-	-	4	4
4040360	Programming in 'C' Practical	-	-	4	4
4040370	Simulation Practical			4	4
	Physical Education	-	2	-	2
	Library	-	1	-	1
Total		16	3	16	35

FOURTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040410	Industrial Electronics	5	-	-	5
4040420	Communication Engineering	5	-	-	5
4040430	Analog and Digital Electronics	4	-	-	4
4040440	Industrial Electronics Practical	-	-	5	5
4040450	Communication Engineering Practical	-	-	4	4
4040460	Analog and Digital Electronics Practical	-	-	5	5
4020620	E-Vehicle Technology & Policy #	4	-	-	4
	Physical Education	-	2	-	2
	Library	-	1	-	1
Total		18	3	14	35

 # Common with Mechanical Engineering

FIFTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040510	Analog and Digital Communication systems	5	-	-	5
4040520	Microcontroller and its Applications	5	-	-	5
4040531	Elective 1.Very Large Scale Integration	4	-	-	4
4040532	2.Consumer Electronics				
4040533	3.Basics of Digital Signal and Image processing				
4040540	Analog and Digital Communication Practical	-	-	5	5
4040550	Microcontroller Practical	-	-	4	4
4040561	Elective practical 1.Very Large Scale Integration Practical	-	-	5	5
4040562	2.Consumer Electronics Practical				
4040563	3.Signal and Image processing Practical				
4020570	Entrepreneurship and Start –ups #			4	4
	Physical Education	-	2	-	2
	Library	-	1	-	1
Total		14	3	18	35

 # Common with Mechanical Engineering

SIXTH SEMESTER

SUBJECT CODE	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040610	Computer Hardware Servicing and Networking	5	-	-	5
4040620	Biomedical Instrumentation	5	-	-	5
	Elective Theory				
4040631	1. Television Engineering	5	-	-	5
4040632	2. Mobile and Optical Communications				
4040633	3.Embedded Systems				
4040640	Computer Hardware Servicing and Networking Practical	-	-	6	6
4040651	Elective Practical 1.Television Engineering Practical	-	-	5	5
4040652	2.Mobile and Optical Communication Practical				
4040653	3. Embedded Systems practical				
4040660	Project Work and Internship	-	-	6	6
	Physical Education	-	2	-	2
	Library	-	1	-	1
Total		15	3	17	35

ELECTRONICS AND COMMUNICATION ENGINEERING

(PART TIME)(3040)

THIRD SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040310	Electronic Devices and Circuits	4	-	-	4
4040320	Electrical Circuits and Instrumentation	4	-	-	4
40015	Engineering Graphics I		4		4
4040340	Electronic Devices and Circuits Practical	-	-	3	3
4040350	Electrical Circuits and Instrumentation Practical	-	-	3	3
	Total	8	4	6	18

FOURTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040330	Programming in 'C'	4	-	-	4
4040410	Industrial Electronics	4	-		4
40025	Engineering Graphics II		4		4
4040360	Programming in 'C' Practical	-		3	3
4040370	Simulation Practical	-		3	3
	Total	8	4	6	18

FIFTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040420	Communication Engineering	4	-	-	4
4040430	Analog and Digital Electronics	4	-	-	4
4040440	Industrial Electronics Practical	-	-	4	4
4040450	Communication Engineering Practical	-	-	3	3
4040460	Analog and Digital Electronics Practical	-	-	3	3
	Total	8		10	18

SIXTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040510	Analog and Digital Communication systems	4	-	-	4
4040520	Microcontroller and its Applications	4	-	-	4
40001	Communication skill Practical			3	3
4040540	Analog and Digital Communication Practical	-	-	3	3
4040550	Microcontroller Practical	-	-	4	4
	Total	8		10	18

SEVENTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040610	Computer Hardware Servicing and Networking	3	-	-	3
4040531	Elective 1.Very Large Scale Integration	3	-	-	3
4040532	2.Consumer Electronics				
4040533	3.Basics of Digital Signal and Image processing				
4020620	E-Vehicle Technology & Policy #	3	-	-	3
4040561	Elective practical 1.Very Large Scale Integration Practical	-	-	3	3
4040562	2.Consumer Electronics Practical				
4040563	3.Signal and Image processing Practical				
4040640	Computer Hardware Servicing and Networking Practical	-	-	3	3
40002	Computer Application Practical			3	3
	Total	9	-	9	18

 # Common with Mechanical Engineering

EIGHTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		THEORY HOURS	TUTORIAL HOURS	PRACTICAL HOURS	TOTAL HOURS
4040620	Biomedical Instrumentation	4	-	-	4
	Elective Theory				
4040631	1. Television Engineering	4	-	-	4
4040632	2. Mobile and Optical Communications				
4040633	3.Embedded Systems				
4020570	Entrepreneurship and Start -ups #			3	3
4040651	Elective Practical 1.Television Engineering Practical	-	-	3	3
4040652	2.Mobile and Optical Communication Practical				
4040653	3 Embedded Systems Practical				
4040660	Project Work and Internship	-	-	4	4
	Total	8		10	18

 # Common with Mechanical Engineering

ANNEXURE II

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ELECTRONICS AND COMMUNICATIONENGINEERING SYLLABUS

N SCHEME

(Implemented from the Academic year 2020- 2021 onwards)

SCHEME OF EXAMINATION

(FULL TIME)(1040)

THIRD SEMESTER

Subject Code	Subject	Examination			
		Marks			Duration
		Internal Assessment	Board Examinations	Total	
4040310	Electronic Devices and Circuits	25	100*	100	3 Hrs.
4040320	Electrical Circuits and Instrumentation	25	100*	100	3 Hrs.
4040330	Programming in 'C'	25	100*	100	3 Hrs.
4040340	Electronic Devices and Circuits Practical	25	100*	100	3 Hrs.
4040350	Electrical Circuits and Instrumentation Practical	25	100*	100	3 Hrs.
4040360	Programming in 'C' Practical	25	100*	100	3 Hrs.
4040370	Simulation Practical	25	100*	100	3 Hrs.
	Physical Education				
	Library				

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

FOURTH SEMESTER

Subject Code	Subject	Examination			
		Marks			Duration
		Internal Assessment	Board Examinations	Total	
4040410	Industrial Electronics	25	100*	100	3 Hrs.
4040420	Communication Engineering	25	100*	100	3 Hrs.
4040430	Analog and Digital Electronics	25	100*	100	3 Hrs.
4040440	Industrial Electronics Practical	25	100*	100	3 Hrs.
4040450	Communication Engineering Practical	25	100*	100	3 Hrs.
4040460	Analog and Digital Electronics Practical	25	100*	100	3 Hrs.
4020620	E-Vehicle Technology & Policy #	25	100*	100	3 Hrs.
	Physical Education				
	Library				

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

 # Common with Mechanical Engineering

FIFTH SEMESTER

Subject Code	Subject	Examination			
		Marks			Duration
		Internal Assessment	Board Examinations	Total	
4040510	Analog and Digital Communication systems	25	100*	100	3 Hrs.
4040520	Microcontroller and its Applications	25	100*	100	3 Hrs.
4040531	Elective Theory 1.Very Large Scale Integration	25	100*	100	3 Hrs.
4040532	2.Consumer Electronics	25	100*	100	3 Hrs.
4040533	3.Basics of Digital Signal and Image processing	25	100*	100	3 Hrs.
4040540	Analog and Digital Communication Practical	25	100*	100	3 Hrs.
4040550	Microcontroller Practical	25	100*	100	3 Hrs.
4040561	Elective practical 1.Very Large ScaleIntegration Practical	25	100*	100	3 Hrs.
4040562	2.Consumer Electronics Practical	25	100*	100	3 Hrs.
4040563	3.Signal and Image processing Practical	25	100*	100	3 Hrs.
4020570	Entrepreneurship and Start –ups #	25	100*	100	3 Hrs.
	Physical Education				
	Library				

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

 # Common with Mechanical Engineering

SIXTH SEMESTER

Subject Code	Subject	Examination			
		Marks			Duration
		Internal Assessment	Board Examinations	Total	
4040610	Computer Hardware Servicing and Networking	25	100*	100	3 Hrs.
4040620	Biomedical Instrumentation	25	100*	100	3 Hrs.
	Elective Theory	25	100*	100	3 Hrs.
4040631	1. Television Engineering	25	100*	100	3 Hrs.
4040632	2. Mobile and Optical Communications	25	100*	100	3 Hrs.
4040633	3.Embedded Systems	25	100*	100	3 Hrs.
4040640	Computer Hardware Servicing and Networking Practical	25	100*	100	3 Hrs.
4040651	Elective Practical 1.Television Engineering Practical	25	100*	100	3 Hrs.
4040652	2.Mobile and Optical Communication Practical	25	100*	100	3 Hrs.
4040653	3 Embedded Systems practical	25	100*	100	3 Hrs.
4040660	Project Work and Internship	25	100*	100	3 Hrs.
	Physical Education				
	Library				

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

List of Equivalent Subjectsfor M- Scheme to N– Scheme

THIRD SEMESTER

Code No	M Scheme	Code No	N scheme
34031	Electronic Devices and Circuits	4040310	Electronic Devices and Circuits
34032	Electrical Circuits and Instrumentation	4040320	Electrical Circuits and Instrumentation
34033	Programming in C	4040330	Programming in C
34034	Electronic Devices and Circuits Practical	4040340	Electronic Devices and Circuits Practical
34035	Electrical Circuits and Instrumentation Practical	4040350	Electrical Circuits and Instrumentation Practical
34036	Programming in C Practical	4040360	Programming in C practical
34037	Computer Application Practical for Electronics	40002	Computer Application Practical

FOURTH SEMESTER

Code No	M Scheme	Code No	N scheme
34041	Industrial Electronics	4040410	Industrial Electronics
34042	Communication Engineering	4040420	Communication Engineering
34043	Digital Electronics	4040430	Analog and Digital Electronics
34044	Linear Integrated Circuits	4040430	Analog and Digital Electronics
34045	Industrial Electronics and Communication Engineering Practical	4040440	Industrial Electronics Practical
34046	Integrated Circuits Practical	4040460	Analog and Digital Electronics Practical
30002	Life and Employability Skill Practical	----------	No Equivalent

FIFTH SEMESTER

Code No	M Scheme	Code No	N scheme
34051	Advanced Communication Systems	4040510	Analog and Digital Communication Systems
34052	Microcontroller	4040520	Microcontroller and its Applications
34053	VLSI	4040531	VLSI
34071	Digital Communication	----------	No Equivalent
34272	Programmable Logic Controller	----------	No Equivalent
34073	Electronic Systems Design	----------	No Equivalent
34055	Advanced communication Systems Practical	4040540	Analog and Digital Communication Practical
34056	Microcontroller Practical	4040550	Microcontroller Practical
34057	VLSI Practical	4040561	VLSI Practical

SIXTH SEMESTER

Code No	M Scheme	Code No	N scheme
34061	Computer Hardware Servicing and Networking	4040610	Computer Hardware Servicing and networking
34062	Bio Medical Instrumentation	4040620	Bio Medical Instrumentation
34081	Television Engineering	4040631	Television Engineering
34082	Test Engineering	----------	No Equivalent
34083	Mobile Communication	4040632	Mobile and Optical Communication
34064	Computer Hardware Servicing and Networking Practical	4040640	Computer Hardware Servicing and Networking Practical
34084	PCB Design Practical	----------	No Equivalent
34085	Test Engineering Practical	----------	No Equivalent
34066	Embedded Systems Practical	4040653	Embedded Systems Practical
34067	Project Work	----------	No Equivalent

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 : 1040:Electronics and Communication Engineering

Subject Code : 4040310

Semester :IIISemester

Subject title : ELECTRONIC DEVICESANDCIRCUITS

TEACHINGAND SCHEME OF EXAMINATION

No ofweeks/ 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:

EveryElectronicsEngineershouldhavesoundknowledgeaboutthecomponentsused in Electronics Industry.This is vitalin R&DDepartment for chip level troubleshooting. To meet theindustrialneeds,diplomaholders mustbetaughtaboutthemostfundamentalsubject, ElectronicdevicesandCircuits.Bystudyingthissubject,theywillbeskilledinhandlingall types ofelectronic devices and ableto applythe skill in electronics system.

OBJECTIVES:

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

- Know the importance of Filters
- Know the construction,working principle and applications ofZener diode
- Know the construction,working principle and applications ofOptoelectronic devices
- Know the biasing methods of Transistors and their applications
- Study the performance of special devices like UJT,FET
- Studythe 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, andTRIAC
- Explain the concept ofwave shaping circuits, Bistable Multivibrator and Schmitt trigger
- Studytheworking principle ofclippers , clampers , Voltage Multipliers and their applications

4040310 ELECTRONIC DEVICES AND CIRCUITS

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 **1.2: ZENER DIODE** Construction, Working principle and Characteristics of Zener Diodes- Zenerbreakdown-Avalanchebreakdown- Zenerdiode asa Voltageregulator. **1.3: OPTO-ELECTRONIC DEVICES** Definition - Types - Symbol, Working , Characteristics and Applications of LED, 7 Segment LED - Photo diode, Photo transistor and Opto- coupler	**5** **5** **4**
II	**BIPOLAR JUNCTION TRANSISTOR (BJT), FIELD EFFECT TRANSISTOR (FET) AND UNI JUNCTION TRANSISTOR (UJT)** **2.1: BIPOLAR JUNCTION TRANSISTOR** Transistorbiasing: Need for biasing - Types- Fixedbias,Collector tobase bias andSelfbias (Operation only ,No derivation of circuit elements and parameters)– Define: Stability factor - Operation of Common Emitter TransistorasanA mplifier andasa switch. **2.2**: **FIELD EFFECT TRANSISTOR (FET)** Construction– Workingprinciple–Classification - Drain and Transfer Characteristics -Applications–Comparison betweenFETandBJT- FET amplifier (common source amplifier). **2.3: UNIJUNCTION TRANSISTOR (UJT)** Construction- Equivalentcircuit-Operation-Characteristics- UJTasa relaxation oscillator	**7** **5** **4**

III	**FEEDBACK , AMPLIFIERS AND OSCILLATORS** **3.1: FEEDBACK** Concept - effects of negativefeedback-Types of negativefeedback connections - Applications **3.2: AMPLIFIERS** Transistor amplifiers - Types - RC coupled amplifier - Working and Frequency responsecharacteristics –Working of Common Collector Amplifier(Emitter follower) **3.3 : OSCILLATORS** **Transistoroscillators**–Conditionsforoscillation(Barkhausencriterion)-Classifications– HartleyOscillator– Colpitts Oscillator – RC Phaseshift oscillator	**6** **6** **4**
IV	**SPECIAL SEMICONDUCTING DEVICES (SCR, DIAC AND TRIAC)** **4.1:SCR (SILICON CONTROLLED RECTIFIER)** Symbol – Layered Structure – Transistor analogy - Working–VIcharacteristics– Applications - ComparisonbetweenSCRand Transistor **4.2: DIAC (Diode for Alternating Current)** Symbol – Layered structure - Working – VIcharacteristics- Applications **4.3: TRIAC (Triode for Alternating Current)** Symbol – Layered structure - Working – VIcharacteristics- 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 SchmittTrigger** Construction – Working – Waveform of Astable and Monostable Multivibratorusing Transistorsand SchmittTrigger usingTransistors	**5** **3** **5**

Reference Books:

1. Electronics Devices & Circuits bySalivahananS,N.Suresh Kumar, A.Vallavaraj Tata McGrawPublication 3rdEdition 2016
2. Electronics Devices and circuit theorybyBoyestad&Nashelsky, PHI , NewDelhi 2009
3. Electronic Principles byMalvino,-Tata McGrawHill Publication 2010.
4. ElectronicsDevices&CircuitsbyJacobMillmanandHalkias3rdEdition 2010, Tata McGraw– Hill publication
5. Optical Fiber Communication byGerdKeiser 5thEdition, Tata McGraw– Hill .

STATE BOARD OF TECHNICAL EDUCATION ANDTRAINING, TAMILNADU

DIPLOMAINENGINEERING / TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

SubjectCode. : 4040320

Semester :III

SubjectTitle :ELECTRICALCIRCUITSANDINSTRUMENTATION

TEACHINGANDSCHEMEOFEXAMINATION

NumberofWeeks/Semester:16weeks

Subject	Instructions		Examination			
			Marks			
	Hours/ Week	Hours/ Semester	Internal Assessment	Board Examination	Total	Duration
ElectricalCircuits andInstrumentation	**6**	**96**	**25**	**100***	**100**	**3Hrs**

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

Topics and Allocation of Hours

UNIT	Topic	Hrs
I	DCCircuitsandTheorems	18
II	ACCircuits	17
III	ElectricalMachines	18
IV	Transducers andCRO	18
V	Measurement and Instruments	18
Revision ,Test& Model Exam		7
TOTAL		96

RATIONALE:

This subject enables the students with concepts of DC circuits & network theorems, AC circuits. The subject also deals with principles and working of different Measuringinstruments and Electrical Machines.Theintroductionofthissubjectimpart the knowledge forstudents to analyze the electrical circuits.

OBJECTIVES:

Onsuccessfulcompletionofthecourse,thestudentsmustbeable to

- State ohm'slawandKirchoff'slaws.
- Understand the DC circuit and network theorems.
- Understandseriesandparallelcircuits.
- Define varioustermsrelatedtoACcircuits.
- Get knowledge on ACcircuits.
- Understand aboutresonance in seriesandparallelcircuits.
- Know theoperationof different Electrical machines.
- Know theoperationof measuringinstruments.
- Have basic knowledge on circuit analysis.

4040320 ELECTRICAL CIRCUITS AND INSTRUMENTATION DETAILEDSYLLABUS

Contents: Theory

UNIT	NAMEOF THE TOPIC	HOURS
1	**D.C.CIRCUITSAND THEOREMS** 1.1 Definition and Unit: Voltage, current, power, resistance andconductance . 1.2 Electrical laws: Ohm's law – Simple problems in ohm'slaw – Kirchoff's current law and Kirchoff's voltage law. 1.3 Basic DC circuits: Series and Parallel connections of resistors – Voltage and Current division in series and parallel circuits – Mesh analysis for DC circuits (simpleproblems). 1.4 Network theorems: Thevenin's theorem –Superpositiontheorem – Maximumpower transfer theorem (Statement, Explanation, Simpleproblems).	**3** **4** **5** **6**
2	**A.C.CIRCUITS** 2.1 Basic AC circuits: Definition for impedance, reactance, admittance andpower factor Sinusoidal and Non sinusoidal waveforms – Average and RMS value – Current and Voltage relationship in R, L and C circuits – Analysis of RL, RC and RLC series circuits – Analysis of RL, RC and RLC parallel circuits (simple problems). 2.2 Resonance: Series resonance – Parallel resonance – Conditionfor resonance – frequency response – Resonant frequency, Q factor and bandwidth.	**9** **8**
3	**ELECTRICAL MACHINES** 3.1 Transformer : Construction – workingprinciple – EMF equation – Losses in transformer – efficiency of a transformer – OC, SC test ontransformer– Applications of transformer. 3.2 Single phase and three phase supply : Introduction to single phase and three phase supply – Star Deltatransformation – Differencebetweensinglephaseandthreephasesupply. 3.3 DC Generator: Construction, working principle, EMF equation. 3.4 Electric Motors: DC motor –Single phase induction motor –Three phase	**5** **5** **3** **5**

	induction motor – Capacitor start induction motor –stepper motor – Universal Motor.	
4	**TRANSDUCERS& CRO:** 4.1 Transducers: Classification of Transducers – Strain gauge: Principle of operation, construction, types, advantage, disadvantage and application, Advantage of semiconductor strain gauge over metallic strain gauge – Photo electric transducer – LVDT – RVDT– Loadcell. 4.2 CRO: CRT – Block diagram and operation of CRO – Applications of CRO – Dual trace – Digital storageOscilloscope:Blockdiagram,working principle – FunctionGenerator : Block Diagram, workingprinciple.	**9** **9**
5	**MEASUREMENT AND INSTRUMENTS:** 5.1 Definition : Definition for Measurement, Accuracy, precision, resolution, Calibration. 5.2 Instruments: Operation of Thermocouple – working principle of Thermistor – PMMC Instrument: Construction and working principle – Moving Iron Instrument: Construction and working principle – Shuntsand Multipliers – Potentiometer – DCammeter – DCvoltmeter – Voltmetersensitivity. 5.3 Measurement: Errors inMeasurement –Temperaturemeasurement using thermocouple –Temperaturemeasurement using thermistors–Resistance measurement: Wheatstone bridge – Measurement of Inductance: Maxwell's bridge – Measurement of Capacitance: Schering Bridge.	**2** **8** **8**

REFERENCEBOOKS:

1."B.L.Theraja,A.K.Theraja"" A Text book of ElectricalTechnology", S. Chand & co publisher, New Delhi 2005.

2.."R.K.Rajput"" Electronic MeasurementsandInstrumentation", S. Chand (Third Edition)-2008.

3. "Dr.M.Arumugam,N.Premkumaran"," ElectricCircuitTheory", KhannaPublishers, New Delhi ,5th edition 1979.

