# SYLLABUS

# DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

**Course Code: 1040 / 3040**
**2015 - 2016**

**M - SCHEME**

**DIRECTORATE OF TECHNICAL EDUCATION**
**GOVERNMENT OF TAMILNADU**

# DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

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**DIPLOMA COURSES IN ENGINEERING/TECHNOLOGY**

**(SEMESTER SYSTEM)**

**(Implemented from 2015- 2016)**

**M – 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 and the Diploma Courses offered through MGR Film Institute, Chennai.*

**1. Description of the Course:**

**a. Full Time (3 years)**

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

**b. Sandwich (3½ years)**

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

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

**c. Part Time (4 years)**

The course for the 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 15 weeks duration of study with 35 hrs. /Week for Regular Diploma Programme and 18hrs/ week (21 hrs. / Week I year) for Part-Time Diploma Programmes.

The Curriculum for all the 6 Semesters of Diploma courses (Engineering & Special Diploma Courses viz. Textile Technology, Leather Technology, Printing Technology, Chemical Technology etc.) have been revised and revised curriculum is applicable for the candidates admitted from 2015 – 2016 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, TamilNadu.

(Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in TamilNadu.

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examination recognized as equivalent to the above by the Board of Secondary Education, TamilNadu.

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 (Lateral Entry):

A pass in HSC ( Academic ) or ( Vocational ) courses mentioned in the Higher Secondary Schools in TamilNadu affiliated to the TamilNadu Higher Secondary Board with eligibility for university Courses of study or equivalent examination, & Should have studied the following subjects.

| Sl. No | Courses | H.Sc Academic | H.Sc Vocational | |
|---|---|---|---|---|
| | | Subjects Studied | Subjects Studied | |
| | | | Related subjects | Vocational subjects |
| 1. | All the Regular and Sandwich Diploma Courses | Maths, Physics & Chemistry | Maths / Physics / Chemistry | Related Vocational Subjects Theory & Practical |
| 2. | Diploma course in Modern Office Practice | English & Accountancy<br><br>English & Elements of Economics<br><br>English & Elements of Commerce | English & Accountancy,<br><br>English & Elements of Economics,<br><br>English & Management Principles & Techniques,<br><br>English & Typewriting | Accountancy & Auditing, Banking, Business Management, Co-operative 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 Practical may also be taken for arriving the eligibility.

- Branch will be allotted according to merit through counseling by the respective Principal as per communal reservation.

- For admission to the Textile Technology, Leather Technology, Printing Technology, Chemical Technology and Modern Office Practice Diploma courses the candidates studied the related subjects will be given first preference.

- *Candidates who have studied Commerce Subjects are not eligible for Engineering Diploma Courses.*

**4. Age Limit: No Age limit.**

**5. Medium of Instruction: English**

**6. Eligibility for the Award of Diploma:**

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

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

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

**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. 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 and 75 marks are allotted for Board Examination.

## 9. Continuous Internal Assessment:

**A . For Theory Subjects:**

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

**i. Subject Attendance** **5 Marks**

(Award of marks for subject attendance to each subject theory/practical will 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 |

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

2 Tests each of 2 hours duration for a total of 50 marks are to be conducted. Out of which the best one will be taken and the marks to be reduced to: 05 marks

The Test – III is to be the Model test covering all the five units and the marks so obtained will be reduced to : 05 marks

Total **10 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** - **Compulsory** Covering all the 5 Units. (Board Examination-question paper-pattern). | End of 15th week | 75 | 3 Hrs |

**# - From the Academic year 2015-2016 onwards.**

Question Paper Pattern for the Periodical Test :( Test - I & Test- II)

With no choice:

| | | |
|---|---|---|
| PART A type questions: | 4 Questions X 2 mark | … … 8 marks |
| PART B type questions: | 4 Questions X 3 marks | … … 12 marks |
| PART C type questions: | 3 Questions X 10 marks | … … 30 marks |
| | | ---------- |
| | **Total** | 50 marks |
| | | ---------- |

**iii) Assignment** **10 Marks**

For each subject Three Assignments are to be given each for 20 marks and the average marks scored should be reduced for 10 marks