4. "A.K.Sawhney"" A Course in Electrical and Electronic Measurements and Instrumentation", Dhanpat raj & co-1993.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name :1040:Electronics and Communication Engineering

Subject Code : 4040330

Semester :IIISemester

Subject title : PROGRAMMING IN C

TEACHINGAND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /Week	Hours /Semester	Internal Assessment	Board Examination	Total	
Programming in C	**5**	**80**	**25**	**100***	**100**	**3 Hrs**

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

TOPICS&ALLOCATIONOFHOURS

UnitNo.	Topics	No.ofHours
I	BASICS OF 'C'	14
II	COPERATORS ,DECISIONMAKING,BRANCHING AND LOOPING STATEMENTS	15
III	ARRAYS AND STRINGS	15
IV	STRUCTURE AND UNION	15
V	FUNCTIONS &FILES I/O	14
	Revision,Test&Model Exam	7
	TOTAL	**80**

RATIONALE:

'C' language is the most widely used computer language, which is being taught as a core course. C is the generalpurpose high level language. Due to the flexibility, it is suitable for different development environments. 'C' language has importance and popularity in recently developed and advanced softwareindustry. 'C' language can also be used for system level programming and it is still considered as first priorityprogramming language. This course covers the basic concepts of 'C'.

OBJECTIVES:

The course aims to provide exposure / train the students to do programming in C.
AttheendoftheCourse,thestudents will be able to

- Know the basics of C.
- Writealgorithm andflowchartforanyproblems.
- Know operators used in 'C' and Decision making statements.
- Define and understand aboutarraysandfunctions.
- Defineand understand aboutstructureandunion.
- Understand strings, string handling functions.
- Developprogramsusing C operators, decision making statements.
- Developprogramsusing arrays, function, and structure.

4040330PROGRAMMINGINC
DETAILEDSYLLABUS

Contents: Theory

UNIT	NAMEOF THE TOPICS	HOURS
I	**BASICS OF C:** **1.1 Introduction to C:** History of 'C' – Structure of C program – Steps for execution of C program – Functions performed by Compiler, Linker – Algorithm & flow chart – Low level and High level Programming language – C character set –Tokens –Constants – Key words – Variables – Data types – Declaration of Variables – Assigningvaluestovariables . **1.2 I/O statements:** Formatted input, Formatted output, Unformatted I/O statements.	**8** **6**
II	**C OPERATORS , DECISIONMAKING,BRANCHING AND LOOPING STATEMENTS:** **2.1 C operators:** Arithmetic, Logical, Assignment, Relational,Increment,Decrement,Conditional,Bitwise and Special operators –Precedence and Associativity – C expressions: Arithmeticexpressions, Evaluation ofexpressions. **2.2 Decisionmaking,branching and looping statements:** Simpleifstatement ,if- else,else-if ladderand nestedif-else statement – switchstatement – while, do-while statements – for loop, go to, break& continuestatement – Programtofindwhetherthegivennumberiseven or odd – ProgramtoperformtheArithmeticoperationsusingswitchstatement – Program to find sum of series using "while" loop .	**7** **8**
III	**ARRAYS AND STRINGS:** **3.1 Arrays:** Definition of array – Declaration andinitializationofOnedimensional,Two dimensional arrays – Accessing array elements –Program to find sum of the elements of array – Program for matrix addition. **3.2 STRINGS:** Declaration and initialization of string variables, String handling Functions: strlen (), strcpy() , strcat(), strcmp() – Program to sort the set of strings using string handling functions.	**8** **7**

IV	**STRUCTURE AND UNION** **4.1 Structure:** Definition of structure – Need of structure – Defining and initializing structure – Arrays of structures, Arrays within structures, structures within structures – Programtopreparethetotalmarksfor Nstudentsbyreadingthe Name,Reg. No,Marks1toMarks5usingarrayofstructure. **4.2 Union:** Declaring and Initializing unions – Program to declare, initialize an UNION – Advantages of unions – DifferencebetweenUnionandstructure.	**8** **7**
V	**FUNCTION AND C FILES I/O:** **5.1 Function:** Types – Inbuilt functions – User defined functions – Function definition – Function call: call by value – Program to find factorial of given N numbers using function– Program to count the number of digits in a number using function. **5.2 C Files I**/O: Opening, Reading, Writing and closing a file – Program using file.	**7** **7**

REFERNCE BOOKS:

1. “Prof. E. BALAGURUSAMY” “Programming in ANSI C”,TATA Mc Graw HILL publications - 2008.

2. “YashavantKanetkar”” LetusC”, BPBPublications - 2002.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040340

Semester : III

Subject title : ELECTRONIC DEVICES ANDCIRCUITS PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION:

No.ofweeks/ 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:

EveryElectronicsEngineershouldhavesoundknowledgeaboutthecomponentsused in Electronics Industry.This is vitalin R&DDepartment for chip level troubleshooting. To meet theindustrialneeds,diplomaholders mustbetaughtaboutthemostfundamentalsubject, ElectronicdevicesandCircuits Practical.Bydoing practical experience in this,theywillbeskilledinhandlingall types ofelectronic circuits and ableto applythe skill in electronic systems.

OBJECTIVES:

On completion ofthefollowing 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 AstableMultivibrator

4040340 ELECTRONIC DEVICES AND CIRCUITS PRACTICAL

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 AstableMultivibrator
12. Construct a circuit totest the negative resistance Characteristics of UJT.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM	:	25
CONNECTION	:	25
EXECUTION & HANDLING OF EQUIPMENT	:	25
OUTPUT / RESULT	:	15
VIVA – VOCE	:	10
TOTAL	:	100

MODEL QUESTION PAPER
4040340ELECTRONICDEVICES&CIRCUITSPRACTICAL

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 Bistable Multivibrator .
12. Construct a circuit to generate Sawtooth waveform using UJT Relaxation oscillator and test its performance.

LIST OF EQUIPMENTS

S.NO	Name oftheEquipments	Range	RequiredNos.
1.	DCRegulated powersupply	0-30V,1A	10
2.	High VoltagePowerSupply	0-250V,1A	2
3.	SignalGenerator	1MHz	4
4.	DualtraceCRO	20MHz/ 30MHz	5
5.	DigitalMultimeter	-	10
6.	DCVoltmeter(Analog/Digital)	DifferentRanges	15
7.	DCAmmeter(Analog/Digital)	DifferentRanges	15

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040350

Semester : III

Subject title : ELECTRICAL CIRCUITS AND INSTRUMENTATION PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION

No.ofweeks/ Semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
Electrical Circuits and Instrumentation Practical	**4**	**64**	**25**	**100***	**100**	**3 Hours**

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

RATIONALE:

This subject enables the students with concepts of DC circuits & network theorems, AC circuits. The subject also deals with principles and working of different Measuringinstruments and Electrical Machines.Theintroductionofthissubjectimpart the knowledge forstudents to analyze the electrical circuits.

OBJECTIVES:

Oncompletionof all theexperiments,thestudentsmustbeable to

- Verify Ohm'slaw.
- Verify Kirchoff'slaws
- Verify network theorems.
- Test the performance of electric circuit.
- Determine the characteristics of measuring instruments.
- Use CRO.

4040350 ELECTRICAL CIRCUITS AND INSTRUMENTATION PRACTICAL

DETAILED SYLLABUS

Contents: Practical

Exercises

Note: Atleast 9experiments should be constructed using breadboard

1. Constructa circuitto verifyOhm's law.
2. Constructa circuitto verifyKirchoff's voltage andcurrentlaw.
3. Constructacircuit toverifySuperposition theorem.
4. Constructa circuitto verifyThevenin's Theorem.
5. ConstructacircuittoverifyMaximumpowertransferTheorem.
6. Construct and test the performance of series resonant circuit.
7. Calibratethegivenammeterandvoltmeter.
8. ConstructandtesttheperformanceofWheatstonebridge.
9. Measuretheamplitude andfrequencyofsignalsusing CRO.
10. TesttheperformanceofLVDT.
11. Measurestrainusingstraingauge.
12. Determinethecharacteristicsofathermistor.

BOARD EXAMINATION

DETAILED ALLOCATIONOFMARKS

CIRCUITDIAGRAM	:	30
CONNECTION	:	30
EXECUTION&HANDLINGOFEQUIPMENT:		25
OUTPUT/RESULT	:	10
VIVA–VOCE	:	05
TOTAL	**:**	**100**

MODEL QUESTION PAPER

4040350 ELECTRICAL CIRCUITS AND INSTRUMENTATION PRACTICAL

1.Constructa circuitto verifyOhm's law.

2.Constructa circuitto verifyKirchoff's voltage andcurrentlaw.

3.Constructacircuit toverifySuperposition theorem.

4.Constructa circuitto verifyThevenin's Theorem.

5.ConstructacircuittoverifyMaximumpowertransferTheorem.

6.Construct and test the performance of series resonant circuit.

7.Calibratethegivenammeterandvoltmeter.

8.ConstructandtesttheperformanceofWheatstonebridge.

9.Measuretheamplitude andfrequencyofsignalsusing CRO.

10.TesttheperformanceofLVDT.

11.Measurestrainusingstraingauge.

12.Determinethecharacteristicsofathermistor.

LIST OF EQUIPMENTS

S No	Name of the Equipments	Range	Required No's
1.	DCregulatedpowersupply	(0-30V),1A	8
2.	Signalgenerators	1MHZs	3
3.	CRO	20MHZ	4
4.	DCVoltmeter	(0-15V)	8
5.	DCAmmeter	(0-300µA)	6
6.	DCAmmeter	(0-100mA)	8
7.	Multimeter	-	4
8.	Galvanometer	-	1
9.	DecadeResistanceBox	-	1

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040360

Semester : III

Subject title : PROGRAMMING IN C PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION

No.ofweeks/ Semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
Programming in C Practical	**4**	**64**	**25**	**100***	**100**	**3 Hours**

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

RATIONALE: To Provide the platform for software

OBJECTIVES:

At the end of the Course, the students will be able to

- Thinkthelogictosolvethegivenproblem.
- Know the concepts of constants, variables, data types and operators
- Developprograms to evaluate expression by knowing ‘c’ precedence rule.
- Write programs using different decision making, looping statements.
- Writeprogramsusingarrays, function and structure.

4040360PROGRAMMINGINCPRACTICAL

DETAILED SYLLABUS

Contents:Practical

Exercises

1. Write Cprogramtocalculate simple interest and compound interest.
2. WriteCprogramtofindthesolutionofaquadraticequation.
3. WriteCprogramtofindwhetherthegivennumberiseven or odd.
4. WriteCprogramtofindthesumof seriesusing 'While'loop.
5. WriteCprogramtoperformtheArithmeticoperationbasedonthenumerickeypressusingswitchcasestatement.(1-Addition,2-Subtraction,3–multiplication,4 -Division).
6. Write C program to find the biggest number among three numbers.
7. WriteCprogramto print Fibonacci series.
8. WriteCprogramtofindfactorialofgivenNnumbersusingfunction.
9. WriteCprogramtopreparethetotalmarksforNstudentsbyreadingtheName,Reg.No,Marks 1toMarks6usingarrayofstructure.
10. WriteCprogramtoswapthevaluesoftwovariables.
11. WriteCprogramtocalculate the sum and average of given three numbers using function.
12. Write C program to sort the names in alphabetical order.
13. WriteCprogramtocount the number of digits in a given integer and print the reverse number.
14. WriteCprogramfor matrix addition.
15. WriteCprogram to print multiplication table.

BOARD EXAMINATION

DETAILED ALLOCATIONOFMARKS

No.	Allocation	Marks
1	Algorithm/Flowchart	30
2	Program	30
3	Executingprogram	25
3	Result	10
4	VivaVoce	05
Total		100

MODEL QUESTION PAPER

4040360 PROGRAMMINGINCPRACTICAL

1. Write Cprogramtocalculate simple interest and compound interest.
2. WriteCprogramtofindthesolutionofaquadraticequation.
3. WriteCprogramtofindwhetherthegivennumberiseven or odd.
4. WriteCprogramtofindthesumof seriesusing 'While'loop.
5. WriteCprogramtoperform theArithmeticoperationbasedonthenumerickeypressusingswitchcasestatement.(1-Addition,2-Subtraction,3–multiplication,4-Division).
6. Write C program to find the biggest number among three numbers.
7. WriteCprogramto print Fibonacci series.
8. WriteCprogramtofindfactorialofgivenNnumbersusingfunction.
9. WriteCprogramtopreparethetotalmarksforNstudentsbyreadingtheName,Reg.No,Marks1toMarks6usingarrayofstructure.
10. WriteCprogramtoswapthevaluesoftwovariables.
11. WriteCprogramtocalculate the sum and average of given three numbers using function.
12. Write C program to sort the names in alphabetical order.
13. WriteCprogramtocount the number of digits in a given integer and print the reverse number.
14. WriteCprogramfor matrix addition.
15. WriteCprogram to print multiplication table.

LIST OF EQUIPMENTS

Hardware Requirement:

Desktop / Laptop Computers: 15 Nos

Laserprinter:1no

Softwarerequirement:

C-compilerandeditor

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040370

Semester : III

Subject title : SIMULATION PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION

No.ofweeks/ Semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
Simulation Practical	**4**	**64**	**25**	**100***	**100**	**3 Hours**

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

RATIONALE:

EveryElectronicEngineershouldhavesoundknowledgeaboutthecomponentsused in Electronic Industry.This is vitalin R&DDepartment for chip level troubleshooting. To meet theindustrialneeds,diplomaholdersmustbetaughtaboutthemostfundamentalsubject, ElectronicdevicesandCircuits Practical.Bydoing practical experience in this,theywillbeskilledinhandlingall types ofelectronic circuits and ableto applythe skill in electronic systems. While designing electronic circuits to test a particular application we have to experiment it in a trial and error manner. In this situation, simulating the circuit is very useful to find out the results and select the suitable circuit elements.

OBJECTIVES:

To study the Simulation Softwares (Multisim / PSpice) and using the simulation of the given Circuits to design and verify the various electronic circuits and can further design the PCBs in the Computer.

4040370 SIMULATION PRACTICAL

DETAILED SYLLABUS

Contents: Practical

Exercises

Note:

All experiments should be designed and verified through simulation tools like Multisim/PSpice/Lab View/TINA

1. Zener diode (Forward and Reverse bias characteristics)
2. Rectifier circuits (Half wave and Full wave Bridge Rectifiers with Capacitor filter)
3. Power supply with Zener diode as Regulator
4. Common Base transistor output characteristics
5. Common emitter amplifier (Implementation of Current Series negative feedback)
6. Emitter follower (Implementation of Voltage Series negative feedback)
7. RC Coupled amplifier (Implementation of the concept of multistage amplifier)
8. Clippers and Clampers
9. RC Phase shift oscillator (Medium frequency Sine wave generators)
10. Hartley oscillator (High frequency Sine wave generator)
11. Astable Multivibrator (Square or Rectangular wave generator)
12. Gate triggering of SCR with various gate currents.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CONNECTION	::	35
EXECUTION & HANDLING OF EQUIPMENT	:	40
OUTPUT / RESULT	:	15
VIVA – VOCE	:	10
TOTAL	:	100

MODEL QUESTION PAPER

4040370SIMULATIONPRACTICAL

Note:

All experiments should be designed and verified through simulation tools like Multisim/PSpice/Lab View/TINA

1. Zener diode Forward and Reverse bias characteristics
2. Rectifier circuits (Half wave and Full wave Bridge Rectifiers with Capacitor filter)
3. Power supply with Zener diode as Regulator
4. Common Base transistor output characteristics
5. Common emitter amplifier (Implementation of Current Series negative feedback)
6. Emitter follower (Implementation of Voltage Series negative feedback)
7. RC Coupled amplifier (Implementation of the concept of multistage amplifier)
8. Clippers and Clampers
9. RC Phase shift oscillator (Medium frequency Sine wave generators)
10. Hartley oscillator (High frequency Sine wave generator)
11. Astable Multivibrator (Square or Rectangular wave generator)
12. Gate triggering of SCR.

LIST OF EQUIPMENTS

S.NO	Name oftheEquipments	Range/Spec	RequiredNos.
1.	Simulation Tool	Multisim/PSpice	
2.	Desk top Computers		20 Nos.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name **:** 1040:Electronics and Communication Engineering

Course Code : 4040410

Semester **:** IV Semester

Subject Title **:** INDUSTRIAL ELECTRONICS

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	
INDUSTRIAL ELECTRONICS	**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	POWER DEVICES AND TRIGGER CIRCUITS	15
II	CONVERTERS AND CHOPPERS	15
III	INVERTERS & APPLICATIONS	14
IV	PROGRAMMABLE LOGIC CONTROLLER	14
V	BUILDING BLOCKS OF A ROBOT	15
	REVISION – TESTS – MODEL	7
Total		**80**

RATIONALE:

The rationale behind the modifying this subject is to give clear explanation of power devices and circuits that are widely used today in modern industry. It also gives exposure to PLCs & ROBOT's which can perform various control functions in industrial environments.

OBJECTIVES:

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

- Study working principle of MOSFET, IGBT
- Study the methods of triggering
- Learn about converters and its types.
- understand commutation concepts in SCR
- Learn about choppers.
- Study about inverters and types.
- Understand the concept of HVDC.
- Know about SMPS.
- Understand about UPS and its types.
- Learn about PLC.
- Discuss about ladder diagrams.
- To understand the basic concepts associated with the design, functioning, applications and social aspects of robots
- To study about the electrical drive systems and sensors used in robotics for various applications

4040410 INDUSTRIAL ELECTRONICS

DETAILED SYLLABUS

Contents:Theory

Unit	Name of the Topics	Hours
I	**POWER DEVICES AND TRIGGER CIRCUITS** **1.1 POWER DEVICES** Insulated gate bipolar transistor (IGBT), MOSFET and GTO - Symbol, principle of working, VI characteristics and applications. Comparison between power MOSFET, power transistor and power IGBT. **1.2 TRIGGER CIRCUITS** Triggering of SCR - Gate triggering – Types –Concepts of DC triggering, AC triggering, Pulse gate triggering – Pulse transformer in trigger circuit – Electrical isolation by opto isolator - Resistance capacitor firing circuit and waveform, Synchronized UJT triggering (ramp triggering) circuit and waveform.	**7** **8**
II	**CONVERTERS AND CHOPPERS (Qualitative treatment only)** **2.1 CONVERTERS**Converters – Definition – Single phase Half controlled bridge converter with R load and RL load - importance of flywheel diode – Single phase fully controlled bridge converter with resistive load – voltage and current waveforms – Single phase fully controlled bridge converter with RL load – voltage and current waveforms Commutation- Natural commutation – Forced commutation – Types **2.2 CHOPPERS** Chopper – Definition –principle of DC chopper operation – Typical chopper circuit (Jones chopper) – Applications of DC chopper – Principle of working of single phase AC chopper - Chopper using MOSFET.	**9** **6**
III	**INVERTERS & APPLICATIONS** **3.1 INVERTERS** inverter with resistive load – Single phase inverter with RL load – Methods to obtain sine wave output from an inverter- Output voltage control in inverters - McMurray inverter – advantages – Parallel **3.2 INVERTER APPLICATIONS** SMPS Types - Block diagram of SMPS – advantages and disadvantages. UPS-Type (ON Line, OFF Line), Comparison.- Battery Banks.	**8** **6**

IV	**PROGRAMMABLE LOGIC CONTROLLER** **4.1 BASICS OF PLC** Evolution – advantages over relay logic- Introduction to PLC – Relays- Block diagram of PLC - PLC Programming Languages - Arithmetic Functions (add, sub, mul, div, sqr) – Comparison of functions - Basics of Input and output module. **4.2 PLC FUNCTIONS** (digital input and output module) - Logic functions- AND logic, OR logic, NAND logic, EX-OR logic - symbols used in ladder logic diagram. Ladder programming – Ladder diagram for simple systems – Star delta starter, Conveyer control and Lift control. PLC interface with GSM	**7** **7**
V	**INTRODUCTION TO ROBOT** **5.1 BUILDING BLOCKS OF A ROBOT** Types of electric motors - DC, Servo, Stepper; specification, drives for motors - speed & direction control and circuitry, Selection criterion for actuators, direct drives, non-traditional actuators. **5.2 ROBOT SENSOR** Sensors for localization, navigation, obstacle avoidance and path planning in known and unknown environments – optical, inertial, thermal, chemical, biosensor, other common sensors; Case study on choice of sensors and actuators for maze solving robot and self-driving cars	**8** **7**

REFERENCE BOOKS:

1. Power Electronics by M.H.Rashid - PHI Publication-3 rd Edition-2005

2. Industrial Electronics and control by Biswanath Paul –PHI publications2 nd Edition -2010

3. Programmable Logic Controllers - “Frank D.Petruzela “PHI publications 4. Power Electronics by Dr.P.S.Bimbhra, Khanna publishers -2 nd Edition1998

4. Saeed. B. Niku, Introduction to Robotics, Analysis, system, Applications, Pearson educations, 2002

5. Roland Siegwart, Illah Reza Nourbakhsh, Introduction to Autonomous Mobile Robots, MIT Press, 2011.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name :1040:Electronics and Communication Engineering

Subject Code : 4040420

Semester : IV

Subject title : COMMUNICATION ENGINEERING

TEACHINGAND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination			
			Marks			
	Hours /Week	Hours /Semester	Internal Assessment	Board Examination	Total	Duration
Communication Engineering	**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	Networks, Filters, Antenna and Propagation	16
II	Amplitude Modulation	15
III	Frequency Modulation	15
IV	Pulse Modulation	13
V	Audio , Video Systems and Displays	14
	Tests and Model Exam	7
Total		**80**

RATIONALE:

Todaycommunication engineering has developedto a great extent that there isalways the need for studyofvarious communication concepts.Thissubject fulfills the need forstudents to have a thorough knowledge of Filters,varioustypes of Antennas, modulations, audio systems, video systems and displays

OBJECTIVES:

On completionofthefollowing units ofthe syllabus contents, the students must be able to