All Test Papers and assignment notebooks after getting the signature with date from the students must be kept in the safe custody in the Department for verification and audit. It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

**B. For Practical Subjects:**

The internal assessment mark for a total of 25 marks which are to be distributed as follows:-

| | | | |
|---|---|---|---|
| a) | Attendance (Award of marks as same as Theory subjects) | : | **5 Marks** |
| b) | Procedure/ observation and tabulation/ Other Practical related Work | : | **10 Marks** |
| c) | Record writing | : | **10 Marks** |
| | | | ----- |
| | TOTAL | : | **25 Marks** |
| | | | ----- |

- *All the Experiments/exercises indicated in the syllabus should be completed and the same to be given for final board examinations.*
- The Record for every completed exercise should be submitted in the subsequent Practical classes and marks should be awarded for 20 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 and the marks awarded for attendance is to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)
- The students have to submit the duly signed bonafide record note book/file during the Practical Board Examinations.
- *All the marks awarded for assignment, Test and attendance should be entered in the Personal Log Book of the staff, who is handling the subject. This is applicable to both Theory and Practical subjects.*

**10. Life and Employability Skill Practical:**

The Life and Employability Skill Practical with more emphasis is being introduced in IV Semester for Circuit Branches and in V Semester for other branches of Engineering.
Much Stress is given to increase the employability of the students:

Internal assessment Mark ….. **25 Marks**

**11. Project Work:**

The students of all the Diploma Programmes **(except Diploma in Modern Office Practice)** have 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, Tamilnadu. 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 same semester.**

**a) Internal assessment mark for Project Work & Viva Voce:**

| | | |
|---|---|---|
| Project Review I | … | **10 marks** |
| Project Review II | … | **10 marks** |
| Attendance | … | **05 marks** (award of marks same as theory subjects pattern) |
| Total | … | **25 marks** |

Proper record to be maintained for the two Project Reviews, and It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

**b) Allocation of Mark for Project Work & Viva Voce in Board Examination:**

| | | |
|---|---|---|
| Viva Voce | … | **30 marks** |
| Marks for Report Preparation, Demo | … | **35 marks** |
| Total | | **65 marks** |

**c) Written Test Mark (from 2 topics for 30 minutes duration):** $

| | | |
|---|---|---|
| i) Environment Management | 2 questions X 2 ½ marks | **= 5 marks** |
| iI) Disaster Management | 2 questions X 2 ½ marks | **= 5 marks** |
| | | **10marks** |

$ - Selection of Questions should be from Question Bank, by the External Examiner. No choice need be given to the candidates.

| | | |
|---|---|---|
| Project Work & Viva Voce in Board Examination | -- | **65 Marks** |
| Written Test Mark (from 2 topics for 30 minutes duration) | -- | **10 Marks** |
| TOTAL | -- | **75 Marks** |

**A neatly prepared PROJECT REPORT as per the format has to be submitted by individual during the Project Work & Viva Voce 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 subject* out of the total prescribed maximum marks including both the internal assessment and the Board Examination marks put together, subject to the condition that he/she secures at least a minimum of *30 marks out of 75 marks in the Board's Theory examinations and a minimum of 35 marks out of 75 marks in the Board Practical Examinations.*

## 14. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2018 onwards (Joined in first year in 2015-2016) 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 3/ 3½/ 4 years (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 of marks in all the semesters put together and passes all the semesters except the I and II semesters in the first

appearance itself and passes all the subjects within the stipulated period of study 3/ 3½/ 4 years (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 semesters put together and passes all the subjects within the stipulated period of study 3/ 3½ / 4 years (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 mentioned classifications are also applicable for the Sandwich / Part-Time students who pass out Final Examination from October 2018 /April 2019 onwards (both joined in First Year in 2015-2016)

**15. Duration of a period in the Class Time Table:**

The duration of each period of instruction is 1 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).

**16. Seminar:**

For seminar the total seminar 15 hours(15 weeks x 1hour) should be distributed equally to total theory subject per semester(i.e 15 hours divided by 3/4 subject). A topic from subject or current scenario is given to students. During the seminar hour students have to present the paper and submit seminar material to the respective staff member, who is handling the subject. It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

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## ANNEXURE I
## CURRICULUM OUTLINE

**THIRD SEMESTER**

| SUBJECT CODE | SUBJECT | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory Hours | Tutorial/ Drawin | Practical Hours | Total Hours |
| 34031 | Electronic devices and circuits @ | 6 | - | - | 6 |
| 34032 | Electrical circuits and Instrumentation | 6 | - | - | 6 |
| 34033 | Programming in "C" | 5 | - | - | 5 |
| 34034 | Electronic devices and circuits Practical # | - | - | 4 | 4 |
| 34035 | Electrical circuits and Instrumentation Practical | - | - | 4 | 4 |
| 34036 | Programming in "C" Practical | - | - | 5 | 5 |
| 34037 | Computer Application Practical for Electronics | - | - | 4 | 4 |
| | Seminar | 1 | - | - | 1 |
| | TOTAL | 18 | - | 17 | 35 |

**@ Common with EEE, ICE and Mechatronics**

**# Common with EEE and Mechatronics**

## FOURTH SEMESTER

| SUBJECT CODE | SUBJECT | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory Hours | Tutorial/ Drawing | Practical Hours | Total Hours |
| 34041 | Industrial Electronics | 5 | - | - | 5 |
| 34042 | Communication Engineering | 6 | - | - | 6 |
| 34043 | Digital Electronics # | 5 | - | - | 5 |
| 34044 | Linear Integrated Circuits | 4 | - | - | 4 |
| 34045 | Industrial Electronics and communication Practical | - | - | 5 | 5 |
| 34046 | Integrated Circuits Practical # | - | - | 5 | 5 |
| 30002 | Life and Employability Skill Practical * | - | - | 4 | 4 |
| | Seminar | 1 | - | - | 1 |
| | TOTAL | 21 | - | 14 | 35 |

**# Common with EEE and Mechatronics**

*** Common for all branches**

## FIFTH SEMESTER

| SUBJECT CODE | SUBJECT | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory | Tutorial/ Drawing | Practical Hours | Total |
| 34051 | Advanced Communication Systems | 6 | - | - | 6 |
| 34052 | Microcontroller @ | 6 | - | - | 6 |
| 34053 | Very Large Scale Integration | 5 | - | - | 5 |
| | Elective I | | - | - | |
| 34071 | 1.Digital Communication | 5 | - | - | 5 |
| 34272 | 2.Programmable Logic Controller @ | | | | |
| 34073 | 3.Electronic Systems Design | | | | |
| 34055 | Advanced Communication Systems Practical | - | - | 4 | 4 |
| 34056 | Microcontroller Practical @ | - | - | 4 | 4 |
| 34057 | Very Large Scale Integration Practical | - | - | 4 | 4 |
| | Seminar | 1 | - | - | 1 |
| | Total | 23 | - | 12 | 35 |

**@ Common with EEE, ICE and Mechatronics**

**SIXTH SEMESTER**

| SUBJECT CODE | SUBJECT | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory | Tutorial/ Drawing | Practical Hours | Total |
| 34061 | Computer Hardware Servicing and Networking | 6 | - | - | 6 |
| 34062 | Test Engineering $ | 6 | - | - | 6 |
| | Elective II | | - | - | |
| 34081 | 1.Television Engineering | 5 | - | - | 5 |
| 34082 | 2 Bio Medical Instrumentation | | | | |
| 34083 | 3.Mobile communication | | | | |
| 34064 | Computer Hardware Servicing and Networking Practical | - | - | 4 | 4 |
| 34065 | Test Engineering Practical $ | - | - | 4 | 4 |
| 34066 | Embedded Systems Practical | - | - | 5 | 5 |
| 34067 | Project Work | - | - | 4 | 4 |
| | Seminar | 1 | - | - | 1 |
| | Total | 18 | - | 17 | 35 |