- Understand the concepts of networks
- Understand the applications of Filters
- Know the Electro Magnetic Frequency Spectrum
- Know the relationship between Wave length and Frequency
- Understand the principlesofworking ofantennas
- Understand the theoryofPropagation
- Understand the conceptof modulation
- StudyAmplitude Modulation Process
- Learn about different types ofAM Transmitters&receivers
- Studythe FrequencyModulation Process
- Learn about different types ofFM Transmitters &Receivers
- Understand the conceptPulse Modulation
- Learn about different type of Pulse Analog modulation Techniques
- Learn about different type of Pulse Digital modulation Techniques
- Learn Different typesofMicrophones
- Learn Different typesofLoudspeaker
- Understand the principlesofMonochrome &colourTV fundamentals
- Understand the concept of Colour transmission and reception in PAL COLOUR TV Receiver
- Understand the concept of various types of displays

4040420 COMMUNICATION ENGINEERING

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**NETWORKS, FILTERS, ANTENNA AND PROPAGATION**.	
	1.1: SYMMETRIACAL AND ASYMMETRICAL NETWORKS	**3**
	Definition – Comparison – Characteristic impedance and Propagation constant	
	1.2: FILTERS	**3**
	Definition,Types–circuitelements andcut-offfrequencies of Constant K-LPF,HPFand BPF(Qualitative analysis only) -applications.	
	1.3: ELECTROMAGNETIC FREQUENCY SPECTRUM	**2**
	Electromagnetic Frequency Spectrum - Types of Electro Magnetic Radiation and their applications	
	1.4: RELATIONSHIP BETWEEN WAVELENGTH AND FREQUENCY	**1**
	1.5: ANTENNA	**3**
	Definition-types of antenna:Monopoleanddipole antenna, directionaland Omnidirectionalantenna,Dipolearrays-Yagi antenna, parabolic antenna-Antenna parameters:radiation pattern andpolarization-applications.	
	1.6: PROPAGATION	**4**
	Types of Propagation - Concept, Frequency Range, Advantages, Applications of Ground wave,SkywaveandSpacewave propagation – Factors affecting the field strength in Ground wave propagation – Effects of Atmosphere in Space wave propagation – Definition of the terms in Sky wave propagation: Critical Frequency, MUF(Maximum Usable Frequency and Skip distance)	
II	**AMPLITUDE MODULATION**	
	2.1: Introduction to Modulation	**3**
	Definition- Need for modulation - Types of modulation - Electromagnetic frequency spectrum - Relationship between Wavelength and Frequency.	
	2.2: Amplitude modulation (AM)	**4**
	Definition - Waveform representation of AM - Expression for AM and modulation index - Frequency spectrum of AM - AM sidebands: DSB, SSB and VSB.	
	2.3: AM Transmitter	**4**

	Types of transmitters: High level AM transmitter, Low level AM transmitter and SSB transmitter. **2.4: AM Receiver** Super Heterodyne receiver - Importance of IF in AM Receiver. Selection of IF (Intermediate Frequency)	**4**
III	**FREQUEENCY MODULATION** **3.1: Frequencymodulation** Definition-Waveform representation of Frequencymodulation, Expression forFrequencymodulation andmodulationindex. Frequency spectrum of FM – Effects of modulation index in frequency spectrum. **3.2: FMTransmitter** Types-DirectFMtransmitter–IndirectFMtransmitterandStereophonicFMtransmitter. **3.3: FMReceiver** Stereophonic FMreceiver-AFC - Comparison ofFMandAM.	**6** **5** **4**
IV	**PULSEMODULATION TECHNIQUES** **4.1: INTRODUCTION** Definition- Types of Pulse modulation- Sampling and Quantization- Sampling theorem- Nyquist sampling rate **4.2:PULSE ANALOG MODULATION TECHNIQUES** GenerationanddetectionofPAM,PWM,PPM **4.3: PULSE DIGITAL MODULATION TECHNIQUES** PCM&DPCM- Delta modulation-Adaptive Delta modulation	**4** **5** **4**
V	**AUDIO AND VIDEO SYSTEMS** **5.1: Microphones** Definition-Construction andperformance ofthe followingmicrophones: Carbon,MovingcoilandVelocityribbon. **5.2: Loudspeakers** Construction and workingof dynamic cone type -Surround-soundsystems. **5.3: MonochromeTelevision** Scanning principles-synchronization -aspect ratio-Composite Video Signal - TV broadcastingstandards.	**3** **3** **3** **3**

	5.4: ColorTV Principlesofcolortransmissionandreception-Block diagram and working of PAL Colour TV Receiver **5.5: DISPLAYS** Construction and working principle of LED ,OLED and Plasma display	**2**

REFERENCE BOOKS:

1. Networkslines and fields – John D.Ryder, PHI
2. Electronic communication Systems– Kennedy–TMH
3. Electronic Communication– Dennis RoddyandJohn colen– PHI
4. Fundamentals ofAcoustics–Kingsler&frey–WileyEastern ltd.
5. TV and Video engineering– Arvind M.Dhake – TMH.
6. CommunicationElectronics–Principlesandapplication–LouisEFrenzel, Third Edition, Tata McGrawhillpublication
7. AudioandVideosystem–Principles,maintenanceandTroubleshooting byR.Gupta Second Edition McGrawHill Education(P) Ltd.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name :1040:Electronics and Communication Engineering

Subject Code : 4040430

Semester :IV

Subject title : ANALOG AND DIGITAL ELECTRONICS

TEACHINGAND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Analog and Digital Electronics	**4**	**64**	**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	Linear ICs and OP-amps	10
II	A/D, D/A,Special Function ICs and IC Voltage Regulators	13
III	Boolean Algebra and Arithmetic operations	10
IV	Combinational and Sequential Logic Circuits	12
V	Memories	12
	Tests and Model Exam	7
Total		**64**

RATIONALE:

The subject Analog and Digital Electronics holds applications in all branches of engineering instrumentation and Industrial Automation.Thiswillimpartindepth knowledgeofNumber Systems , Logics of Combinational &Sequential circuits and memories.

OBJECTIVES:

On completionofthefollowing units ofthe syllabus contents, the students must be able to

- Understand the basicsofoperational amplifier.
- Know the op-amp applications.
- Know the waveform generator and Active filter.
- Know the concept of D/A and A/D converters
- Know the applications of Special function IC, IC 555 Timer.
- Understand various Number Systems used in Digital Circuits
- Understand basic Boolean postulates and laws.
- Understand the De-Morgan's theorem.
- Understand the concept ofKarnaugh Map.
- Learn about Basic logic Gates.
- Studyabout Boolean techniques.
- Learn the different digital logic families
- Learn arithmetic circuits- Adder/Subtractor
- Understand the encoder/decoder & MUX / DEMUX
- Understand the concept ofparityGeneratorand checker
- Understand various types of flip-flops.
- Understand various types ofcounters
- Understand various modes ofshift registers
- Understand various types of memories

4040430 ANALOG AND DIGITAL ELECTRONICS

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**LINEAR ICS AND OP-AMPS** **1.1: OPERATIONAL AMPLIFIER** Ideal Op-Amp – Block diagram and Characteristics – Op-amp parameters CMRR – Slew rate – Concept of Virtual ground **1.2: APPLICATIONS OF OP-AMP** Inverting amplifier –Summing amplifier – Non inverting amplifier – Voltage follower - Comparator – Zero crossing detector – Integrator – Differentiator- waveform generation (SchmittTrigger only)–RC Low pass Active filter. **1.3: OP-AMP SPECIFICATIONS** OP-amp 741 – Symbol – Pin diagram – Specifications	**4** **4** **2**
II	**A/D, D/A ,SPECIAL FUNCTION ICs AND IC VOLTAGE REGULATORS** **2.1: SAMPLING AND QUANTIZATION** **2.2: A/D CONVERTER** Analog to digitalconversion using Ramp method – Successive approximation method – Dual slopemethod – Specifications of A/D converter **2.3: D/A CONVERTER** Basic concepts – Weighted Resistor D/A converter – R-2R Ladder D/Aconverter – Specifications of DAC IC **2.4:SPECIAL FUNCTION ICs** 2.4.1:IC555 Timer – Pin diagram - Functional Block diagram of IC 555 in Astable and MonostableMultivibrator mode - Schmitt trigger using IC 555 2.4.2:IC 565-PLL-Pin diagram-Functional Block diagram of IC 565 2.4.3:IC 566-VCO-Pin diagram-Functional Block diagram of IC 566 **2.5.: IC VOLTAGE REGULATORS** Positive IC Voltage Regulators: 78XX - Negative IC Voltage Regulators: 79XX and General purpose IC Voltage Regulatorsusing LM 723.	**2** **3** **2** **3** 3

III	**BOOLEAN ALGEBRA AND ARITHMETIC OPERATIONS** **3.1: NUMBER SYSTEMS** Decimal – Binary – Octal – Hexadecimal – BCD – Conversion from one number system to other – Boolean Algebra – Basic laws and Demorgan's Theorems **3.2: UNIVERSAL GATES** Realization of basic logic gates using universal gates NAND and NOR -Tristate Buffer circuit **3.3: PROBLEMS USING 2, 3, AND 4 VARIABLES** Boolean expression for outputs – Simplification of Boolean expression using Karnaugh map (up to 4 variable)- Constructing logic circuits for the Boolean expressions **3.4:ARITHMETIC OPERATIONS** Binary Addition-Binary Subtraction-1's compliment and 2's compliment-Signed binary numbers **3.5: ARITHMETIC CIRCUITS** Half Adder-Full Adder-Half Subtractor-Full Subtractor	**2** **2** **2** **2** **2**
IV	**COMBINATIONAL ANDSEQUENTIALLOGIC CIRCUITS** **4.1: PARITY GENERATOR AND CHECKER** **4.2: DECIMAL to BCD ENCODER** **4.3: 3 to 8 DECODER** **4.4: MULTIPLEXER:** 4 to 1 Multiplexer **4.5: DEMULTIPLEXER** :1 to 4 Demultiplexer **4.6: FLIP-FLOPS (FF)** RS FF– JK FF: Master Slave FF and Edge triggered FF – D and T FF **4.7: COUNTERS** 4 bit Asynchronous Up Counter –Mod N counter – Decade counter – 4 bit Synchronous up counter **4.8:SHIFT REGISTER** 4 bit shift register – Serial in Serial out	**1** **1** **1** **1** **1** **2** **3** **2**

V	**MEMORIES** **5.1:CLASSIFICATION OF MEMORIES** **5.2:RAM** RAMorganization-AddressLines and MemorySize- Read/writeoperations-Static RAM-BipolarRAMcell- Dynamic RAM- SD RAM- DDR RAM. **5.3:ROM** ROM organization-Expanding memory- PROM- EPROM- and EEPROM- Flash memory- Anti Fuse Technologies.	**6** **6**

Reference books:

1. Albert Paul Malvino and Donold P. Leach – Digital Principles and Applications
2. Roger L. Tokheim Macmillan – Digital Electronics – McGraw – Hill –1994.
3. William H.Goth Mann – Digital Electronics – An introduction to theoryand practice – PHI 1998.
4. Linear integrated circuits byB.Suseela&T.R.Ganeshbabu -Scitech publications-2018
5. Integrated circuits by K.R.Botkar-Khanna publisher's-1996.
6. D.Roychoudhury&shail. B.Jain- Linear Integrated Circuits -New age International publishers - II Edition -2004.
7. R.P.Jain – Modern Digital Electronics – TMH 2003.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name **:** 1040:Electronics and Communication Engineering

Course Code : 4040440

Semester **:** IV Semester

Subject Title **:** INDUSTRIAL ELECTRONICS PRACTICAL

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	
INDUSTRIAL ELECTRONICS PRACTICAL	**5**	**80**	**25**	**100***	**100**	**3 Hrs.**

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

RATIONALE:

The rationale behind the modifying this subject is to give clear explanation of power devices and circuits that are widely used today in modern industry. It also gives exposure to PLCs &Inverters which can perform various control functions in industrial environments.

OBJECTIVES:

- All the experiments given in the list of experiments should be completed and given for the endSemester practical examination.
- In order to develop best skills in handling Instruments/Equipment and taking readings in the practicalclasses, every three students should be provided with a separate experimental setup for doingexperiments in the laboratory.
- The external examiners are requested to ensure that a single experimental question should not begiven to more than three students while admitting a batch of 30 students during Board Examinations.

4040440 INDUSTRIAL ELECTRONICS PRACTICAL

DETAILED SYLLABUS

Contents:Practical

Exercises

1. Phase control characteristics of SCR and testing a commutation circuit.
2. Construct a Lamp dimmer using TRIAC (in Bread Board Only)
3. Construct and test a MOSFET based PWM chopper circuit
4. Construct and test an IC based buck converter using PWM
5. Write and implement a simple ladder logic program using digital inputs and outputs for PLC
6. Write and implement a simple ladder logic program for interfacing a lift control with PLC.
7. Write and implement a simple ladder logic program for interfacing a conveyer control with PLC.
8. Write and implement a simple ladder logic program using timer and counter with branching and subroutines with PLC.
9. Construct and draw the VI characteristics of IGBT.
10. Construct and draw the VI characteristics of Power MOSFET.
11. Construct and draw single phase half controlled bridge converter with resistive load.
12. Construct and designa fan regulator using TRIAC and DIAC.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM	: 25
CONNECTION	: 25
EXECUTION & HANDLING OF EQUIPMENT	: 25
OUTPUT / RESULT	: 15
VIVA – VOCE	:10

TOTAL : 100

MODEL QUESTION PAPER

4040440 INDUSTRIAL ELECTRONICS PRACTICAL

1 Phase control characteristics of SCR and testing a commutation circuit.

2. Construct a Lamp dimmer using TRIAC (in Bread Board Only)

3. Construct and test a MOSFET based PWM chopper circuit

4. Construct and test an IC based buck converter using PWM

5. Write and implement a simple ladder logic program using digital inputs and outputs for PLC

6. Write and implement a simple ladder logic program for interfacing a lift control with PLC.

7. Write and implement a simple ladder logic program for interfacing a conveyer control with PLC

8. Write and implement a simple ladder logic program using timer and counter with branching and subroutines with PLC..

9. Construct and draw the VI characteristics of IGBT.

10. Construct and draw the VI characteristics of Power MOSFET.

11. Construct and draw single phase half controlled bridge converter with resistive load.

12. Construct and designafan regulator using TRIAC and DIAC.

LIST OF EQUIPMENTS

S.NO	Name of the Equipment	Range	Required Nos
1	Regulated Power supply	0-30v	5
2	Dual trace CRO	-	2
3	Signal generator	-	2
4	PAM kit	-	1
5	Pcm kit	-	1
6	PLC’s	-	5
7	Computers	-	5
8	Software For PLC	-	-
9	Multimeter		10

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040 :Electronics and Communication Engineering

Subject code : 4040450

Semester : IV

Subject title : COMMUNICATION ENGINEERING PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION

No. of weeks/ Semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
Communication Engineering Practical	**4**	**64**	**25**	**100***	**100**	**3 Hours**

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

RATIONALE:

EveryElectronicsEngineershouldhavesoundknowledgeaboutthecomponentsused in Electronics Industry.This is vitalin R&DDepartment for chip level troubleshooting. To meet the telecommunication industrialneeds,diplomaholders mustbetaughtaboutthefundamentalsubject, Communication Engineering Practical.Bydoing practical experience in this,theywillbeskilledinhandlingall types of Communication circuits and ableto applythe skill in trouble shooting of Audio and Video Systems and all electronic systems in various applications.

OBJECTIVES:

On completion of thefollowing experiments, the students must be able to understand the concept, working principle and applications of all Analog and Digital modulation techniques and all types of transmitters.

4040450 COMMUNICATION ENGINEERING PRACTICAL

DETAILED SYLLABUS

Contents: Practical

Exercises

Note: At least 5experimentsshould be constructed using breadboard /soldering

1. Construct and test the performance of symmetrical T and π attenuators
2. Construct and test the performance of passive Low pass and High pass filters.Find out the cut-off frequency from the frequency response characteristics
3. Construct and test the performance of Band pass filter.Find out the cut-off frequencies and find the Bandwidth from the frequency response characteristics
4. Construct and test the performance of series and shunt equalizers.
5. Construct and test the performance of Amplitude modulator
6. Construct and test the performance of AM linear diode detector.
7. Construct and test the performance of Pulse Width Modulator (PWM)
8. Construct and test the performance of Pulse Position Modulator(PPM)
9. Determine the directional characteristics of Moving Coil Microphone.
10. Determine the directional characteristics of Dynamic cone Loudspeaker
11. Determine the frequency response characteristics of Two way cross over network
12. Design the PCB of AM modulator using simulation tools like Multsim/OrCAD

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM	:	25
CONNECTION	:	25
EXECUTION & HANDLING OF EQUIPMENT	:	25
OUTPUT / RESULT	:	15
VIVA – VOCE	:	10
TOTAL	:	100

MODEL QUESTION PAPER

4040450COMMUNICATION ENGINEERING PRACTICAL

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

1. Construct and test the performance of symmetrical T and π attenuators
2. Construct and test the performance of passive Low pass and High pass filters. Find out the cut-off frequency from the frequency response characteristics
3. Construct and test the performance of Band pass filter.Find out the cut-off frequencies and find the Bandwidth from the frequency response characteristics
4. Construct and test the performance of series and shunt equalizers.
5. Construct and test the performance of Amplitude modulator
6. Construct and test the performance of AM linear diode detector.
7. Construct and test the performance of Pulse Width Modulator (PWM)
8. Construct and test the performance of Pulse Position Modulator(PPM)
9. Determine the directional characteristics of Moving Coil Microphone.
10. Determine the directional characteristics of Dynamic cone Loudspeaker
11. Determine the frequency response characteristics of Two way cross over network
12. Design the PCB of AM modulator simulation tools like Multsim /OrCAD

LIST OF EQUIPMENTS

S.NO	Name of the Equipment	Range	Required No.
1.	Regulated Power Supply	0 – 30V	10
2.	Dual trace CRO	60 MHz	5
3.	Signal Generator	-	10
4.	Desk Top Computer	-	2
5.	Decade Resistance Box	0 - 100KOhm	5
6.	Decade Capacitance Box	0 - 100uF	5
7.	Decade Inductance Box	0 - 10H	5
8.	Dynamic cone Loud speaker	-	2
9.	Moving coil Microphone	-	1
10.	Velocity Ribbon Micro phone	-	1
11.	Software Tool	Multisim/OrCAD	

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040460

Semester : IV

Subject title : ANALOG AND DIGITAL ELECTRONICS PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION

No.ofweeks/ Semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
Analog and Digital Electronics Practical	**5**	**80**	**25**	**100***	**100**	**3 Hours**

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

RATIONALE:

EveryElectronic Engineershouldhavesoundknowledgeaboutthe ICs used in Electronics Industry.This is vitalin R&DDepartment for Chip level troubleshooting. To meet theindustrialneeds,diplomaholders mustbetaughtaboutthemostfundamentalsubject, Analog and Digital Electronics Practical.Bydoing practical experience in this,theywillbeskilledinhandlingall types of ICs and ableto applythe skill in electronic system design and the designing of PCBs.

OBJECTIVES:

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

- Know the Verification of truth table of OR, AND, NOT, NOR, NAND, EX-OR gates
- Know the Realization of basic gates using NAND & NOR gates.

- Know the verification of Half Adder and Full Adder using IC's.
- Know the verification of Half Subtractor andFull Subtractor using IC's.
- Know theVerification of Truth Table for Decoder/Encoder.
- Know the Verification of truth table for RS, D, T & JK flip-flop.
- Test Inverting Amplifier and Non inverting amplifier using Op-amp
- Test Summing Amplifier, Difference Amplifier and Voltage Comparator using Op-amp.
- Test Integrator and Differentiator.
- Test Astablemultivibrator using IC 555
- Design IC Voltage RegulatorPower Supplies using IC 7805, IC 7912
- Design the PCB of4- bit ripple counter using FF

4040460 ANALOG AND DIGITAL ELECTRONICS PRACTICAL

DETAILED SYLLABUS

Contents: Practical

Exercises

Note: At least 6 experiments should be constructed using breadboard

1. Realization of basic gates using NAND & NOR gates.
2. Realization of logic circuit for De-Morgans Theorems
3. Test the performance of Half Adder and Full Adder.
4. Test the performance of Half Subtractor andFull Subtractor.
5. Test the performance of Decoder/Encoder.
6. Test the performance of RS, D, T & JK flip-flops.
7. Test the performance of Parity generator and checker using parity checker/ generator IC's.
8. Test the performance of Multiplexer/De-multiplexer using IC 4051
9. Test the performance of Inverting Amplifier and Non inverting amplifier using Op-amp IC 741.
10. Test the performance of Summing Amplifier, Difference Amplifier.
11. Test the performance ofZero Crossing Detector and VoltageComparator using Op-amp IC 741.
12. Test the performance of Integrator and Differentiator using Op-amp IC 741.
13. Test the performance ofAstablemultivibrator using IC 555.
14. Test the performance of IC Voltage Regulator Power Supplies using IC 7805, IC 7912.

15. Design the PCB of4- bit ripple counter using FF using Software tool Multisim/OrCAD etc

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM	:	25
CONNECTION	:	30
EXECUTION & HANDLING OF EQUIPMENT	:	20
OUTPUT / RESULT	:	15
VIVA – VOCE	:	10
TOTAL	:	100

MODEL QUESTION PAPER
4040460 ANALOG AND DIGITAL ELECTRONICSPRACTICAL

Note: At least 6 experiments should be done using Bread board

1.Realization of basic gates using NAND & NOR gates.

2.Realization of logic circuit for De-Morgans Theorems.

3.Test the performance of Half Adder and Full Adder.

4.Test the performance of Half Subtractor andFull Subtractor..

5.Test the performance of Decoder/Encoder.

6.Test the performance of RS, D, T & JK flip-flops.

7.Test the performance of Parity generator and checker using parity checker/ generator IC's.

8.Test the performance of Multiplexer/De-multiplexer using IC 4051.

9.Test the performance of Inverting Amplifier and Non inverting amplifier using Op-amp IC 741.

10.Test the performance of Summing Amplifier, Difference Amplifier.

11.Test the performance ofZero Crossing Detector and VoltageComparator using Op-amp IC 741.

12.Test the performance of Integrator and Differentiator using Op-amp IC 741.

13.Test the performance ofAstablemultivibrator using IC 555.

14.Test the performance of IC Voltage Regulator Power Supplies using IC 7805, IC 7912.

15.Design the PCB of4- bit ripple counter using FF using Software tool Multisim/OrCAD etc.

LIST OF EQUIPMENTS

S NO	Name ofthe Equipments	Range	Required Nos
1	DCRegulated powersupply	0-30V,1A	5
2	IC VoltagePowerSupply	0-5V,1A 15-0-15V, 1A	5 5
3	SignalGenerator	1MHz	4
4	DualtraceCRO	20MHz/ 30MHz	5
5	DigitalTrainer	-	10
6	DC Voltmeter(Analog/Digital)	DifferentRanges	5
7	DCAmmeter(Analog/Digital)	DifferentRange	5
8	DeskTop Computer	-	5
9	Simulation Tool	Multisim/OrCAD	1

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1020 : Mechanical Engineering

Subject Code : 4020620

Semester : VI

Subject Title : E Vehicle Technology & Policy

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
4020620 E Vehicle Technology & Policy	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
	4	64	25	100*	100	3 Hrs.

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

Topics and Allocation of Hours

Unit	Topics	Hours
I	Environmental impact and history & Electric vehicle Types	12
II	Electric vehicle & Drive System	12
III	Energy Storages, Charging System, Effects and Impacts	11
IV	Electric Mobility Policy Frame Work	11
V	Tamilnadu E-Vehicle Policy 2019	11
Test And Revision		7
Total		**64**

RATIONALE:

The world is transitioning to cleaner mobility options with the aim at improving air quality and reducing dependency on fossil fuels. Electric Vehicles (EVs) have emerged a popular clean mobility choice to reduce emissions. EVs are powered fully or partially by batteries, they can help to reduce dependence on fossil fuels also air quality. Tamil Nadu is one of the most advanced states in India. Tamil Nadu has a highly developed industrial eco-system and is very strong in sectors like automobiles and auto-components. Many globally renowned companies have setup their manufacturing facilities in Tamil Nadu. Due the rapid depletion of fossil fuel and increase in fuel cost, environmental pollution, the shift to clean transport is necessary. This subject introduced by keeping all the above factors.

OBJECTIVES:

- To learn the environmental impact and history of Electric Vehicles.
- To understand the concept of Electric Vehicle and its types.
- To study the configurations of Electric Vehicles
- To acquire knowledge about Energy Storages, Charging System, Effects and Impacts
- To appreciate the Electric Mobility Policy Frame work India and EV Policy Tamil Nadu 2019.

4020620 E Vehicle Technology & Policy

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**Environmental impact and history:** Environmental impact of conventional vehicle **-** Air pollution – Petroleum resources – History of Electric vehicles & Hybrid Electric Vehicles - Conventional drive train system – Rear Wheel, Front Wheel and All wheel - Parts of Drive train system **Electric vehicle Types:** Introduction to Battery Electric Vehicle (BEV) – Definition BEV – Necessity BEV – Different between BEV and Conventional Vehicle - Advantages of BEV - Block diagram of BEV – Hybrid electric Vehicle (HEV) - Plug-in Hybrid Electric Vehicle (PHEV) – Fuel Cell Electric Vehicle (FCEV) – Description.	12
II	**Electric Vehicles:** Configurations of Electric Vehicle – Performance of Electric Vehicles – Tractive Effort in Normal Driving – energy consumption. Hybrid Electric Vehicles: Concept of Hybrid electric drive trains – Architecture of Hybrid Electric Drive trains – Series, Parallel and Series & Parallel **Electric Propulsion Systems:** Types of EV motors - DC motor drives– Permanent Magnetic Brush Less DC Motor Drives (BLDC) – Principles, Construction and Working – Hub motor Drive system – Merits and Demerits of DC motor drive, BLDC motor drive	12
III	**Energy Storages:** Electrochemical Batteries – Battery Technologies – Construction and working of Lead Acid Batteries, Nickel Based Batteries and Lithium Based Batteries Role of Battery Management System (BMS)– Battery pack development Technology– Cell Series and Parallel connection to develop battery pack. **Charging:**	11

	Battery Charging techniques - Constant current and Constant voltage, Trickle charging – Battery Swapping Techniques – DC charging – Wireless charging **–** Maintenance of Battery pack – Latest development in battery chemistry. **Effects and Impacts:** Effects of EV – Impacts on Power grid – Impacts on Environment – Impacts on Economy.	
IV	**Electric Mobility Policy Frame Work** Government of India Electric Mobility Policy Frame work – Global Scenario of EV adoption – Electric mobility in India – National Electric Mobility Mission Plan 2020 – Action led by Original Equipment Manufacturers – Need of EV Policy – Advantage of EV Eco system – Scope and Applicability of EV Policy – ARAI Standards for Electric Vehicle – AIS 038, AIS 039 &AIS 123 - Key Performance Indicator - Global impact – Trends and Future Developments	11
V	**Tamil Nadu E-Vehicle Policy 2019** Tamil Nadu E-vehicle Policy 2019: Vehicle Population in Tamil Nadu – Objectives of EV Policy – Policy Measures – Demand side incentives – Supply side incentives to promote EV manufacturing – Revision of Transport Regulation of EV – City building codes – Capacity Building and Skilling – Charging structure – implementing agencies – R&D and Business Incubation – Recycling Ecosystem – Battery and EVs	11

Reference Books

1. Modern Electric, Hybrid Electric and Fuel Cell Vehicles, Mehrdad Ehsani, Yimin Gao, Sebastien E.Gay, Ali Emadi, CR Press, London, New York.
2. Comparison of Electric and Conventional Vehicles in Indian Market: Total Cost of Ownership, Consumer Preference and Best Segment for Electric Vehicle (IJSR), Akshat Bansal, Akriti Agarwal
3. A Comprehensive Study of Key Electric Vehicle (EV) Components, Technologies, Challenges, Impacts, and Future Direction of Development (MDPI), Fuad Un-Noor, SanjeevikumarPadmanaban, Lucian Mihet-Popa, Mohammad NurunnabiMollah and Eklas Hossain.
4. Electric Vehicles: A future Projection CII October 2020 report.
5. Design and analysis of aluminum/air battery system for electric vehicles, Shaohua Yang, Harold Knickle, Elsevier.

6. Propelling Electric Vehicles in India, Technical study of Electric Vehicles and Charging Infrastructure
7. ZERO EMISSION VEHICLES (ZEVs): TOWARDS A POLICY FRAMEWORK – NTI Aayog.
8. FASTER ADOPTION OF ELECTRIC VEHICLES IN INDIA: PERSPECTIVE OF CONSUMERS AND INDUSTRY, The Energy and Resources Institute, New Delhi.
9. India EV Story: Emerging Opportunities by Innovation Norway.
10. Automotive Industry Standards – AIS 038, AIS 039 & AIS 123 – Manual

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name :1040: Electronics and Communication Engineering

Subject Code :4040510

Semester :V

Subject title : ANALOG AND DIGITAL COMMUNICATION SYSTEMS

TEACHINGAND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Analog and Digital communication systems	**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

Units	TOPIC	Hrs
I	Radar, Navigational Aids, Telephony	14
II	Digital Communication	14
III	Optical Communication	15
IV	Satellite Communication	15
V	Mobile Communication	15
	Tests and Model Exam	7
Total		**80**

RATIONALE:

The subject Analog and Digital communication systems will enable the students to learn about the advancement in communication systems. it will give exposure to the various modes of communication viz Radar, Telephone, digital communication, digital codes, optical communication, satellite communication, microwave communication, mobile communication and satellite multiple access techniques.

OBJECTIVES:

On completionofthefollowing units ofthe syllabus contents, the students must be able

- To understand principles of Radar.
- To understand principles of navigational aids .
- To study Electronic Exchange .
- To study basic digital communication system and discuss the characteristics of data transmission circuits.
- To learn Error detection and correction codes and various digital modulation techniques
- To learn optical sources, optical detectors.
- To discuss the applications of fiber optic communication
- To Study satellite system, orbits, launching, Antennas
- To Study earth segment and space segment components
- To study about satellite services
- To study fundamental cellular concepts such as frequency reuse, handoff.
- To learn multiple access techniques.
- To learn digital cellular system-GSM

4040510 ANALOG AND DIGITAL COMMUNICATION SYSTEMS

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**ADAR AND NAVIGATIONAL AIDS:** **1.1 RADAR :** Basic Radar System– Applications – Radar Range Equation(Qualitative Treatment Only) – Factors Influencing Maximum Range – Basic Pulsed Radar System – Block Diagram – Display Methods- A - Scope, PPI Display - Instrument Landing System –Ground Controlled Approach System. **1.2 TELEPHONY :** Telephone System–Public Switched Telephone Network (PSTN) - Electronic Switching System – Block Diagram – ISDN –Architecture, Features - Video Phone – Block Diagram	7 7
II	**DIGITAL COMMUNICATION:** **2.1 BASICS OF DIGITAL COMMUNICATION SYSTEM:** Basic Elements Of Digital Communication System – Block Diagram- Characteristics Of Data Transmission Circuits -Bandwidth Requirement – Speed – Baud Rate – Noise -Crosstalk – Distortion. **2.2 DIGITAL CODES**: ASCII Code – EBCDIC Code – Error Detection Codes – Parity Check Codes – Redundant Codes – Error Correction Codes -Retransmission- Forward Error Correcting Code – Hamming Code – Digital Modulation Techniques – ASK, FSK, PSK, QPSK Modulation/Demodulation Techniques (Only Block Diagram And Operation)	5 8

III	**OPTICAL COMMUNICATION :** **3.1 BASICS OF OPTICAL COMMUNICATION AND LOSSES:** Optical Communication System – Block Diagram – Advantages Of Optical Fiber Communication Systems – Principles Of Light Transmission In A Fiber Using Ray Theory – Single Mode Fibers, Multimode Fibers – Step Index Fibers, Graded Index Fibers (Basic Concepts Only) – Attenuation In Optical Fibers -Absorption Losses, Scattering Losses, Bending Losses, Core And Cladding Losses **3.2 OPTICAL SOURCES AND APPLICATIONS:** Optical Sources – LED – Semiconductor LASER – Principles – Optical Detectors – PIN And APD Diodes - Optical Transmitter – Block Diagram – Optical Receiver – Block Diagram – Application Of Optical Fibers – Networking, Industry And Military Applications.	7 7
IV	**SATELLITE COMMUNICATION:** **4.1SATELLITE SYSTEM:** Kepler's I,II,II laws – orbits – launching orbits – types - Geostationary synchronous satellites - Advantages – Apogee – Perigee - Active and passive satellite - Earth eclipse of satellite **4.2ANTENNA:** Parabolic reflector antenna **4.3SPACE SEGMENT:** Space segment: Power supply- Attitude control- station keeping – Transponders – TT and C subsystem – Antenna subsystem. **4.4 EARTH SEGMENT:** Earth segment: Block diagram of Transmit receive earth station - Satellite mobile services - Basics of GPS. **4.4 MICROWAVE COMMUNICATION:** Microwave frequency ranges - microwave devices – Parametric amplifiers – Travelling wave tubes – simple block diagram of microwave transmitter, receiver	4 1 3 3 4

	and microwave link repeater	
V	**MOBILE COMMUNICATION AND MUTIPLE ACCESS TECHNIQUES:** **5.1MOBILE COMMUNICATION:** (Qualitative Treatment only) Cellular telephone– fundamental concepts – Simplified Cellular telephone system - frequency reuse – Interference – Co-channel Interference – Adjacent Channel Interference – Improving coverage and capacity in cellular systems – cell splitting – sectoring – Roaming and Handoff – Basics of blue tooth technology **5.2SATELLITE MULTIPLE ACCESS TECHNIQUES:** TDMA, FDMA, CDMA. Digital cellular system – Global system for mobile communications (GSM) –GSM services – GSM System Architecture – Basics of GPRS.	7 7

Reference Books:

1. Electronic communication systems - Kennedy - Davis - fourth Edition – Tata McGraw Hill - 1999.
2. Electronics communication - Dennis Roddy and John coolen – Third Edition - PHI – 1988
3. Optical fiber communication - Gerd Keiser - Third Edition - McGraw Hill – 2000
4. Satellite communication - Dr. D.C. Agarwal - Third Edition –Khannapublishers– 1995
5. Satellite communication - Dennis Roddy - Third Edition - McGraw Hill – 2001
6. Electronic communication systems-Fundamentals through Advanced –Wayne Tomasi-fifth Edition –pearson Education-2005

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 : 1040: Electronics and Communication Engineering

Subject Code : 4040520

Semester : V

Subject Title : Microcontroller and its applications

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	
Microcontroller and its Applications	**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	Architecture of 8051 Microcontroller	15
II	8051 Instruction set and Programming	16
III	Peripherals of 8051	15
IV	Interfacing techniques	16
V	Advanced Microcontrollers	11
Test & Model Exam		7
Total		**80**

RATIONALE:

The introduction of this subject will enable the students to learn about microcontroller 8051 architecture, Pin details, Instruction sets, Programming and interfacing. This subject enables the students to do the project effectively. It also helps the students to choose the field of interest. If the student is aiming for higher studies, this subject is foundation.

OBJECTIVES:

On completion of the syllabus, the students must be able to

-> Know the difference between microprocessor and microcontroller.

-> Understand the architecture of 8051.

-> Write programs using 8051 ALP.

-> Understand the programming of I/O ports, Timer, Interrupt and Serial Programming.

-> Use the interfacing techniques

-> Know the types of microcontrollers

-> Explain IoT.

.

4040520 MICROCONTROLLER AND ITS APPLICATIONS

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**Architecture Of 8051 Microcontroller** **1.1 : Architecture** Microprocessor-Microcontroller-Comparison of microprocessor and microcontroller-Architecture diagram of microcontroller 8051-Functions of each block-Pin details of 8051-ALU- ROM-RAM-Memory organization of 8051- Special function registers-Program counter-PSW register-Stack-I/O ports-Timer-Interrupt-serial port-External memory- Oscillator and Clock-Reset-Power on reset-Clock cycle-machine cycle-Instruction cycle-Overview of 8051 family.	15
II	**8051 Instruction set and programming** **2.1: Instruction Set Of 8051** Instruction set of 8051-Classification of 8051 instructions-data transfer instructions-Arithmeticinstructions-Logical instructions-Branching instructions-Bit manipulation instructions- Assembling and running an 8051 program-Structure of Assembly language-Assembler directives-Different Addressing modes of 8051-Time delay routines. **2.2: Assembly language programs** 16 bit addition and 16 bit subtraction-8 bit multiplication and 8 bit division-BCD to HEX code conversion-HEX to BCD code conversion.-Smallest number/ Biggest number.	8 8
III	**Peripherals of 8051** **3.1: I/O Ports** Bit addresses for I/O ports-I/O port programming-I/O bit manipulation programming. **3.2: Timer/Counter** SFRS for Timer- Modes of Timers/counters- Programming 8051 Timer(Simple programs). **3.3: Serial Communication** Basics of serial communication-SFRs for serial communication-RS232	 3 4 4

	standard-8051 connection to RS 232-8051 serial port programming.. **3.4: Interrupts** 8051 interrupts-SFRs for interrupt-Interrupt priority.	4
IV	**Interfacing Techniques** **4.1: IC 8255** IC 8255-Block diagram-Modes of 8255-8051 interfacing with 8255 **4.2: Interfacing** Interfacing external memory to 8051-Relay interfacing- Sensor interfacing -Seven segment LED display interfacing-Keyboard interfacing-Stepper motor interfacing-ADC interfacing- DAC interfacing-DC motor interfacing using PWM-LCD interfacing.	3 13
V	**Advanced Microcontrollers** **5.1: Types of microcontrollers** PIC microcontroller-General Block diagram-Features-Applications-Arduino- General Block diagram-Variants-Features-Applications-Raspberry pi-General Block diagram-Features-Applications-Comparison of microcontrollers. **5.2: IoT** Introduction to IoT-Block diagram of home automation using IoT.	8 3

Reference Books :

1. ”Ajit pal” “Microcontrollers, Principles and Applications ”,PHI Ltd,-2011.

2 .”Mazidi,Mazidi and D.MacKinlay” “8051 Microcontroller and Embedded Systems using Assembly and C”,2006 Pearson Education Low Price Edition.

3. ”R. Theagarajan” “Microprocessor and Microcontroller”, Sci Tech Publication,Chennai.

4. www.microchip.com, www.raspberrypi.org,www.arduino.org.

5. “J.B. Peatman” ”Design with PIC microcontrollers”.

6. ”Michael McRoberts”, ”beginning Arduino.

7. ”Matt Richardson”, ”Getting started with Raspberry Pi”.

8.”Samuel Greengard”, ”The Internet of Things”.

STATE BOARD OF TECHNICAL EDUCATION ANDTRAINING, TAMILNADU

DIPLOMAINENGINEERING / TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name : 1040: Electronics and Communication Engineering

Subjectcode: 4040531

Semester:V

SubjectTitle:VERYLARGESCALEINTEGRATION

TEACHINGANDSCHEMEOFEXAMINATION

Noofweekspersemester:16weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
VERYLARGESCALEINTEGRATION	**4**	**64**	**25**	**100***	**100**	**3Hours**

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

TopicsandAllocationofHours

Unit	Topic	Hours
I	INTRODUCTION TO VLSI	12
II	INTRODUCTION TO VHDL	10
III	COMBINATIONAL CIRCUIT DESIGN	12
IV	SEQUENTIAL CIRCUIT DESIGN	12
V	PROGRAMMABLE LOGIC DEVICES	11
	Test& Model Exam	7
	Total	**64**

RATIONALE:

Very Large Scale Integration technology, when especially used fordesigning digital systems, it is mandatory that thebehaviorof therequired system to be described (modeled) and verified (simulated)before synthesis, translate the design into real hardware fabricationin the foundry (gates and wires).Hardware DescriptionLanguage (HDL)allows designs to be described using any methodology- top down,bottomup approach. VHDLcan be used to describe hardware atthe gatelevel or in a more abstract way. This course is to introduce the digital system design conceptsthrough hardware descriptionLanguage,VHDL programming, design flow of VLSI andarchitectures ofCPLD, FPGA.Itis mainlyaimedatdesignofcombinational andsequentialfunctions and simulates or verifiestheirfunctionalityusingtheHardwaredescriptionLanguage(HDL).

OBJECTIVES:

Onsuccessfulcompletionofthecourse,thestudentsmustbeableto

- Understand the concepts of VLSIdesignprocess.
- DevelopaVHDLcodeforcombinationalcircuit
- DevelopaVHDLcodeforsequentialcircuit.
- ExplaintheimportanceofPROM,PLA,and PAL.
- DifferentiatePROM, PLAandPAL.
- Developthecircuitusing PROM, PALandPLA.
- Understand CPLDandFPGAhardware.
- Differentiate ASIC, CPLD, FPGA.

4040531 VERY LARGE SCALE INTEGRATION
DETAILEDSYLLABUS

Contents:Theory

Unit	NameoftheTopic	Hours
I	**INTRODUCTION TO VLSI:** 1.1 NMOS,CMOS logic: NOT, AND, OR, NAND, and NOR Gates using NMOS – NOT, AND, OR, NAND, and NOR Gates using CMOS – Implementation of logic function (SOP, POS) in CMOS. 1.2 VLSI design process: Different level of abstractions in VLSI design – steps involved in VLSI design process: Design Entry,Simulation, Synthesis, Placement and Routing – Layout rules, Stick diagram.	**6** **6**
II	**INTRODUCTION TO VHDL**: 2.1 Introduction: HDL – Different types of modeling – General format for VHDL program . 2.2 VHDL statements: Syntax for process statement, if statement, if else statement, if elsif else statement, case statement –Syntax for signal declaration and signal assignment statement –Syntax for variable declaration and variable assignment statement, component declaration. 2.3 VHDL code example: VHDL code for Logic gatesAND, OR, NOT, NAND, NOR gate and XOR gates.	**2** **4** **4**
III	**COMBINATIONAL CIRCUIT DESIGN:** 3.1 Combinational circuit: Half adder, Full adder , Half subtractor and Full subtractor – 4 to 1 Mux, 1 to 4 Demux, 4 to 2 Encoder, 2 to 4 decoder andcomparator – FourbitArithmeticadder – FourbitArithmeticsubtractor . 3.2 VHDL program for Combinational circuit: VHDL program for Half adder, Full adder – VHDL program for Hall subtractor and Full subtractor – 4 to 1 Mux, 1 to 4 Demux, 4 to 2 Encoder, 2 to 4 decoder andcomparatorinVHDL – VHDL program forFourbitArithmeticadder (structural) – VHDL program forFourbitArithmeticsubtractor (structural) .	**6** **6**

IV	**SEQUENTIAL CIRCUIT DESIGN:** 4.1 Sequential circuit: Flip-flops: D,JKandTFlip-flops – counters:3 bit up Counter,3 bit down counter and 3 bit up/down counter,Decadecounter, ring counter and JohnsonCounter. 4.2 VHDL program for Sequential circuit: VHDLprogramforD,JKandTFlip-flopswith resetinput, withoutresetinput – VHDL program for 3 bit up Counter,3 bit down counter and 3 bit up/down counter,Decadecounter, ring counter and JohnsonCounter.	**6** **6**
V	**PROGRAMMABLE LOGIC DEVICES**: 5.1 PROM, PLA and PAL : Introduction to PROM, PLA and PAL – ImplementationofcombinationalcircuitswithPROM,PALandPLA (upto4variables) – ComparisonbetweenPROM,PALandPLA. 5.2 CPLD,FPGA and ASIC : Architecture of Complex Programmable Logic device (CPLD) – Architecture of FieldProgrammableGateArrays(FPGA) – Introduction to Application Specific Integrated Circuit(ASIC) – TypesOf ASIC – ASIC design flow.	**5** **6**

ReferenceBooks:

1.“M.MorrisMano,MichaelDCiletti ““DigitalDesign”PearsonEducation2008.