**$ - Common with ICE**

**ANNEXURE- II**
**SCHEME OF THE EXAMINATION**
**THIRD SEMESTER**

| SUBJECT CODE | SUBJECT | Examination Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal assess-ment | Board Exam Marks | Total Mark | | |
| 34031 | Electronic devices and circuits @ | 25 | 75 | 100 | 40 | 3 |
| 34032 | Electrical circuits and Instrumentation | 25 | 75 | 100 | 40 | 3 |
| 34033 | Programming in “C” | 25 | 75 | 100 | 40 | 3 |
| 34034 | Electronic devices and circuits Practical # | 25 | 75 | 100 | 50 | 3 |
| 34035 | Electrical circuits and Instrumentation Practical | 25 | 75 | 100 | 50 | 3 |
| 34036 | Programming in “C” Practical | 25 | 75 | 100 | 50 | 3 |
| 34037 | Computer Application Practical for Electronics | 25 | 75 | 100 | 50 | 3 |
| | TOTAL | 175 | 525 | 700 | | |

**@ Common with EEE, ICE and Mechatronics**

**# Common with EEE and Mechatronics**

**FOURTH SEMESTER**

| SUBJECT CODE | SUBJECT | Examination Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal assessment marks | Board Exam Marks | Total Mark | | |
| 34041 | Industrial Electronics | 25 | 75 | 100 | 40 | 3 |
| 34042 | Communication Engineering | 25 | 75 | 100 | 40 | 3 |
| 34043 | Digital Electronics # | 25 | 75 | 100 | 40 | 3 |
| 34044 | Linear Integrated Circuits | 25 | 75 | 100 | 40 | 3 |
| 34045 | Industrial Electronics and communication Practical | 25 | 75 | 100 | 50 | 3 |
| 34046 | Integrated Circuits Practical # | 25 | 75 | 100 | 50 | 3 |
| 30002 | Life And Employability Skill Practical * | 25 | 75 | 100 | 50 | 3 |
| | TOTAL | 175 | 525 | 700 | | |

**# Common with EEE and Mechatronics**

*** Common for all branches**

**FIFTH SEMESTER**

| SUBJECT CODE | SUBJECT | Examination Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal assessment marks | Board Exam Marks | Total Mark | | |
| 34051 | Advanced Communication Systems | 25 | 75 | 100 | 40 | 3 |
| 34052 | Microcontroller @ | 25 | 75 | 100 | 40 | 3 |
| 34053 | Very Large Scale Integration | 25 | 75 | 100 | 40 | 3 |
| | Elective I | | | | | |
| 34071 | 1. Digital Communication | 25 | 75 | 100 | 40 | 3 |
| 34272 | 2. Programmable Logic Controller @ | | | | | |
| 34073 | 3. Electronic Systems Design | | | | | |
| 34055 | Advanced Communication Systems Practical | 25 | 75 | 100 | 50 | 3 |
| 34056 | Microcontroller Practical @ | 25 | 75 | 100 | 50 | 3 |
| 34057 | Very Large Scale Integration Practical | 25 | 75 | 100 | 50 | 3 |
| | Total | 175 | 525 | 700 | | |

**@ Common with EEE, ICE and Mechatronics**

## SIXTH SEMESTER

| SUBJECT CODE | SUBJECT | Examination Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal assess-ment marks | Board Exam Marks | Total Mark | | |
| 34061 | Computer Hardware Servicing and networking | 25 | 75 | 100 | 40 | 3 |
| 34062 | Test Engineering $ | 25 | 75 | 100 | 40 | 3 |
| | Elective II | | | | | |
| 34081 | 1.Television Engineering | 25 | 75 | 100 | 40 | 3 |
| 34082 | 2.Bio medical Instrumentation $ | | | | | |
| 34083 | 3.Mobile Communication | | | | | |
| 34064 | Computer Hardware Servicing and Networking Practical | 25 | 75 | 100 | 50 | 3 |
| 34065 | Test Engineering practical $ | 25 | 75 | 100 | 50 | 3 |
| 34066 | Embedded Systems Practical | 25 | 75 | 100 | 50 | 3 |
| 34067 | Project Work | 25 | 75 | 100 | 50 | 3 |
| | Total | 175 | 525 | 700 | | |

**$ - Common with ICE**

**ANNEXURE- I**

**CURRICULUM OUTLINE**

**3040: DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**(PART TIME)**

**THIRD SEMESTER**

| Subject Code | Subject | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory | Tutorial/ Drawing | Practical | Total |
| 34031 | Electronic Devices and Circuits | 4 | | | 4 |
| 34032 | Electrical Circuits and Instrumentation | 4 | | | 4 |
| 30016 | Engineering Graphics - I | | 4 | | 4 |
| 34034 | Electronic Devices and Circuits practical | | | 3 | 3 |
| 34035 | Electrical Circuits and Instrumentation practical | | | 3 | 3 |
| **TOTAL** | | **8** | **4** | **6** | **18** |

**FOURTH SEMESTER**

| Subject Code | Subject | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory | Tutorial/ Drawing | Practical | Total |
| 34033 | Programming in "C" | 4 | | | 4 |
| 34043 | Digital Electronics | 4 | | | 4 |
| 30026 | Engineering Graphics - II | | 4 | | 4 |
| 34036 | Programming in "C" Practical | | | 3 | 3 |
| 34037 | Computer application practical for Electronics | | | 3 | 3 |
| **TOTAL** | | **8** | **4** | **6** | **18** |

**FIFTH SEMESTER**

| Subject Code | Subject | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory | Tutorial/ Drawing | Practical | Total |
| 34041 | Industrial Electronics | 4 | | | 4 |
| 34042 | Communication Engineering | 4 | | | 4 |
| 34044 | Linear Integrated Circuits | 4 | | | **4** |
| 34045 | Industrial Electronics & Communication Engineering practical | | | 3 | 3 |
| 34046 | Integrated Circuits practical | | | 3 | 3 |
| **TOTAL** | | **12** | | **6** | **18** |

## SIXTH SEMESTER

| Subject Code | Subject | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory | Tutorial/ Drawing | Practical | Total |
| 34051 | Advanced Communication System | 4 | | | 4 |
| 34052 | Microcontroller | 4 | | | 4 |
| 34055 | Advanced communication system Practical | | | 4 | 4 |
| 34056 | Microcontroller practical | | | 3 | 3 |
| 30002 | Life And Employability Skill Practical | | | 3 | 3 |
| **TOTAL** | | **8** | **-** | **10** | **18** |

## SEVENTH SEMESTER

| Subject Code | Subject | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory | Tutorial/ Drawing | Practical | Total |
| 34053 | Very Large Scale Integration | 4 | | | 4 |
| 34071<br>34272<br><br>34073 | **Elective – I**<br>1.Digital Communication<br>2. Programmable Logic Controller<br>3. Electronic Systems Design | 4 | | | 4 |
| 34061 | Computer Hardware Servicing and Networking | 4 | | | **4** |
| 34057 | Very Large Scale Integration Practical | | | 3 | 3 |
| 34064 | Computer Hardware Servicing and Networking Practical | | | 3 | 3 |
| **TOTAL** | | **12** | | **6** | **18** |

## EIGHTH SEMESTER

| Subject Code | Subject | HOURS PER WEEK | | | |
|---|---|---|---|---|---|
| | | Theory | Tutorial/ Drawing | Practical | Total |
| 34062 | Test Engineering | 4 | | | 4 |
| 34081<br>34082<br>34083 | **Elective – II**<br>1.Television Engineering<br>2. Biomedical Instrumentation<br>3.Mobile Communication | 4 | | | 4 |
| 34066 | Embedded Systems Practical | | | 4 | **4** |
| 34065 | Test Engineering Practical | | | 3 | **3** |
| 34067 | Project Work | | | 3 | 3 |
| **TOTAL** | | **8** | | **10** | **18** |