2. “BhaskerJ ““VHDLPrimer”PrenticeHallIndia-2009.

3. “NEIL H.E.WESTE, KAMRAN ESRHAGHIAN” “Principles of CMOS VLSI design”, Addison – Wesley professional, second edition 1994.

4.“NigelP.Cook” “DigitalElectronicswithPLDIntegration”,Pearson 2000.

5.“Ashok K.Sharma” “ProgrammableLogicHandbook:PLDs,CPLDs,andFPGAs”,Mcgraw-Hill,1998.

6. “Michael John Sebastian Smith””Application Specific Integrated Circuits”,Addison – Wesley professional,first edition 1997.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name **:** 1040:Electronics and Communication Engineering

Course Code : 4040532

Semester **:** V Semester

Subject Title **:** CONSUMER ELECTRONICS

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	
Consumer Electronics	**4**	**64**	**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	Audio system	11
II	Audio recording and reproducing system	12
III	Colour TV	12
IV	Digital Transmission and reception	12
V	Consumer Appliances	10
Test & Model Exam		7
Total		**64**

RATIONALE:

The objective of teaching this subject is to give students in depth knowledge of various electronic audio and video devices and systems. Further, this subject will introduce the students with working principles, block diagram, main features of consumer electronics Gadgets/goods/devices. This in-turn will develop in them capabilities of assembling, fault Diagnosis and rectification in a systematic way.

OBJECTIVES:

- Understand the various types of microphones and loud speakers.
- To identify the various digital and analog signal.
- Describe the basis of television and composite video signal.
- Describe the various kinds of colour TV standards and system.
- Compare the various types of digital TV system.
- Understand the various types of consumer goods.
- Maintain various consumer electronic appliances.

4040532 CONSUMER ELECTRONICS
DETAILED SYLLABUS

Contents: Theory

UNIT	NAME OF THE TOPICS	HOURS
I	**INTRODUCTION TO AUDIO SYSTEM** **1.1 Audio System** Microphones and Loudspeakers: Carbon, moving coil, cordless microphone,Direct radiating and horn loudspeaker, Multi-speaker system. **1.2 Sound Recording** Magnetic Recording, Digital Recording, Optical Recording (CD system, DVD, Blu-ray Disc).	6 5
II	**2.1 Reproducing system** Sound reproducing Systems: Monophonic, Stereophonic, Surround System. Hi-Fi system, block diagram and use of Home Theatre Systems . **2.2 Audio recording** Sound Recording: Principles of Sound recording: Magnetic Recording/ Reproduction. Audio CD Recording/ Reproduction, Study of working principle of audio and VCD, Digital sound recording on CD system, MP3.	6 6
III	**3.1 Colour TV** Primary colours, concepts of additive and subtracting mixing of colours, concepts of luminance, Hue and Saturation, Representation of a colour in colour triangle, non-spectral colour, visibility curve. **3.2 TV ENCODERS**:Compatibility of colour TV system with monochrome system. Basic colour TV system-NTSC, SECAM, and PAL their advantages and disadvantages. Construction and working principles of Trinitron and PIL types of colour picture tubes.	6 6
IV	**4.1 DIGITAL TRANSMISSION** Digital satellite television, Direct-To-Home (DTH) satellite television, Introduction to: Video on demand, CCTV, High Definition (HD)-TV. **4.2 RECEPTION** Introduction to Liquid Crystal and LED Screen Televisions Basic block diagram ofLCD and LED Television and their comparison.	6 6

V	**5.1 CONSUMER APPLIANCES** Basics principle and working of Microwave Oven and Photostat Machine and Digital Camera, Cam CorderWashing Machine: wiring diagram, electronic controller for washing machine, technical specifications, types of washing machine, fuzzy logic .	10

REFERENCE BOOKS:

1. Consumer Electronics- Bali S.P.- Pearson Education India,2010 , latest edition
2. Colour TV by A.Dhake
3. Audio Video Systems by R. G. Gupta; McGraw Hill Education System.
4. Consumer Electronics by Yagnik & Jain – Ishan Publication.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name :1040: Electronics and Communication Engineering

Subject Code : 4040533

Semester :V

Subject title : BASICS OF DIGITAL SIGNAL AND IMAGE PROCESSING

TEACHING AND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /Week	Hours /Semester	Internal Assessment	Board Examination	Total	
Basics of Digital Signal and Image Processing	**4**	**64**	**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	Classification of Signals and systems	10
II	Analysis of continuous time Signals	13
III	Digital Image Fundamentals	10
IV	Image Enhancement and Image Restoration	12
V	Image Segmentation and compression	12
	Tests and Model Exam	7
Total		**64**

RATIONALE:

The subject basic of digital signal and image processing introduce visualization and mathematical representation of continuous time and discrete time signals and ability to analyses LTI system and give clear explanation of image compression, restoration, enhancement, segmentation. The student will have depth of knowledge about signal and image processing which will help in industries and in bio medical field.

OBJECTIVES:

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

- Know about basic knowledge of signals and system
- Know fourier representation of periodic signals
- Be able to characterize LTI system
- Steps in image processing
- Simple image fundamental
- Various image enhancement techniques
- Histogram processing
- Spatial filtering
- Understand various compression models
- Study JPEG techniques
- Detection of point, line, edge in images

4040533 BASICS OF DIGITAL SIGNAL AND IMAGE PROCESSING

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**CLASSIFICATION OF SIGNALS AND SYSTEMS** **1.1 SIGNALS:** Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids_ Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals **1.2 SYSTEMS:** Classification of systems- CT systems and DT systems- – Linear & Nonlinear, Time-variant & Time-invariant, Causal & Non-causal, Stable & Unstable.	5 5
II	**ANALYSIS OF CONTINUOUS TIME SIGNALS** **2.1 FOURIER TRANSFORM:** Fourier series for periodic signals – Fourier Transform – properties **2.2 LAPLACE TRANSFORM:** Laplace Transforms and properties	7 6
III	**DIGITAL IMAGE FUNDAMENTALS** **3.1 BASICS OF IMAGE PROCESSING;** Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Relationships between pixels **3.2 IMAGE SAMPLING AND QUANTIZATION** **3.3 COLOR IMAGE FUNDAMENTALS** RGB, HSI models**.**	6 2 2

IV	**IMAGE ENHANCEMENT AND IMAGE RESTORATION** **4.1 IMAGE ENHANCEMENT:** Spatial Domain: Gray level transformations – Histogram processing Basics of Spatial Filtering–Smoothing and Sharpening Spatial filtering. **4.2 IMAGE RESTORATION :** Image Restoration – degradation model, Noise models	7 5
V	**IMAGE SEGMENTATION AND COMPRESSION** **5.1 IMAGE SEGMENTATION:** Edge detection, Region based segmentation – Region growing – Region splitting and merging **5.2 IMAGE COMPRESSION:** Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG	6 6

REFERENCE BOOKS:

1. Signals, System and communication -B.P.Lathi, B.S Publication 2003
2. Signals and Systems – A.V. Oppenheim, A.S. willsky and S.H. Nawab, PHI 2nd Edition
3. Signals and Systems – Simon Haykin and van. Veen.Wiley, 2nd Edition
4. RafelC.Gonzalez and Richard Ewoods – Digital Image processing –Pearson Inc- 4th Edition – 2018
5. Anil K-Jain – Fundamental of Digital Image processing – Pearson Education, Inc – 2002

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040540

Semester : V

Subject title : ANALOG AND DIGITAL COMMUNICATION PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION

No. of weeks/ Semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
ANALOG AND DIGITAL COMMUNICATION PRACTICAL	**5**	**80**	**25**	**100***	**100**	**3 Hours**

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

RATIONALE:

This laboratory is based on communication system based on analog and digital system. The Student will able to test various communication equipments including transmitter and receiver. This lab system enable students to apply many experiments and activities covers various topics in analog and digital communication system of different types which gain the various skill in day today life.

OBJECTIVES:

On completion ofthefollowing experiments, the students must be able to

- know the concept of analog transmitter and receiver
- know the concept of digital (ASK/ FSK/ PSK)
- know about TDM
- Knowthe fiber optical link

- know the losses in optical fiber
- Test the performance of Manchester encoder and decoder
- know about DTH system

4040540 ANALOG AND DIGITAL COMMUNICATION PRACTICAL

DETAILED SYLLABUS

Contents: Practical

Exercises

1. Construct a sample and hold circuit, test and trace its waveforms.
2. Test the performance of ASK modulator and demodulator &drawits input and output waveform
3. Test the performance of FSK modulator and demodulator &drawits input and output waveform
4. Test the performance of PSK modulator and demodulator &drawits input and output waveform
5 Test the performance of Time Division Multiplexer and draw its input and output waveforms
6. Test the performance of analog transmitter and receiver and draw its input and output waveforms
7. Test the performance of a fiber optic analog link and draw its input and output waveforms
8. Test the performance of a fiber optic digital link and draw its input and output waveforms
9. Find the bending loss and propagation loss in fiber with two different fiber lengths
10. Test the performance of Manchester encoder and decoder using optical communication.
11. Test the performance of a voice link using optical fiber.
12. Test the Horizontal and Vertical deflection sensitivity of CRT.
13. Install a DTH system and test its performance.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM/BLOCK DIAGRAM:		25
CONNECTION	:	30
EXECUTION & HANDLING OF EQUIPMENT	:	20
OUTPUT / RESULT	:	15
VIVA – VOCE	:	10
TOTAL	:	100

MODEL QUESTION PAPER

4040540 ANALOG AND DIGITAL COMMUNICATION PRACTICAL

1. Construct a sample and hold circuit, test and trace its waveforms.
2. Test the performance of ASK modulator and demodulator & drawits input and output waveform
3. Test the performance of FSK modulator and demodulator & drawits input and output waveform
4. Test the performance of PSK modulator and demodulator & drawits input and output waveform
5 Test the performance of Time Division Multiplexer and draw its input and output waveforms
6. Test the performance of analog transmitter and receiver and draw its input and output waveforms
7. Test the performance of a fiber optic analog link and draw its input and output waveforms
8. Test the performance of a fiber optic digital link and draw its input and output waveforms
9. Find the bending loss and propagation loss in fiber with two different fiber lengths
10. Test the performance of Manchester encoder and decoder using optical communication.

11. Test the performance of a voice link using optical fiber.

12. Test the Horizontal and Vertical deflection sensitivity of CRT

13. Install a DTH system and test its performance.

LIST OF EQUIPMENTS

S.NO	Name oftheEquipments	Range	RequiredNos.
1	DualtraceCRO	100MHz	2
2	PSK Modulation Kit		1
3	PSK Demodulation Kit		1
4	Fiber optic demonstration kit		2
5	DTH		1

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronicsand Communication Engineering

Subject Code : 4040550

Semester : V

Subject Title : Microcontroller Practical

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	
Microcontroller Practical	**4**	**64**	**25**	**100***	**100**	**3 Hrs.**

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

RATIONALE:

The introduction of this subject will enable the students to have hands on experience in using 8051 trainer kit. The students are exposed to learn simple programs using assembly language. They can also get familiar with the C compiler platform. They also gain knowledge by using application specific interfacing boards .

OBJECTIVES:

The students are able to

-> Understand the use of instruction set by writing and executing simple ALP.

-> Know the connection details between microcontroller and peripherals.

.

4040550 MICROCONTROLLER PRACTICAL

DETAILED SYLLABUS

Contents:Practical

Exercises

Part A

The following experiments should be written using 8051 assembly language program and should be executed in the 8051 microcontroller trainer kit.

1. 8 / 16 bit addition
2. 8 / 16 bit subtraction
3. 8 bit multiplication
4. 8 bit division
5. BCD to Hex code conversion
6. Hex to BCD code conversion
7. Smallest / Biggest number
8. Time delay routine (Demonstrate by Blinking LEDS).
9. Using Timer/ counter of 8051

Part B (Interfacing Application Boards)

The following experiments can be written using C compiler or 8051 assembly language and to be executed.

10. Interfacing Digital I/O board
11. Interfacing DAC
12. Interfacing Stepper motor
13. Interfacing Seven segment LED display or LCD
14. Sending data through the serial port between microcontroller kits
15. Interfacing DC motor using PWM.

BOARD EXAMINATION

Note:

1.Students are provided with Hex code sheet for manual hand assembly.

DETAILED ALLOCATION OF MARKS

I.	Algorithm or Flow chart	: 20 marks
II.	Program	: 30 marks
III.	Execution	: 30 marks
IV.	Result	: 10 marks
V.	Viva	: 10 marks
	TOTAL	:100 marks

MODEL QUESTION PAPER

4040550 MICROCONTROLLER PRACTICAL

1.Write an assembly language program for adding two 8 bit / 16 bit numbers and execute the same using 8051 trainer kit. Store the output result in memory. Input numbers can be given as immediate data or can be stored in the memory.

2.Write a program to interface stepper motor with microcontroller 8051 and execute. Check the execution for varying the speed of the motor and also the forward/reverse rotation of the motor.

3.Write a 8051 Assembly Language program to use Timer/ Counter of 8051 microcontroller to generate time delay and observe the output.

4.Write a 8051 Assembly language program to generate 1 second time delay using Time delay routine and verify the output at LEDS.

5.Write a program to interface DAC interface board with microcontroller and verify the analog output.

6. Write a program to interface LCD interface board with microcontroller and observe the output at LCD.

7.Write a program to interface Digital I /O board with microcontroller and verify all input and output operations.

8.Write an assembly language program using 8051 to convert the given BCD number to hexadecimal number and store the result in memory. The input can be given as an immediate data or can be stored in the memory.

9. Write an assembly language program using 8051 to convert the given hexadecimal number to BCD number and store the result in memory. The input can be given as an immediate data or can be stored in the memory.

10.Write an assembly language program using 8051 to find the smallest number of the array of given numbers and store the result in the memory. The size of the array and the input numbers can be stored in the memory.

11.Write an assembly language program using 8051 to perform 8 bit multiplication and store the result in the memory. The input numbers can be given as immediate data or can be stored in the memory.

12. Write an assembly language program for subtracting two 8 bit / 16 bit numbers and execute the same using 8051 trainer kit. Store the output result in memory. Input numbers can be given as immediate data or can be stored in the memory.

13. Write an assembly language program using 8051 to perform 8 bit division and store the result in the memory. The input numbers can be given as immediate data or can be stored in the memory.

14.Write a program to perform serial communication between two 8051 microcontroller kits and verify the output.

15.Write a program to interface seven segment LED interface with microcontroller and verify the output at seven segment display .

16.Write a program to interface a DC motor with microcontroller and verify the rotation of motor in both directions using PWM method.

LIST OF EQUIPMENTS

S.NO	Name of the Equipments	Required Nos
1.	8051 Microcontroller kit	14
2.	Digital I/O Interface board	2
3.	Seven segment LED display interface board	2
4.	8 bit DAC interface board	2
5.	Stepper motor control interface board	2
6.	DC motor control interface board	2
7.	RS 232 serial port cable	2
8.	LCD interface board	2
9.	Laptop / Desktop Computer	6

STATE BOARD OF TECHNICAL EDUCATION ANDTRAINING,TAMILNADU

DIPLOMAINENGINEERING / TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name:1040:Electronics and Communication Engineering

SubjectCode: 4040561

Semester :V

SubjectTitle: VeryLarge Scale IntegrationPractical

TEACHINGANDSCHEMEOFEXAMINATION

Noofweekspersemester:16weeks

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

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

RATIONALE:

VHDL is a versatile and powerful hardware description language which isuseful for modeling digital systems at various levels of design abstraction.This language is mainly for describing the hardware. Execution of a VHDL program results in asimulation of the digital system allows us to validate the design prior tofabrication of Digital Integrated circuit. This practical will enable the students to have hands on experience in using FPGA kit. The students are exposed to do programming in VHDL.

OBJECTIVES:

Thestudentswillbeableto

- Understand the use of VHDL statements by writing program in VHDL.
- DevelopaVHDLcodeforany digital circuits.
- Understand the concepts of digital circuits / logic function by simulating VHDL programs through XILINX software.
- Understand the concepts of digital circuits by using FPGA kit.
- To know the usage of input switches, output LEDs and seven segment display in FPGA kit.

4040561VERYLARGESCALEINTEGRATIONPRACTICAL

DETAILED SYLLABUS

Contents: Practical

Exercises

NOTE: Behavioral or structural model can be used for allexperiments

1.SIMULATIONOFVHDLCODEFOR LOGIC GATES (AND GATE,OR GATE)
Develop code for logic gates. Simulate the code in the software.

2.SIMULATIONOFVHDLCODEFORCOMBINATIONALFUNCTION
Optimize a 4 variable combinational function (SOP), describe it inVHDL codeandsimulateit.Example:F=(0,1,4,5,8,9,12)insop

3.SIMULATIONOFVHDLCODEFOR HALF ADDER AND FULL ADDER
Develop code for half adder and full adder. Simulate the code in the software .

4.SIMULATIONOFVHDLCODEFOR HALF SUBTRACTOR AND FULL SUBTRACTOR
Develop code for half subtractor and full subtractor. Simulate the code in the software.

5.SIMULATIONOFVHDLCODEFOR SINGLE BIT DIGITAL COMPARATOR
Develop Boolean expression for A>B, A=B, A<B, write a VHDL code and simulate the code in the software.

6.VHDLIMPLEMENTATIONOF8 TO 1 MULTIPLEXER
Develop the code for a 8 to 1 multiplexer and implement it in FPGA kit in which switches are connected for select inputs and for data inputs, a LED is connected to the output.

7.VHDLCODE FOR JK FLIPFLOP (SIMULATION/IMPLEMENTATION)
Develop the code for JK flipflop and simulate using software or implement it in FPGA kit**.**

8.VHDLIMPLEMENTATIONOF 1 TO 8 DEMULTIPLEXER

Develop the code for a 1 t0 8 Demultiplexer and implement it in FPGA kit in which Switches are connected for select inputs and a data input, Eight LEDs are connectedtotheoutputofthe circuit.

9.VHDLIMPLEMENTATIONOF7SEGMENTDECODER – BOOLEAN EXPRESSION

DevelopBooleanexpressionfor4inputvariablesand7outputvariables.Develop a seven segment decoder in VHDL for 7 equations. A seven segment display is connected to the output of the circuit. Four switches areconnectedtotheinput.The4bitinputisdecodedto7segmentequivalent.

10.VHDLIMPLEMENTATIONOF7SEGMENTDISPLAY - WITH COUNTER

Design and develop a seven segment decoder in VHDL. Design and developa 4 bit BCD counter, the output of the counter is given to seven segment decoder.A seven segment display is connected to the output of the decoder. The displayshows0,1,2..9foreveryonesecond

11.VHDLIMPLEMENTATIONOF 8 TO 3ENCODER

Develop code for 8 to 3 encoder. There willbe 8 switches and 3 LEDs in the FPGA kit. The input givenfrom switches and it is noted that any one of the switch is active. The binaryequivalentforthecorrespondinginputswitchwillbeglowingintheLEDasoutput.

12.VHDLIMPLEMENTATION OF2 TO 4 DECODER

Develop code for 2 to 4 decoder and implement it in FPGA kit in which 2 Switches are connected for inputs , four LEDs foroutput.

13.VHDLIMPLEMENTATIONFORBLINKINGALED

Develop a VHDL Code for delay .Delay is adjusted in such a way that LED blinks for every 1 or 2seconds.

14.VHDLIMPLEMENTATIONFORBLINKINGANARRAYOFLEDS

Design and develop a VHDL Code for 4 bit binary up counter. Four LEDs areconnected at the output of the counter. The counter should up for every onesecond.

15.VHDLIMPLEMENTATIONOFASPELLERWITHANARRAYOFLEDS

Design and develop VHDL Code for a 5 bit Johnson ring counter 4 bit TheLEDs are connected at the output of the counter. The speller should work foreveryonesecond.

BOARD EXAMINATION

NOTE:

1.All the experiments given in the list of experiments should be completed andgivenfortheendsemesterpracticalexamination.

2.In order to develop best skills in handling Instruments/Equipment practical classes, every three students should be provided with a separateexperimentalsetupfor doingexperimentsinthelaboratory.

3.The external examiners are requested to ensure that a single experimentalquestion should not be given to more than three students while admitting abatchof30studentsduringBoardExaminations.

DETAILED ALLOCATIONOFMARKS

Algorithm orflowchart		30marks
Program		30Marks
Execution	25marks	
Result		10 marks
VivaVoce		5marks
Total		100Marks

MODEL QUESTION PAPER
4040561 VERYLARGESCALEINTEGRATIONPRACTICAL

1.Write aVHDLcodefor logic gates (AND gate, OR gate) and simulate the code.