## 3040: DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING (PART TIME)

### THIRD SEMESTER

| Subject Code | SUBJECT | Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal Assessment | Board Examination | Total | | |
| 34031 | Electronic Devices and Circuits | 25 | 75 | 100 | 40 | 3 |
| 34032 | Electrical Circuits and Instrumentation | 25 | 75 | 100 | 40 | 3 |
| 30016 | Engineering Graphics - I | 25 | 75 | 100 | 40 | 3 |
| 34034 | Electronic Devices and Circuits practical | 25 | 75 | 100 | 50 | 3 |
| 34035 | Electrical Circuits and Instrumentation practical | 25 | 75 | 100 | 50 | 3 |

### FOURTH SEMESTER

| Subject Code | SUBJECT | Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal Assessment | Board Examination | Total | | |
| 34033 | Programming in “C” | 25 | 75 | 100 | 40 | 3 |
| 34043 | Digital Electronics | 25 | 75 | 100 | 40 | 3 |
| 30026 | Engineering Graphics - II | 25 | 75 | 100 | 40 | 3 |
| 34036 | Programming in “C” Practical | 25 | 75 | 100 | 50 | 3 |
| 34037 | Computer application practical for Electronics | 25 | 75 | 100 | 50 | 3 |

## FIFTH SEMESTER

| Subject Code | SUBJECT | Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal Assessment | Board Examination | Total | | |
| 34041 | Industrial Electronics | 25 | 75 | 100 | 40 | 3 |
| 34042 | Communication Engineering | 25 | 75 | 100 | 40 | 3 |
| 34044 | Linear Integrated Circuits | 25 | 75 | 100 | 40 | 3 |
| 34045 | Industrial Electronics & Communication Engineering practical | 25 | 75 | 100 | 50 | 3 |
| 34046 | Integrated Circuits practical | 25 | 75 | 100 | 50 | 3 |

## SIXTH SEMESTER

| Subject Code | SUBJECT | Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal Assessment | Board Examination | Total | | |
| 34051 | Advanced Communication System | 25 | 75 | 100 | 40 | 3 |
| 34052 | Microcontroller | 25 | 75 | 100 | 40 | 3 |
| 34055 | Advanced communication system Practical | 25 | 75 | 100 | 50 | 3 |
| 34056 | Microcontroller practical | 25 | 75 | 100 | 50 | 3 |
| 30002 | Life And Employability Skill Practical | 25 | 75 | 100 | 50 | 3 |

**SEVENTH SEMESTER**

| Subject Code | SUBJECT | Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal Assessment | Board Examination | Total | | |
| 34053 | Very Large Scale Integration | 25 | 75 | 100 | 40 | 3 |
| 34071<br>34272<br><br>34073 | **Elective – I**<br>1.Digital Communication<br>2. Programmable Logic Controller<br>3. Electronic Systems Design | 25 | 75 | 100 | 40 | 3 |
| 34061 | Computer Hardware Servicing and Networking | 25 | 75 | 100 | 40 | 3 |
| 34057 | Very Large Scale Integration Practical | 25 | 75 | 100 | 50 | 3 |
| 34064 | Computer Hardware Servicing and Networking Practical | 25 | 75 | 100 | 50 | 3 |

**EIGHTH SEMESTER**

| Subject Code | SUBJECT | Marks | | | Minimum for pass | Duration of Exam Hours |
|---|---|---|---|---|---|---|
| | | Internal Assessment | Board Examination | Total | | |
| 34062 | Test Engineering | 25 | 75 | 100 | 40 | 3 |
| 34081<br>34082<br>34083 | **Elective – II**<br>1.Television Engineering<br>2. Biomedical Instrumentation<br>3.Mobile Communication | 25 | 75 | 100 | 40 | 3 |
| 34066 | Embedded Systems Practical | 25 | 75 | 100 | 50 | 3 |
| 34065 | Test Engineering Practical | 25 | 75 | 100 | 50 | 3 |
| 34067 | Project Work | 25 | 75 | 100 | 50 | 3 |

**Board Examination - Question paper pattern**

**Common for all theory subjects**

**Time: 3 Hrs** **Max. Marks: 75**

***PART A*** ***- (1 to 8) 5 Questions are to be answered out of 8 questions for 2 marks each.*****(Question No. 8 will be the compulsory question and *can be asked from any one of the units)(From each unit maximum of two 2 marks questions alone can be asked)***