2. Simplify the function f=(0,1,4,5,8,9,12). Write aVHDLcodeforthe simplified function andsimulateit.

3.Write aVHDLcodefor half adder and full adder and simulate the code.

4.Write aVHDLcodeforhalf subtractor and full subtractor and simulate the code.

5.Write aVHDLcodefor single bit digital comparator and simulate the code.

6.Write aVHDLcodefor8 to 1 multiplexer and implement it in FPGA kit.

7.Write aVHDLcodeforJK flipflop and simulate using software or implement it in FPGA kit.

8.Write aVHDLcodefor1 to 8 demultiplexer and implement it in FPGA kit.

9.Write aVHDLcodefor7segmentdecoder – Boolean expression and implement it in FPGA kit.

10.Write aVHDLcodefor7segmentdisplay - with counter and implement it in FPGA kit.

11.Write aVHDLcodefor 8 to 3 encoder and implement it in FPGA kit.

12.Write aVHDLcodefor2 to 4 decoder and implement it in FPGA kit.

13.Write aVHDLcodeforblinkingaLED and implement it in FPGA kit.

14.Write aVHDLcodeforblinkinganarrayofLEDs and implement it in FPGA kit.

15.Write aVHDLcodeforspellerwithanarrayofLEDs and implement it in FPGA kit.

LISTOFEQUIPMENTS

1. FPGA KIT with atleast 10 switches for input, 8 LEDs for output, a 7 segmentdisplay, debounced push switch (2 Nos) for manual clock input and external clocksource–10Nos with software.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name **:** 1040:Electronics and Communication Engineering

Course Code : 4040562

Semester **:** V Semester

Subject Title **:** Consumer Electronics Practical

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	
Consumer Electronics Practical	**5**	**80**	**25**	**100***	**100**	**3 Hrs.**

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

RATIONALE:

The objective of teaching this subject is to give students an in depth knowledge of various electronic audio and video devices and systems. Further this subject will introduce the students with working principles, block diagram, main features of consumer electronics gadgets/goods/devices. This in-turn will develop in them capabilities of assembling, fault diagnosis and rectification in a systematic way.

OBJECTIVES:

On completion ofthefollowing experiments, the students must be able to

- Troubleshoot different types of Microphones and loudspeakers.
- Maintain and troubleshoot of audio systems.
- Troubleshoot LED TV Receiver.
- Know about installation and troubleshoot of CCTV and Dish antenna.

- Know about various sensors and their functionalities of washing machine.
- Know about Installation and troubleshoot of A/C
- Maintain various consumer Electronic appliances.

4040562 CONSUMER ELECTRONICS PRACTICAL
DETAILED SYLLABUS

Contents:Practical

Exercises

1. To study public address system and its components.
2. To plot the directional response of a Microphone.
3. To plot the directional response of a Loud Speaker.
4. Trouble shooting of CD/DVD Player.
5. To perform fault identification in LED TV.
6. Installation of Dish Antenna for best reception.
7. Installation of CCTV system.
8. Demonstration of Microwave Oven.
9. Demonstration of Automatic Washing Machine and locate various sensors used in that washing machines.
10. To study the various parameters in the Smartphone and Tablet.
11. Explore digital cameras settings.
12. To build and test temperature control system.
13. To build and test circuit for A/C motor control.
14. Verify functions of Camcorder.
15. Installation of LCD/LED Projector and verify the functionalities.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM	: 25
PROCEDURE	: 30
EXECUTION & HANDLING OF EQUIPMENT	: 20
OUTPUT / RESULT	: 15
VIVA – VOCE	: 10

TOTAL : 100

MODEL QUESTION PAPER
4040562 CONSUMER ELECTRONICS PRACTICAL

1. To study public address system and its components.
2. To plot the directional response of a Microphone.
3. To plot the directional response of a Loud Speaker.
4. Trouble shooting of CD/DVD Player.
5. To perform fault identification in LED TV.
6. Installation of Dish Antenna for best reception.
7. Installation of CCTV system.
8. Demonstration of Microwave Oven.
9. Demonstration of Automatic Washing Machine and locate various sensors used in that washing machines.
10. To study the various parameters in the Smartphone and Tablet.
11. Explore digital cameras settings.
12. To build and test temperature control system.
13. To build and test circuit for A/C motor control.
14. Verify functions of Camcorder.
15. Installation of LCD/LED Projector and verify the functionalities.

LIST OF EQUIPMENTS

S.NO	Name of Equipment with specification	Quantity
1.	Digital Multimeter	10
2.	Microphone (Different types)	10
3.	Loud Speaker	10
4.	LED TV	2
5.	Dish Antenna	1
6.	Microwave Oven, Washing machine, A/C	2
7.	Digital Camera, Smart Phone/Tablet, Camcorder	2
8.	LCD/LED Projector.	2
9.	CCTV Cameras	5

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040563

Semester : V

Subject title : SIGNAL AND IMAGE PROCESSING 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	
Signal and Image Processing Practical	**5**	**80**	**25**	**100***	**100**	**3 Hours**

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

RATIONALE:

This laboratory makes the student to understand the basic concepts of signal and image processing .signal processing focuses on analyzing, modifying and synthesizing signals such as sound, images and scientific measurements. The need to extract information from images and interpret their contents has been one of the driving factors in the development of image processing and computer vision during the past decades .Image processing application cover a wide range of human activities such as Medical application, Industrial, Military, Consumer Electronics, Law Enforcement and security, The internet particularly the world wide web.

OBJECTIVES:

On completion ofthefollowing experiments, the students must be able to

- know to generate discrete sequence signal.
- knowabout fourier transform
- know first order low pass filter and first order high pass filter
- know about spatial domain
- know about contrast stretching.
- know graylevel slicing and bitplane slicing
- know about masking
- know frequency domain of ideal lowpass filter and ideal high pass filter

4040563 SIGNAL AND IMAGE PROCESSING PRACTICAL

DETAILED SYLLABUS

Contents: Practical

Exercises

1. Write a MATLAB program to generate the discrete sequence unit step and unit impulse. Plot all sequences
2. Write a MATLAB program to generate the discrete sequence ramp and periodic sinusoidal signal.plot all sequences.
3. Find the Fourier transform of a square pulse using MATLAB .Plot its amplitude and phase spectrum.
4. Write a MATLAB program to generate a random sinusoidal signal and plot four possible realizations of random signals
5. Write a MATLAB program to find the magnitude and phase response of first order low pass filter. Plot the responses in logarithmic scale.
6. Write a MATLAB program to find the magnitude and phase response of first order high pass filter. Plot the responses in logarithmic scale.
7. Write a MATLAB program in spatial domain for image negatives and log transformation
8. Obtain the power law transformation in spatial domain using MATLAB.
9. Write a MATLAB program for contrast stretching.
10. Write a MATLAB program in spatial domain for linear filter
11. Write a MATLAB program for graylevel slicing andbitplane slicing.
12. Write a MATLAB program for histogram equalization

13. Write a MATLAB program for unsharp masking.
14. Obtain the frequency domain of ideal lowpass filter in MATLAB.
15. Obtain the frequency domain of ideal high pass filter in MATLAB.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

WRITING PROGRAM:		40
EXECUTION OF PROGRAM :		35
OUTPUT / RESULT :		15
VIVA – VOCE	:	10
TOTAL	:	100

MODEL QUESTION PAPER

4040563SIGNAL AND IMAGE PROCESSINGPRACTICAL

1. Write a MATLAB program to generate the discrete sequence unit step and unit impulse. Plot all sequences
2. Write a MATLAB program to generate the discrete sequence ramp and periodic sinusoidal signal.plot all sequences.
3. Find the Fourier transform of a square pulse using MATLAB .Plot its amplitude and phase spectrum.
4. Write a MATLAB program to generate a random sinusoidal signal and plot four possible realizations of random signals
5. Write a MATLAB program to find the magnitude and phase response of first order low pass filter. Plot the responses in logarithmic scale.
6. Write a MATLAB program to find the magnitude and phase response of first order high pass filter. Plot the responses in logarithmic scale.
7. Write a MATLAB program in spatial domain for image negatives and log transformation
8. Obtain the power law transformation in spatial domain using MATLAB.
9. Write a MATLAB program for contrast stretching.
10. Write a MATLAB program in spatial domain for linear filter
11. Write a MATLAB program for gray level slicing and bit plane slicing
12. Write a MATLAB program for histogram equalization
13. Write a MATLAB program for unsharp masking.
14. Obtain the frequency domain of ideal lowpass filter using MATLAB.

15. Obtain the frequency domain of ideal high pass filter using MATLAB.

LIST OF EQUIPMENTS

S.NO	Name oftheEquipments	Range	RequiredNos.
1.	Desk Top Computer		15
2.	Simulation Tool	MATLAB	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 :1020:Mechanical Engineering

Subject Code : 4020570

Semester : V

Subject Title : ENTREPRENEURSHIP AND START-UPS

TEACHING AND SCHEME OF EXAMINATION

No. of Weeks per Semester: 16 Weeks

Subject	Instruction		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Entrepreneurship and Startups	**4 hours**	**64 hours**	**25**	**100***	**100**	**3 Hours**

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

Topics and Allocation of Hours

UNIT	Topic	Hours
1	Entrepreneurship – Introduction and Process	10
2	Business Idea and Banking	10
3	Start ups, E-cell and Success Stories	10
4	Pricing and Cost Analysis	10
5	Business Plan Preparation	10
Revision, Field visit and Preparation of case study report		14
Total		64

RATIONALE:

Development of a diploma curriculum is a dynamic process responsive to the society and reflecting the needs and aspiration of its learners. Fast changing society deserves changes in educational curriculum particularly to establish relevance to emerging socio-economic environments; to ensure equity of opportunity and participation and finally promoting concern for excellence. In this context the course on entrepreneurship and start ups aims at instilling and stimulating human urge for excellence by realizing individual potential for generating and putting to use the inputs, relevant to social prosperity and thereby ensure good means of living for every individual, provides jobs and develop Indian economy.

OBJECTIVES:

At the end of the study of 5th semester the students will be able to

- To excite the students about entrepreneurship
- Acquiring Entrepreneurial spirit and resourcefulness
- Understanding the concept and process of entrepreneurship
- Acquiring entrepreneurial quality, competency and motivation
- Learning the process and skills of creation and management of entrepreneurial venture
- Familiarization with various uses of human resource for earning dignified means of living
- Know its contribution in and role in the growth and development of individual and the nation
- Understand the formation of E-cell
- Survey and analyze the market to understand customer needs
- Understand the importance of generation of ideas and product selection
- Learn the preparation of project feasibility report
- Understand the importance of sales and turnover
- Familiarization of various financial and non financial schemes
- Aware the concept of incubation and starts ups

DETAILED SYLLABUS

Unit	Name of the Topics	Hours
1	**ENTREPRENEURSHIP – INTRODUCTION AND PROCESS** ● Concept, Functions and Importance ● Myths about Entrepreneurship ● Pros and Cons of Entrepreneurship ● Process of Entrepreneurship ● Benefits of Entrepreneur ● Competencies and Characteristics ● Ethical Entrepreneurship ● Entrepreneurial Values and Attitudes ● Motivation ● Creativity ● Innovation ● Entrepreneurs - as problem solvers ● Mindset of an employee and an entrepreneur ● Business Failure – causes and remedies ● Role of Networking in entrepreneurship	**10**
2	**BUSINESS IDEA AND BANKING** ● Types of Business: Manufacturing, Trading and Services ● Stakeholders: Sellers, Vendors and Consumers ● E- Commerce Business Models ● Types of Resources - Human, Capital and Entrepreneurial tools	**10**

	● Goals of Business and Goal Setting ● Patent, copyright and Intellectual Property Rights ● Negotiations - Importance and methods ● Customer Relations and Vendor Management ● Size and Capital based classification of business enterprises ● Role of Financial Institutions ● Role of Government policy ● Entrepreneurial support systems ● Incentive schemes for State Government ● Incentive schemes for Central Government	
3	**STARTUPS, E-CELL AND SUCCESS STORIES** ● Concept of Incubation centre's ● Activities of DIC, financial institutions and other relevance institutions ● Success stories of Indian and global business legends ● Field Visit to MSME's ● Various sources of Information ● Learn to earn ● Startup and its stages ● Role of Technology – E-commerce and Social Media ● Role of E-Cell ● E-Cell to Entrepreneurship	**10**
4	**PRICING AND COST ANALYSIS** ● Calculation of Unit of Sale, Unit Price and Unit Cost	

	• Types of Costs - Variable and Fixed, Operational Costs • Break Even Analysis • Understand the meaning and concept of the term Cash Inflow and Cash Outflow • Prepare a Cash Flow Projection • Pricing and Factors affecting pricing • Understand the importance and preparation of Income Statement • Launch Strategies after pricing and proof of concept • Branding - Business name, logo, tag line • Promotion strategy	**10**
5	**BUSINESS PLAN PREPARATION** • Generation of Ideas, • Business Ideas vs. Business Opportunities • Selecting the Right Opportunity • Product selection • New product development and analysis • Feasibility Study Report – Technical analysis, financial analysis and commercial analysis • Market Research - Concept, Importance and Process • Marketing and Sales strategy • Digital marketing • Social Entrepreneurship • Risk Taking-Concept • Types of business risks	**10**

REFERNCE BOOKS:

1. Dr. G.K. Varshney, Fundamentals of Entrepreneurship, Sahitya Bhawan Publications, Agra - 282002
2. Dr. G.K. Varshney, Business Regulatory Framework , Sahitya Bhawan Publications, Agra - 282002
3. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Entrepreneurship , McGraw Hill (India) Private Limited, Noida - 201301
4. M.Scarborough, R.Cornwell, Essentials of Entrepreneurship and small business management, Pearson Education India, Noida - 201301
5. Charantimath Poornima M. Entrepreneurship Development and Small Business Enterprises, Pearson Education, Noida - 201301
6. Trott, Innovation Management and New Product Development, Pearson Education, Noida - 201301
7. M N Arora, A Textbook of Cost and Management Accounting, Vikas Publishing House Pvt. Ltd., New Delhi-110044
8. Prasanna Chandra, Financial Management, Tata McGraw Hill education private limited, New Delhi
9. I. V. Trivedi, RenuJatana, Indian Banking System, RBSA Publishers, Rajasthan
10. Simon Daniel, HOW TO START A BUSINESS IN INDIA, BUUKS, Chennai - 600018
11. Ramani Sarada, The Business Plan Write-Up Simplified - A practitioners guide to writing the Business Plan, Notion Press Media Pvt. Ltd., Chennai 600095.

Board Examination – Evaluation Pattern

Internal Mark Allocation

Assignment (Theory portion)*	- 10
Seminar Presentation	- 10
Attendance	- 5
TOTAL	**- 25**

Note: * Two assignments should be submitted. The same must be evaluated and converted to 10 marks.

Guidelines for assignment:

First assignment – Unit I

Second assignment – Unit II

Guidelines for Seminar Presentation--Unit III

Each assignment should have five three marks questions and two five marks questions.

BOARD EXAMINATION

Note

1. The students should be taught all units and proper exposure and field visit also arranged. All the portions should be completed before examinations.
2. The students should maintain theory assignment and seminar presentation. The assignment and seminar presentation should be submitted during the Board Practical Examinations.
3. The question paper consists of theory and practical portions. All students should write the answers for theory questions (40 Marks) and practical portions (60 Marks) should be completed for board examinations.
4. All exercises should be given in the question paper and students are allowed to select by lot. If required the dimensions of the exercises may be varied for every batch. No fixed time allotted for each portion and students have liberty to do the examination for 3Hrs.
5. For Written Examination: theory question and answer: 45 Marks

   Ten questions will be asked for 3 marks each. Five questions from each unit 1 & 2. (10 X 3 = 30).

   Three questions will be asked for 5 marks each. One question from each unit 1, 2 & 3. (3 X 5 = 15)
6. For Practical Examination: The business plan/Feasibility report or Report on Unit 4 & 5 should be submitted during the board practical examinations. The same have to be evaluated for the report submission (40 marks).

DETAILED ALLOCATION OF MARKS

Sl. No	Description	Marks
Part A	Written Examination - Theory Question and answer (10 questions x 3 marks:30 marks & (3 questions x 5 marks: 15 marks)	45
Part B	Practical Examination – Submission on Business Plan/Feasibility Report or Report on Unit 4 & 5	40
Part C	Viva voce	15
	Total	100

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040610

Semester : VI

Subject title : COMPUTER HARDWARE SERVICING AND NETWORKING

TEACHING AND SCHEME OF EXAMINATION

No. of Weeks per Semester: 16 Weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
Computer hardware Servicing and Networking	**5**	**80**	**25**	**100***	**100**	**3 Hours**

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

Topics and Allocation of Hours

Unit	Topics	Hours
I	MOTHERBOARD COMPONENTS AND MEMORY STORAGE DEVICES	16
II	I/O DEVICES AND INTERFACE	14
III	TROUBLE SHOOTING OF DESKTOP AND LAPTOPS	15
IV	COMPUTER NETWORK DEVICES AND OSI LAYERS	14
V	802.X AND TCP/IP PROTOCOLS	14
	Tests and Model	7
	Total	**80**

RATIONALE:

Maintaining and servicing the computers, laptops and peripherals are essential requirements of the computer students. The clear understanding of computer network devices and protocols are also taught in this subject.

OBJECTIVES:

On completion of the following units of syllabus contents, the students can

- Identify the major components ofCPU.
- Understand the principle of operations of all the interfacing boards, IO/Memory slots and interfacingdevices.
- Know the use of diagnostic Software.
- Trouble shoot the problems inLaptop.
- Understand the different layers of OSI and their functions. Compare different LANprotocols.
- Identify the protocols used in TCP /IP and compare with OSI model. Use of IP addressing and TCP/ IP protocolsbriefly.

4040610 COMPUTER HARDWARE SERVICING AND NETWORKING

DETAILED SYLLABUS

Contents : Theory

Unit No.	Name of the Topic	Hours
I	**MOTHERBOARD COMPONENTS AND MEMORY STORAGEDEVICES** **1.1 Introduction:** Hardware, Software and Firmware. Mother board, IO and memory expansion slots, SMPS, Drives, front panel and rear panel connectors. **1.2 Processors:** Architecture and block diagram of multicore Processor, Features of new processor (Definition only)-chipsets (Concepts only) **1.3Bus Standards:** Overview and features of PCI, AGP, PCMCIA **1.4 Primary Memory**: Introduction-Main Memory, Cache memory – DDR2, DDR3, DDR4 and Direct RDRAM. **1.5 Secondary Storage:** Hard Disk – Construction – Working Principle Specification of IDE, Ultra ATA, Serial ATA; HDD Partition - Formatting, SSD Introduction. **1.6 Removable Storage:** CD-R, CD-RW, DVD –ROM and DVD –RW**:** construction and reading & writing operations, Zip Drive; Blu-ray – Introduction – Disc Parameters.	3 3 2 3 3 2
II	**I/O DEVICES AND INTERFACE** **2.1 Keyboard:** Signals – operation of membrane and mechanical keyboards– troubleshooting; wireless Keyboard. **2.2Mouse:** Types, connectors, operation of Optical mouse and Troubleshooting. **2.3 Printers**: Introduction – Types of printers- Dot Matrix, Inkjet, Laser, MFP (Multi-Function Printer) and Thermal printer – Operation, Construction andFeatures - Troubleshooting **2.4 I/O Ports:** Serial, Parallel, USB, Game Port and HDMI. **2.5 Displays:** Principles of LED (OLED, AMOLED, POLED), LCD & TFT Displays.	2 2 2 1 2

	2.6 Graphic Cards: VGA and SVGA card. **2.7 Modem:** Working principle. **2.8 Power Supply:** Servo Stabilizers, online and offline UPS - working principles; SMPS: Principles of Operation and block diagram of ATX Power supply, Connector Specifications.	2 1 2
III	**MAINTENANCE AND TROUBLE SHOOTING OF DESKTOP AND LAPTOPS** **3.1 Bios-setup:** Standard CMOS setup, Advanced BIOS setup, Power management, advanced chipset features, PC Bios communication – upgrading BIOS, Flash BIOS - setup. **3.2 POST:** Definition – IPL hardware – POST Test sequence – beep codes **3.3 Diagnostic Software and Viruses:** Computer Viruses – Precautions –Anti-virus Software – identifying the signature of viruses – Firewalls and latest diagnostic softwares. **3.4 Laptop:** Types of laptop – block diagram – working principles – configuring laptops and power settings - SMD components, ESD & precautions. **3.5 Laptop components:** Adapter – types, Battery – types, Laptop Mother Board - block diagram, Laptop Keyboard and Touchpad. **3.6 Installation and Troubleshooting:** Formatting, Partitioning and Installation of OS – Trouble Shooting Laptop Hardware problems - Preventive maintenance techniques for laptops.	2 2 2 2 3 4
IV	**COMPUTER NETWORK DEVICES AND OSI LAYERS** **4.1 Data Communication:** Components of a data communication. **4.2 Data flow:** Simplex – half duplex – full duplex; **4.3 Topologies:** Star, Bus, Ring, Mesh, Hybrid – Advantages and Disadvantages of each topology. **4.4 Networks:** Definition -Types of Networks: LAN – MAN – WAN – CAN – HAN – Internet –Intranet –Extranet, Client-Server, Peer to Peer Networks. **4.5 Network devices:** Features and concepts of Switches – Routers (Wired and Wireless) – Gateways. **4.6 Network Models:** Protocol definition - standards - OSI Model – layered architecture – functions of alllayers.	1 1 2 4 3 3

V	**802.X AND TCP/IP PROTOCOLS** **5.1 Overview of TCP / IP:** TCP/IP – Transport Layers Protocol – connection oriented and connectionless Services – Sockets - TCP & UDP. **5.2 802.X Protocols:** Concepts and PDU format of CSMA/CD (802.3) – Token bus (802.4) – Token ring (802.5) – Ethernet – type of Ethernet (Fast Ethernet, gigabit Ethernet) – Comparison between 802.3, 802.4 and 802.5 **5.3 Network Layers Protocol:** IP – Interior Gateway Protocols (IGMP, ICMP, ARP, RARP Concept only). **5.4 IP Addressing:** Dotted Decimal Notation – Subnetting & Supernetting. **5.5 Application Layer Protocols:** FTP - Unmanageable Switch - manageable Switch – Telnet – SMTP– HTTP – DNS – pop	3 4 3 2 2

REFERENCEBOOKS:

1. IBM PC and CLONES, B. Govindrajalu, Tata McGraw-Hill Publishers, IBM PC and CLONES
2. Computer Installation and Servicing, D. Balasubramanian, Tata McGraw Hill
3. Computer Installation and Servicing
4. The complete PC upgrade and Maintenance, Mark Minasi, BPB Publication, The complete PC upgrade and Maintenance
5. Troubleshooting, Maintaining and Repairing PCs, Stephen J Bigelow, Tata McGraw Hill Publication, Troubleshooting Maintaining and Repairing PCs
6. Upgrading and repairing laptops, Scott Mueller, QUE Publication, Upgrading and repairing laptops
7. Data Communication and networking, Behrouz A. Forouzan, Tata Mc-Graw Hill, New Delhi,
8. Data and Computer Communications, William Stallings, Prentice-Hall of India, Eighth Edition
9. Computer Networks, Andrew S. Tanenbaum, Prentice-Hall of India, New Delhi,
10. Computer Networks, Achyut Godbole, Tata McGraw Hill - New Delhi
11. Principles of Wireless Networks– A unified Approach, Kaveh Pahlavan and Prashant Krishnamurty, Pearson Education, 2002

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name :1040: Electronics and Communication Engineering

Subject Code : 4040620

Semester :VI

Subject title : BIOMEDICAL INSTRUMENTATION

TEACHINGAND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /Week	Hours /Semester	Internal Assessment	Board Examination	Total	
Biomedical instrumentation	**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	Hours
I	Bio-electric potentials, Electrodes and Clinical measurements	14
II	Diagnostic Instruments	15
III	Therapeutic Instruments	16
IV	Biotelemetry and Patient Safety	15
V	Modern Imaging Techniques	13
	Tests and Model Exam	7
Total		80

RATIONALE:

Every year,thereisatremendousincreaseintheuseof Modern Electronic medicalequipment inthehospitalandhealthcareindustry. Thereforeitisnecessary forevery student ttounderstandthe functioning of various medical equipments.

OBJECTIVES:

After learning this subject the studentwill beable to understand the about

- The generation ofBio-potential and its measurement using various electrodes.
- The measurement ofblood pressure.
- The measurement oflung volume.
- The measurement ofrespiration rate.
- The measurement ofbodytemperature and skin temperature.
- The principleofoperation ofECG recorder and the analysis of ECG waves
- The principle ofoperationofEEG recorder and the analysis of EEG waves
- The principle ofoperation ofEMG recorder.
- Theworking principles of audio meter.
- The principleofoperation ofpacemaker.
- The basic principle ofdialysis.
- The basic principle ofventilators.
- Theworking principles of telemetry.
- The basic principle oftelemedicine.
- To learn about patient safety.
- The various methods ofaccident prevention.
- The basic principle ofvarious types oflasers and their applications
- The basic principle of various types of Medical Imaging Systems.

4040620 BIOMEDICAL INSTRUMENTATION

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the topics	Hours
I	**BIO-ELECTRIC POTENTIALS, ELECTRODES AND CLINICAL MEASUREMENTS** **1.1: BIOPOTENTIALS AND ELECTRODES** Elementaryideas ofcell structure, Bio-electric potentialsand their origin- Resting and action potentials– Propagation ofaction potential - Electrodes – Micro – Skinsurface– needle electrodes. **1.2: CLINICAL MEASUREMENTS:** Measurement ofBlood pressure : Sphygmomanometer– Blood flowmeter (Electromagnetic& ultrasonic blood flowmeter)– Acid base balance: pH, Measurement of pH value of various body fluids- Measurement ofRespiration rate : Impedance Pneumograph– Measurement of Lung volume: Spiro meter– Heart rate monitor– Medical laboratory equipment: Auto analyzer	7 7
II	**DIAGNOSTIC INSTRUMENTS:** **2.1: Electro- Cardio Graph (ECG) :** 12 Lead system of ECG– ECG recorder– Analysis of abnormal ECG waves. **2.2: Nervous system:** Electro- EnchephaloGraph(EEG) - 10-20 EEG lead system– EEG recorder–EEGwave types– Clinical uses of EEG **2.3: Electro– Myo Graph (EMG) :** EMGwaves– Measurement of conduction velocity– EMG recorder **2.4: Electro- Retino Graph (ERG) :** ERG recorder – ERG wave **2.5: Audiometer:** Principle– types – Basics audiometer working- Air conduction and bone conduction test	3 3 3 3 3

III	**THERAPEUTIC INSTRUMENTS** **3.1: Cardiac pacemaker** Need for Pacemaker-Classification – R-wave triggered and Ventricular inhibited implantable pacemakers– Programmable pacemaker **3.2: Cardiac defibrillators** Need for Defibrillator - Classification – AC and DC defibrillators **3.3: Heart lung machine** : Need for Heart Lung Machine –Blockdiagram – working **3.4: Dialysis** Need for Dialysis – Processes involved in Dialysis - Hemo dialysis– peritoneal dialysis - Comparison of Hemodialysis and Peritonael dialysis **3.5: Lithitripsy** Need for Lithotriptor- block diagram and working **3.6: Ventilators** Need for Ventilators - Types – modern ventilator blockdiagram – Working	2 3 3 3 3 2
IV	**BIOTELEMETRY AND PATIENTSAFETY:** **4.1: Biotelemetry** Physiological parameters adaptable to biotelemetry - componentsofa biotelemetrysystem– applications of biotelemetry–Radio telemetry with sub carrier: single channel and multi channel telemetry system- Telemedicine: concept and applications. **4.2: Patient safety** Physiological effects ofelectric current– Micro and macro shock–Hazardous situations of micro and macro shocks- leakage current– lethal effects of leakage current **4.3:Methods ofAccident Prevention** Grounding – Double Insulation – Ground fault circuit interrupter (GFI)– Safetyaspectsin electrosurgicalunits:burns –Highfrequency currenthazard-explosionhazard. Precautionstominimize electric shock hazards	5 5 5

V	**MODERN IMAGINGTECHNIQUES:** **5.1: LASER** Laser beamproperties– Blockdiagram and explanation of ND-Yag LASER – Applications ofLASER inpatient care. **5.2: X ray** Properties of X-Rays - Working of X ray apparatus– Special techniques inX-rayimaging: C arm image intensifier- Computerized Axial tomography– CT scanner- Angiography **5.3: Ultrasonic imaging techniques:** Pulse echo system - Echo Cardiography – Operating modes – Working **5.4:** Magnetic Resonance Imaging techniques – Working – Superiority of MRI Scan	3 3 3 4

Reference Books:

1. LeslieCromwell– Fredj.Wibell,ErichA.PFeither- Biomedical Instrumentation andmeasurements,IIEdition Jacobson andWebstar–Medicine andclinicalEngineering.
2. R.S.Khandpur–HandbookofBiomedical Instrumentation.
3. Medical Electronics - Kumara doss
4. Introduction to Medical Electronics. B.R. Klin
5. Introduction to Biomedical Instrumentation Mandeep SinghPrintice Hall India 2010.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject Code : 4040631

Semester : VI

Subject Title : Television Engineering.

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	
Television Engineering	**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	Television Fundamentals.	15
II	Camera Tubes and Picture Tubes.	14
III	Television Transmitter and Television Receiver.	17
IV	Modern Television Technology.	14
V	Advanced Television Systems.	13
Test & Model Exam		7
Total		**80**

RATIONALE:

This subject makes the students to understand from the basic concepts of TV to advanced techniques of TV .It also enables the students to have the knowledge about the Modern Technology including flat panel display. This subject makes the students to understand about Color TV fundamentals .The subject also introduces troubleshooting techniques. It gives the clear understanding about TV standards .

OBJECTIVES:

On completion of the syllabus, the students must be able to

->Understand CVS and CCVS signal. .

-> Understand the different types of scanning.

-> Study the types of camera tubes and picture tubes.

-> Explain about TV transmitter and TV receiver(Monochrome and PAL).

-> Study the Modern TV technology.

->Understand the use of Advanced TV systems.

.

4040631 TELEVISION ENGINEERING

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**Television Fundamentals** **1.1 : Monochrome TV** Basic block diagram of monochrome TV transmitter and receiver -scanning process -horizontal, vertical and sequential scanning -Flicker-Interlaced scanning(qualitative treatment only) -need for synchronization -blanking pulses-Aspect ratio -Resolution -vertical and horizontal resolution -video bandwidth -composite video signal (CVS) -Definitions for vertical sync pulse, serrated vertical pulse, Equalizing pulse -Positive and negative modulation -TV standards . **1.2 : Colour TV Fundamentals** Additive mixing of colours -colour perception -Chromaticity diagram-Definition for Luminance, Hue ,Saturation and Chrominance- Formation of chrominance signal in PAL system with weighting factors- colour composite video signal(CCVS).	8 7
II	**Camera tubes and Picture Tubes** **2..1 : Camera Tube** Characteristics-Types of camera tube-working principle of Vidicon camera tube-study of Target plate (only) of plumbicon camera tube -CCD camera-Video processing of camera pick up signal-Block diagram and principle of working of colour TV camera tube. **2.2 : Picture Tube** Magnetic deflection and Electrostatic focusing -Screen phosphor -Screen burn-screen persistence-Aluminized screen- types of colour picture tubes-Construction and working principle of Trinitron colour picture tube -Automatic degaussing.	7 7
III	**Television Transmitter and Receiver**	

	3.1:Television Transmitter Types-Comparison-principle-Block diagram of low level IF modulated TV Transmitter -Visual Exciter-Aural Exciter -Principle of working of CIN Diplexer-colour compatibility -PAL colour Coder working operation-merits and demerits of PAL system. **3.2:Television Receiver** Block diagram of monochrome receiver- functions of each block-need for AGC-merits of AGC-Video Amplifier Requirements -High and low frequency compensation--Block diagram of PAL colour receiver-need for sync separator -Basic sync separator circuit- Integrator and Differentiator -AFC-need for AFC-Horizontal AFC.	9 8
IV	**Modern Television Technology** **4.1:Modern TV** Flat panel Display-Principles of operation-Large screen display -Types of TV-projection TV-plasma TV-merits of plasma TV-construction and working operation of LCD TV-LED TV -Types of LED TV -working operation of LED TV-merits of LED TV-LCD projector working operation -set top box-principles of DTH-Trouble shooting of set top box-communication cables-Types-Feeder wire-coaxial cable and optical fiber cable-RF TV Tuner card.	14
V	**Advanced Television Systems** **5.1:Advanced TV** Block diagram of a digital colour TV receiver -Remote control IR transmitter and receiver -closed circuit TV System -Applications of CCTV -scrambler-necessity-basic principle -types- descrambler block diagram -Telecine equipment -Digital CCD telecine system-Introduction to high definition TV(HDTV) and 3DTV. **5.2:TV connector Ports** HDMI port-USB port-RF in-AV Jack.	10 3

Reference Books:

1.”R.R. Gulati”,”Modern Television Practice-Transmission,Reception,Applications “,New age international 5th Edition 2015.
2.”A.M.Dhake” “TV and Video Engineering” ,Second Edition TMH-2003
3.”R.R Gulati” “Monochrome and Color TV “, New Age Publishers-2003
4.”S.P.bali” “color TV, Theory and Practice” TMH-1994.
5.” Manohar Lotia& Pradeep Nair “ “Modern VCD-Video CD player Introduction, servicing and troubleshooting “,BPB Publications 2002

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS

N SCHEME

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

Course Name :1040:Electronics and Communication Engineering

Subject Code : 4040632

Semester : VI

Subject title : MOBILE AND OPTICAL COMMUNICATION

TEACHINGAND SCHEME OF EXAMINATION

No ofweeks/ semester: 16weeks

Subject	Instruction		Examination			
			Marks			
	Hours /Week	Hours /Semester	Internal Assessment	Board Examination	Total	Duration
Mobile and Optical Communication	**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	Hours
I	Mobile Communication concepts	14
II	Equalization, Diversity, Channel coding and Speechcoding	15
III	Wireless Networking , Personal Communication Services/ Networks(PCS/PCNS) and Network data bases	16
IV	Optical Cables, Connectors, Splicers, Optical Digital and Analog link	14
V	WDM Concepts and Components	14
	Tests and Model Exam	7
Total		80

RATIONALE:

Communication is one ofthe integral parts ofscience that hasalways beena focuspointfor exchanginginformation amongpartiesatlocations

physicallyapart.Afteritsdiscovery, telephones havereplacedthetelegrams andletters.Similarly,theterm‘mobile’hascompletely revolutionizedthe communicationby openingupinnovativeapplicationsthatarelimitedtoone’s imagination.Today,mobilecommunicationhas becomethebackboneofthe society.Allthe mobile systemtechnologieshaveimprovedtheway ofliving.Usually Mobile cellular networks have both Circuit Switching and Packet Switching for handling calls. For Circuit Switching ,Optical fiber using WDM is employed. Hence inthis subject, with Mobile communication , Optical communication is added.

OBJECTIVES:

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

- Know the concept of Mobile Communication
- Know the concept of Channel Assignments
- Know aboutthe Handoff processes performed in Mobile Communication
- Know the interferences and system capacity
- Know the methods of improving coverage and capacity to avoid network congestion
- Know the concept of equalization, diversity , channel coding and speech coding
- Know the concept of LTE and VoLTE (Voice over Long Term Evolution
- Know about wireless networking , Personal Communication Services/ Networks(PCS/PCNS) and network data bases
- Know about Universal Mobile Telecommunication System (UMTS)
- Know about Fiber optic cables
- Know about Power launching and coupling
- Know about Fiber-to-fiber joints
- Know about Fiber splicing techniques
- Know aboutOptical fiber connectors
- Know about Digital transmission systems
- Know about WDMconcepts and components
- Know about Opticalnetworks

4040632 MOBILE AND OPTICAL COMMUNICATION

DETAILED SYLLABUS

Contents:Theory

Unit	Name of the topics	Hours
I	**MOBILE COMMUNICATION** **1.1: CELLULAR CONCEPTS**	3
	CHANNEL ASSIGNMENT STRATEGIES **1.2: HANDOFF STRATEGIES**	3
	Prioritizing Handoffs-Practical Handoff Considerations **1.3: INTERFERENCE AND SYSTEM CAPACITY** Co-channel interference and System Capacity- Channel Planning for wireless Systems- Adjacent Channel Interference-Power Control for Reducing Interference	4 4
	1.4: IMPROVING COVERAGE AND CAPACITY Cell splitting and Cell sectoring - Repeaters for Range Extension – Micro cell Zone Concept	
II	**EQUALIZATION, DIVERSITY , CHANNEL CODING AND SPEECH CODING** **2.1: FUNDAMENTALS OF EQUALIZATION** Introduction – Training a Generic Adaptive Equalizer – Equalizers in Communication Receiver – Survey of Equalization Techniques	3 3
	2.2: DIVERSITY TECHNIQUES Practical considerations in space diversity – Polarization diversity – Frequency diversity – Time diversity – RAKE Receiver - Interleaving. **2.3: FUNDAMENTALS OF CHANNEL CODING**	 3
	2.4: SPEECH CODING Introduction – Characteristics of Speech signals – Probability Density Function – Autocorrelation function – Frequency Domain Coding of Speech – Sub band Coding – Adaptive Transform Coding – Vocoders – The GSM Codec.	3 3
	2.5: LTE AND VoLTE(Voice over Long Term Evolution)	

III	**WIRELESS NETWORKING , PERSONAL COMMUNICATION SERVICES/ NETWORKS(PCS/PCNs) AND NETWORK DATA BASES** **3.1: INTRODUCTION TO WIRELESS NETWORKS** **3.2: DIFFERENCE BETWEEN WIRELESS NETWORKS AND FIXED NETWORKS** Limitations in wireless networking – Merging wireless network and PSTN Development of Wireless Networks **3.3: WIRELESS DATA SERVICES** Cellular Digital Packet Data (CDPD) – Advanced Radio Data Information Systems (ARDIS) – RAM Mobile Data (RMD) **3.4: PERSONAL COMMUNICATION SERVICES/ NETWORKS(PCS/PCNs)** Packet Vs Circuit Switching for PCN – Cellular Packet Switched Architecture **3.5: NETWORK DATABASES** Distributed Database for Mobility Management **3.6:UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM (UMTS)**	3 3 3 3 2 2
IV	**OPTICAL COMMUNICATION** **4.1: FIBER OPTIC CABLES** **4.2: POWER LAUNCHING AND COUPLING** Source to Fiber Power Launching - Source Output Pattern- Schematic diagram of an optical source coupled to an optical fiber-Lensing scheme for coupling improvement **4.3: FIBER-TO-FIBER JOINTS** **4.3: FIBER SPLICING TECHNIQUES** **4.4: OPTICAL FIBER CONNECTORS** **4.5: DIGITAL TRANSMISSION SYSTEMS** Simplex point to point transmission link – System consideration **4.6: ANALOG TRANSMISSION SYSTEMS** Over view of Analog links	2 3 2 2 2 3

V	**WDMCONCEPTS AND COMPONENTS** **5.1: OPERATIONAL PRINCIPLES OF WDM** **5.2: WDM COMPONENTS** 2x2 Fiber couplers - Star matrix representation - 2x2 Waveguide couplers - Star couplers **5.3: OPTICALNETWORKS** Basic Networks - Network topologies –Performance of Star Architecture **5.4: SONET / SDH** Basic concepts -Transmission Formats and Speeds - OpticalInterfaces - SONET/SDH rings - SONET/SDH Networks **5.5: WAVELENGTH - ROUTED NETWORKS** Optical Cross – connects **5.6: OPTICAL CDMA** **5.7: ULTRAHIGH CAPACITY NETWORKS** Ultrahigh Capacity WDM Systems – Bit- interleaved Optical TDM-Time-Slotted Optical TDM.	2 2 2 2 2 2 2

REFERNCE BOOKS:

1.Wireless Communication Principles and Practice Theodore S. Rappaport Pearson Education, 2003

2.Mobile CellularCommunications W.C.Y. Lee 2nd Edition, MC GrawHill, 1995

3.Mobile Communications Jochen Schiller Pearson Education, 2009,Second edition

4.Optical fiber communication- Gerd Keiser - Third Edition – McGraw Hill -2000

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject Code : 4040633

Semester : VI

Subject Title : Embedded Systems

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	
Embedded Systems	**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	Introduction to Embedded systems and ARM processor	16
II	ARM Instruction Set	16
III	LPC 2148 controller	16
IV	LPC 2148 peripherals	15
V	Operating System	10
Test & Model Exam		7
Total		**80**

RATIONALE:

This subject makes the students to understand the definition for Embedded Systems. It also enables the students to have the knowledge about the different architectures, RISC and CISC processors. This subject makes the students to understand about RTOS. To specific, the subject deals with ARM7 RISC processor and the on chip peripherals of LPC2148 .

OBJECTIVES:

On completion of the syllabus, the students must be able to

-> Understand ARM7 processor .

-> Understand the architecture of LPC 2148.

-> Understand ARM7 instruction set.

-> Understand the types of buses.

-> Explain On chip peripherals.

-> Have clear knowledge about RTOS concepts.

.

4040633 EMBEDDED SYSTEMS

DETAILED SYLLABUS

Note: Bit level details in registers should not be asked in board theory examination.

Contents: Theory

Unit	Name of the Topics	Hours
I	**Introduction to Embedded Systemsand ARM Processor** **1.1 : Embedded Systems** Definition of Embedded System – Features of Embedded System – Types of Embedded System – List of Embedded System Devices-Harvard and Von-Neumann architectures-RISC and CISC Processors. **1.2:ARM Processor Architecture Fundamentals** Block diagram of ARM based embedded system with hardware components - Pipeline-Data Flow Model-CPU registers – Modes of Operation – PSW -Processor State and Instruction Set-Exceptions-Interrupts-Vector table-Little Endian and Big Endian.	 8 8
II	**ARM Instruction Set** **2.1:Instruction Set** ARM state instruction set- Thumb State Instruction sets(Brief introduction only)-Data processing instructions-Branch instructions-Load-store instructions-Software interrupt instruction-Program status register instructions-stack instructions-Conditional execution. **2.2:Simple programs** Addition, Subtraction and Multiplication using ARM processor assembly language.	12 4
III	**LPC 2148 Controller** **3.1:Introduction to LPC 2148 ARM controller** LPC 2148 ARM Controller – Features-Block diagram – Memory and on chip peripheral devices – ARM 7 TDMI-S Nomenclature– Memory Map – Memory re-map and boot block-Types of buses. **3.2:System control functions** Crystal oscillator-PLL-Power control-RESET-VPB Divider-Wakeup timer-Vector Interrupt controller-(VIC)-Register description-External Interrupts.	 8 8
IV	**LPC 2148 Peripherals** **4.1:Peripherals**	

	Pin connect block-Features-pin connect block register description-GPIO (Slow)- Features-register description -- Timer/Counter – Block diagram – Register description --PWM-features-register description-ADC -features-register description-DAC-features-register description. **4.2:Serial communication in LPC 2148** UART features – UART0 Block diagram—UART0 register description.	10 5
V	**Operating System** **5.1:Embedded OS and RTOS** Introduction to OS- -Functions of OS-Embedded OS-Foreground/background systems -Real time system concepts-Resources-shared resources-Critical section- multitasking-Tasks-kernel-Scheduler-Round Robin-Non Pre-emptive and Pre-emptive scheduling-Context switch- re-entrancy- task priorities- Event flag-mutual exclusion-semaphores and types-Message mail box-Message Queues.	10

Reference Books

1.”Andrew N Sloss””ARM System Developer’s Guide Designing and Optimizing” Elsevier publication,2004.

2.”B.Kanta Rao” “Embedded systems”, PHI publishers.

3.”TammyNoergaard” “Embedded Systems Architecture”,Newness edition.

4.”SteveFurbe “ “ARM System on chip Architecture”, 2nd edition,Pearson Education,2000.

5.”Dr.K.V.K.K Prasad””Embedded Real Time Systems”,Dream tech press,2009.

6.”David Seal” “ARM Architecture Reference Manual”.

7.LPC 2148 User Manual.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject Code : 4040640

Semester : VI Semester

Subject Title : COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL

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	
Computer Hardware Servicing and Networking Practical	**6**	**96**	**25**	**100***	**100**	**3 Hrs.**

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

RATIONALE:

The course aims at making the students familiar with various parts of computers and laptops and how to assemble them and the different types of peripherals desired. In addition, the course will provide the students with necessary knowledge and skills in computer and laptop software installation and maintenance and to make him diagnose the software faults. This subject also gives the knowledge and competency to diagnose the problems in computer hardware and peripherals and gives the knowledge for trouble shooting for systematic repair and maintenance of computers and laptops

OBJECTIVES:

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

- Know the various indicators, switches, SMPS,motherboard ,connectors and various disk drives used in Computers. .
- Install various secondary storage devices with memory partition andformatting.
- Acquire the practical knowledge about the installation of various devices like printer, scanner, web camera and bio-metricdevices.
- Assemble PC system and laptop and checking
- Install Dual OS in asystem.
- Enable to perform different cabling in anetwork.
- Configure Internet connection and able to debug network issues.

4040640 COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL

DETAILED SYLLABUS

Contents:Practical

Exercises

Part A – Computer Hardware servicing

1. IDENTIFICATION OF SYSTEMLAYOUT

i) Identify front panel indicators & switches and Front side & rear side connectors

ii) Familiarize the computer system layout by marking positions of SMPS, Motherboard, FDD, HDD, CD, DVD and add on cards.

2.HARDDISK

i) Configure bios setup program and troubleshoot the typical problems using BIOS utility.

ii) Install, Configure, Partition and Format Hard disk.

3.DVD/BLU-RAYWRITER

i) Install and Configure a DVD Writer and record a blank DVD.

ii) Install and Configure a Blu-ray Writer and record a blank Blu-ray Disc.

4.Printer Installation

i) Install and configure Dot matrix printer

ii) Install and configure Laser printer

5. i) Install and configure Scanner

ii) Install and configure Web cam and bio-metric device

6. i) Assemble a system with add on cards and check the working condition of the system

ii) Install OS in the assembled system.

7. Install Dual OS in a system

8. i) Assemble and Disassemble a Laptop to identify the parts.

ii) Installation of different device drivers and Installation of different Application Software.

Part B – Computer networking

9. Do the following Cabling works for establishing a network

i) Crimp the network cable with RJ 45 connector in Standard cabling mode and cross cabling mode.

ii) Test the crimped cable using a cable tester.

10. Use IPCONFIG, PING, TRACERT and NETSTAT utilities to debug the network issues.

11. Interface two PCs to form Peer To Peer network using the connectivity devices Switch or Router in a LAN.

12. i) Share the files and folders in a LAN
ii) Share a printer in a LAN.

13. Remote Desktop, Remote Assistance, Telnet, HyperTerminal, TeamViewer

14. Configure DNS to establish interconnection between systems and describe how a name is mapped to IP Address

15. i) Install and configure Network Devices: HUB, Switch (4/8/16/24 ports),Routers
ii) Install and Configure NIC.

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CONTENT	Max. Marks	
	Part A	Part B
Procedure	20	20
Execution	20	20
Result with printout	5	5
Viva	10	
Total	100	

MODEL QUESTION PAPER
4040640 COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL

1. IDENTIFICATION OF SYSTEMLAYOUT

i) Identify front panel indicators & switches and Front side & rear side connectors

ii) Familiarize the computer system layout by marking positions of SMPS, Motherboard, FDD, HDD, CD, DVD and add on cards.

2.HARDDISK

i) Configure bios setup program and troubleshoot the typical problems using BIOS utility.

ii) Install, Configure, Partition and Format Hard disk.

3.DVD/BLU-RAYWRITER

i) Install and Configure a DVD Writer and record a blank DVD.

ii) Install and Configure a Blu-ray Writer and record a blank Blu-ray Disc.

4.Printer Installation

i) Install and configure Dot matrix printer
ii) Install and configure Laser printer

5. .i) Install and configure Scanner
ii) Install and configure Web cam and bio-metric device

6. i) Assemble a system with add on cards and check the working condition of the system.
ii) Install OS in the assembled system.

7. Install Dual OS in a system

8. i) Assemble and Disassemble a Laptop to identify the parts.
ii) Installation of different device drivers and Installation of different Application Software.

9. Do the following Cabling works for establishing a network
i) Crimp the network cable with RJ 45 connector in Standard cabling mode and cross cabling mode.
ii) Test the crimped cable using a cable tester.

10. Use IPCONFIG, PING, TRACERT and NETSTAT utilities to debug the network issues.

11. Interface two PCs to form Peer To Peer network using the connectivity devices Switch or Router in a LAN.

12. i) Share the files and folders in aLAN
ii) Share a printer in a LAN.

13. Remote Desktop, Remote Assistance, Telnet, HyperTerminal, TeamViewer.

14. Configure DNS to establish interconnection between systems and describe how a name is mapped to IP Address

15. i) Install and configure Network Devices: HUB, Switch (4/8/16/24 ports),Routers
ii) Install and Configure NIC.

LIST OF EQUIPMENTS

Hardware Requirements :

Computer with Pentium / Core processors with inbuilt NIC	-30 Nos
Hard disk drive	-02 Nos
CD / DVD Writer	-02Nos
Blu Ray writer	-01 No
Blank DVD,Blu-ray disk	-30 Nos
Web camera	-02 Nos
Laser Printer Dot	-02 Nos
matrix Printer	-02Nos
Blank DVD	-30Nos
Scanner	-02Nos
Laptop	-02Nos
Biometric device	-02Nos
Crimping Tool	-06Nos
Network Cables	
RJ45Tester	-06Nos
Modem with internet connection	-02Nos
Hub	-02Nos
Switch 2x2/4x4	-02Nos
Router	-02 Nos

Software Requirements:

Windows XP operating system/ Windows 7 OS
DVD/ CD Burning S/W (Ahead Nero or latest S/W)

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040: Electronics and Communication Engineering.

Subject Code : 4040651

Semester : VI

Subject Title : Television Engineering Practical

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	
Television Engineering Practical	**5**	**80**	**25**	**100***	**100**	**3 Hrs.**

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

RATIONALE:

The introduction of this subject will enable the students to get familiar with basic methods used for trouble shooting, servicing and measurement. The Simple methods are used to find the faults in the servicing of TV. The students can find the career in servicing.

OBJECTIVES:

The students are able to

-> Understand the assembling of Antenna.

-> Construct and test the deflection circuits.

-> Construct and test the sync circuits.

->Service TV remote.

-> Check faults in power supply.

-> Find the faults in video section and audio section

-> Understand about DTH connection

-> Study the use of set of box

-> Service the monitors.

.4040651 TELEVISION ENGINEERING PRACTICAL

DETAILED SYLLABUS

Contents:Practical

Exercises

1.Assembling of yagiuda antenna.

2.Construct and test the sync separator circuit.

3.Construct a horizontal sawtooth generator and measure its frequency .

4.Construct a vertical sawtooth generator and measure its frequency.

5.Trouble shooting of IR TV Remote control unit.

6. Fault finding in SMPS and measure its different voltage levels.

7.Trouble shooting of EHT section in TV.

8.Trouble shooting of sound section in TV.

9.Study of RF Tuner.

10.Trouble shooting of deflection yoke with controls.

11.Servicing of computer monitors (observe the VGA signals using CRO)

12.Servicing of LED /LCD monitors.

13.Measure the dc voltages at various points in TV receiver .

BOARD EXAMINATION

Note: All the experiments to be kept for the examination.

DETAILED ALLOCATION OF MARKS

Circuit Diagram	:	25 marks
Connection / Procedure	:	25 marks
Execution and handling of equipment	:	30 marks
Output / Result	:	10 marks
Viva	:	10 marks
TOTAL	**:**	**100** marks

MODEL QUESTION PAPER

4040651 TELEVISION ENGINEERING PRACTICAL

1.Construct a vertical sawtooth generator for the frequency of 50 hz and verify its output.

2.Troubleshoot the sound section in TV receiver and observe the values.

3.Troubleshoot the deflection yoke of TV receiver and draw the observed waveforms.

4.Troubleshoot the EHT section of TV receiver and measure the values.

5. Construct and test the sync separator circuit and observe the waveforms and draw.

6. Assemble the Yagi-uda antenna with the given antenna elements.

7. Service the given computer monitor and observe the VGA signals using CRO.

8 . Service the TV remote and find the fault.

9. Troubleshoot the given LED / LCD monitor and find the faults.

10. Service the given SMPS and measure the voltage levels.

11. Construct the horizontal sawtooth generator for the frequency of 15,625 hz and verify its output.

12. Measure and write down the Voltage levels of the TV receiver given for troubleshooting .

13. Study the given RF tuner and explain the function of sections of RF tuner.

LIST OF EQUIPMENTS

1. Antenna elements (dipole , reflector, director) - 2 Sets.
2. Audio oscillator -5 Nos.
3. CRO – 2 Nos.
4. Power Supply (0 – 30v) – 5 Nos.
5. Multi meters-5.
6. SMPS-4 Nos.
7. IR TV remote receivers – 2 Nos.
8. B/W Television Receiver Trainer kit.
9. Color TV Receiver Trainer kit.
10. VGA Monitors- 2 Nos.
11. LCD / LED monitors -2 Nos.

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject code : 4040652

Semester : VI

Subject title : MOBILE AND OPTICAL COMMUNICATION PRACTICAL

TEACHINGAND SCHEME OFEXAMINATION

No.ofweeks/ Semester: 16weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hours /week	Hours /semester	Internal Assessment	Board Examination	Total	
Mobile and Optical Communication Practical	**5**	**80**	**25**	**100***	**100**	**3 Hours**

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

RATIONALE:

All types of Mobile Communication circuits are merged with Optical fiber links to get Broad band services to Home and all working environments. Hence in this subject Mobile Communication and Optical Communication related practical circuits are going to be tested by the students. By Practicing the following experiments the students can develop their skill which could be helpful for their self employment in future.

OBJECTIVES:

On completion ofthefollowing experiments, the students must be able to

- Understand the concept of Mobile Communication
- Know the working principle of Mobile Networks
- Know the working of Transmitter and Receiver in GSM

- Study the workingofSIMcardinGSMhandset and SIM card detection.
- StudyandobserveTransmitted/ReceivedRFsignal.
- StudyandobserveTransmitted(I&Q)/Received(I&Q)signalsconstellations.
- StudyandanalyzetheBuzzerin4GLTESmartPhoneTechBook.
- StudyandAnalyzetheVibratorin4GLTESmartphoneTechBook
- StudyofswitchfaultsinUserInterface Sectionof4GLTESmart Phone TechBook
- Studyandanalyzethe PowerManagementUnitin4GLTESmart PhoneTechBook
- Generate the Pseudo random binary sequence
- Test the VI characteristics of LED (Light emitter) and Photo diode (Light detector)
- Test the VI Characteristics of anOpto - coupler
- Test the performance of Time Division Multiple Access in Fiber optical communication link
- Determine the Numerical aperture of the given optical fiber

4040652 MOBILE AND OPTICAL COMMUNICATION PRACTICAL

DETAILED SYLLABUS

Contents: Practical

Exercises

MOBILE COMMUNICATION

(TounderstandtheBasiccircuitofMobilephone(Transmitter, ReceiverandBasebandcontroISection).

1. Tostudy the workingofSIMcardinGSMhandset and SIM card detection.
2. ToStudyandobserveTransmitted/ReceivedRFsignal.
3. StudyandobserveTransmitted(I&Q)/Received(I&Q)signalsconstellations.
4. StudyandanalyzetheBuzzerin4GLTESmartPhoneTechBook.
5. TostudyandAnalyzetheVibratorin4GLTESmartphoneTechBook
6. StudyofswitchfaultsinUserInterface Sectionof4GLTESmart Phone TechBook
7. Studyandanalyzethe PowerManagementUnitin4GLTESmart PhoneTechBook
8. Generation of Pseudo random binary sequence

OPTICAL COMMUNICATION

9. Construct a circuit to test the VI characteristics of LED (Light emitter) and Photo diode

(Light detector)

10. Construct a circuit to test the VI Characteristics of anOpto - coupler
11. Test the performance of Time Division Multiple Access in Fiber optical communication link
12. Determine the Numerical aperture of the given optical fiber

BOARD EXAMINATION

DETAILED ALLOCATION OF MARKS

CIRCUIT DIAGRAM	:	25
CONNECTION	:	25
EXECUTION & HANDLING OF EQUIPMENT	:	25
OUTPUT / RESULT	:	15
VIVA – VOCE	:	10
TOTAL	:	100

MODEL QUESTION PAPER

4040652 MOBILE AND OPTICAL COMMUNIICATION PRACTICAL

1. Studythe workingofSIMcardinGSMhandset and SIM card detection.
2. StudyandobserveTransmitted/ReceivedRFsignal.
3. StudyandobserveTransmitted(I&Q)/Received(I&Q)signalsconstellations.
4. StudyandanalyzetheBuzzerin4GLTESmartPhoneTechBook.
5. StudyandAnalyzetheVibratorin4GLTESmartphoneTechBook
6. StudyofswitchfaultsinUserInterface Sectionof4GLTESmart Phone TechBook
7. Studyandanalyzethe PowerManagementUnitin4GLTESmart PhoneTechBook
8. Generate Pseudo random binary sequence
9. Construct a circuit to test the VI characteristics of LED (Light emitter) and Photo diode (Light detector)

10. Construct a circuit to test the VI Characteristics of anOpto - coupler
11. Test the performance of Time Division Multiple Access in Fiber optical communication link
12. Determine the Numerical aperture of the given optical fiber

LIST OF EQUIPMENTS

S.NO	Name of the Equipment	Range	Required No.
1.	Regulated Power Supply	0 – 30V	2
2.	Dual trace CRO	60 MHz	5
3.	Signal Generator	-	5
4.	Desk Top Computer	-	2
5.	Smart phone Techbook	-	3
6.	Digital Trainer Kit	-.	2
7.	Digital Multimeter	-	5

STATE BOARD OF TECHNICAL EDUCATION &TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N-SCHEME

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

Course Name : 1040:Electronics and Communication Engineering

Subject Code : 4040653

Semester : VI

Subject Title : Embedded Systems Practical

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	
Embedded Systems Practical	**5**	**80**	**25**	**100***	**100**	**3 Hrs.**

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

RATIONALE:

The introduction of this subject will enable the students to have hands on experience in using ARM Based trainer kit. The students are exposed to use the on chip peripherals using embedded C language. They can also get familiar with the use of ARM instruction set. They are learning the different methods for providing time delay and u se of serial communication. 32 bit ARM is a RISC processor which makes the students to expose to the new dimension in the field of embedded systems.

OBJECTIVES:

The students are able to

-> Understand the use of instruction set by writing simple ARM ALP and simulate to see output.

-> Know the application details of on chip peripherals.

-> familiarize with the register map of on chip Timer / counter.

-> Know the use of serial communication concepts using on chip UART0.

-> understand the use of GPIO and the connection of peripheral devices using these on chip GPIO programmable port Pins.

-> Use the interrupts with the help of VIC.

-> Get used with pin connect block registers for programming the GPIO port pins.

-> interface stepper motor and its operation.

-> understand the multiplexing of seven segment LED display device.

.

4040653 EMBEDDED SYSTEMS PRACTICAL

DETAILED SYLLABUS

Contents:Practical

Exercises

1. Study of ARM Processor kit.(Example LPC 2148 kit)

2. Write assembly language program for addition, subtraction and multiplication and simulate.

3. Write and execute C program to blink the LEDs using software delay routine.

4. Write and execute C program to blink the LEDs using on chip TIMER// COUNTER for the delay(Using Polling method).

5. Write and execute C program to blink the LEDs using on chip TIMER// COUNTER for the delay(Using interrupt method).

6. Write and execute C program to read the switch and display in the LEDs.

7. Write and execute C program to count external interrupt pulses EINTx (using VIC) and Show the binary count value in LEDs.

8. Write and execute C program to display a number in seven segment LED .

9. Write and execute C program for serial transmission and reception using on chip UART. Send the received character back to the PC by Polling method.

10. Write and execute C program for serial transmission and reception using on chip UART. Send the received character back to the PC by Interrupt method.

11.Write and execute C program for accessing an internal ADC and display the binary output in LEDs.

12. Write and execute C program to generate square wave using on chip DAC.

BOARD EXAMINATION

Note:

1.Manual for the ARM instruction sets and manual for the trainer kit (Excluding sample program) can be allowed for their board exam.

2.Definition for built in function for the board can be given to students for their board function.

3.manual containing procedure for program down loading through boot loader or JTAG can be given to students for their board exam.

4.Bit details of Registers of on chip peripheral devices can be given for the board practical examination.

DETAILED ALLOCATION OF MARKS

I.	Algorithm or Flow chart	:	20 marks
II.	Program	:	30 marks
III.	Execution	:	30 marks
IV.	Result	:	10 marks
V.	Viva	:	10 marks
	TOTAL	:	100 marks

MODEL QUESTION PAPER

4040653 EMBEDDED SYSTEMS PRACTICAL

1.Write a C program to blink a LED with the time delay of 1 second .Time delay can be generated using software delay routine.

2.Write a C program to blink the LEDS with the time delay. Generate the time delay using internal TIMER in polling method and verify.

3.Write a C program to display the following single digit number ------- at seven segment LED device.

4.Write a C program using on chip UART for serial transmission and reception using polling method and check the output .

5.Write an assembly language program to add / subtract 32 bit numbers and simulate the output result.

6. Write a C program to blink the LEDS with the time delay. Generate the time delay using internal TIMER in interrupt method and verify.

7. Write a C program using on chip UART for serial transmission and reception using interrupt method and verify the output.

8.Write a C program to convert analog signal to digital using internal ADC and verify the binary output at the LEDs.

9.Write a C program to use the internal DAC to generate a square wave output and observe the output at CRO.

10.Write a C program to get the input from a switch and display at the LEDs.

11.Write a C program to demonstrate the use of external interrupt using on chip VIC and observe the result at the LEDs.

12.Write an assembly language program to multiply two numbers and simulate the output result.

LIST OF EQUIPMENTS

1.ARM7 TDMI KIT – 15 numbers with interface boards for the above experiments .The chip set may be TMS4701,LPC2138,LPC2148 or STR7 etc.

2.Desktop computer / Laptop -15 Nos

3.Interfaces :Seven segment display. LEDS ,switches and stepper motor .

4. Manual for the trainer kit and Interfaces.

5.Manual for the built in function for the board.

6.Bit details of registers of on chip peripherals.

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 : 1040: Electronics and Communication Engineering

Subject Code : 4040660

Semester : VI

Subject Title : Project Work & Internship

TEACHING AND SCHEME OF EXAMINATION

No. of Weeks per Semester: 16

Subject	Instruction		Examination		
	Hours/ Week	Hours/ Semester	Assessment Marks		
			Internal	Board Exam	Total
PROJECT WORK & INTERNSHIP	**6**	**96**	**25**	**100***	**100**

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

Minimum Marks for Pass is 50 out of which minimum 50 marks should be obtained out of 100 marks in the Board Examination alone.

OBJECTIVES:

- The project work and internship is aimed to assembleand test a photo type model of any one item/gadget.
- Real time application problems if any may be identified from any industry and maybe chosen.
- The knowledge and the skill sofar acquired may be made use of.
- The team spirit may be motivated.
- The entrepreneurship ideas may be motivated by conducting a career guidance programme.
- Learn and understand the gap between the technical knowledge acquired through curriculum and the actual industrial need through internship .

INTERNAL ASSESSMENT:

The internal assessment should be calculated based on the review of the progress of the work done by the student periodically as follows.

Detail of assessment	Period of assessment	Max. Marks
First Review	6th week	10
Second Review	12th week	10
Attendance	Entire semester	5
Total		**25**

EVALUATION FOR BOARD EXAMINATION:

Details of Mark allocation	Max Marks
Demonstration/Presentation	**25**
Report	**25**
Viva Voce	**30**
Internship report	**20**
Total	**100**