***PART B*** ***- (9 to 16)5 Questions are to be answered out of 8 questions for 3 marks each.*** **(Question No. 16 will be the compulsory question and *can be asked from any one of the units) (From each unit maximum of two 3 marks questions alone can be asked)***

***PART C*** ***- (17 to 21) Five Questions will be in the Either OR Pattern. Students have to answer these five questions. Each question carries 10 marks. (Based on the discretion of the question setter, he/she can ask two five mark questions (with sub division A & sub division B) instead of one ten marks question if required)***

# III SEMESTER

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M - SCHEME**

**III SEMESTER**

**2015-2016 onwards**

# ELECTRONIC DEVICES AND CIRCUITS

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject Code : 34031**

**Semester : III Semester**

**Subject title : ELECTRONIC DEVICES AND CIRCUITS**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| Electronic Devices and Circuits | 6 | 90 | 25 | 75 | 100 | 3 Hrs |

**Topics and allocation of hours**

| UNIT | TOPIC | TIME (HRS) |
|---|---|---|
| I | Semiconductor and Diodes | 16 |
| II | Bipolar Junction Transistor | 15 |
| III | Transistor oscillators and FET and UJT | 17 |
| IV | SCR,DIAC,TRIAC and MOSFET | 16 |
| V | Opto Electronic Devices and Wave shaping Circuits | 16 |
| | Revision, Tests and Model Exam (3+4+3 Hrs) | 10 |
| Total | | 90 |

**RATIONALE:**

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

**OBJECTIVES:**

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

- Study the working principle of PN junction diode and transistor
- Understand the working principle of different types of rectifiers, different transistor configurations and differentiate various types of amplifiers
- Study the performance of special devices like UJT, FET
- Study the performance of different transistor oscillators
- Study the performance of SCR, DIAC, and TRIAC
- Study the performance and types of MOSFET
- Study the different modes of operations of MOSFET
- Know the construction and working principle of optoelectronic devices
- Study the performance of solar cell with principle and applications
- Explain the concept of wave shaping circuits
- Study the working principle of clippers and clampers

## 34031 – ELECTRONIC DEVICES AND CIRCUITS

| Unit | Name of the topic | Hrs |
|---|---|---|
| 1 | **Semiconductor and Diodes:**<br>**Semiconductor-**Definition, classification, intrinsic and extrinsic N type & p type – drift current &diffusion current diodes – PN junction diode – forward and Reverse bias characteristics – specification – zener diode construction & working Principle-characteristics - zener break down-avalanche break down- zener Diode as a voltage regulator –applications- specifications<br><br>**Rectifier** – introduction-classification of rectifiers-half wave rectifier-full wave Rectifier(center tapped, bridge)-(no mathematical equations)-comparison-Applications-filters-C, LC and PI filters | 10<br><br>6 |
| 2 | **Bipolar junction Transistor:**<br>**Transistor –** NPN and PNP transistor – operation-transistor as an amplifier-transistor as a switch – transistor biasing – fixed bias, collector base bias, self bias – CB,CE,CC configurations – characteristics - comparison between three configurations in terms of input impedance, output impedance, current gain, voltage gain – classification of amplifiers-<br><br>RC coupled amplifier – emitter follower and its application – negative feedback Concept, effect of negative feedback – types of negative feedback connections | 10<br><br>5 |
| 3 | **Transistor Oscillators and FET and UJT:**<br>**Transistor oscillator** – Classifications – Condition for oscillations (Barkhausen criterion) – General form of LC oscillator – Hartley Oscillator – Colpitts Oscillator – RC Phase shift oscillator- Crystal oscillator.<br>**Field Effect Transistor** – construction – working principle of FET – difference Between FET and BJT – classification of FET – characteristics of FET – Applications – FET amplifier (common source amplifier).<br>**Uni Junction Transistor** – construction – equivalent circuit – operation – Characteristics – UJT as a relaxation oscillator | 11<br><br>6 |
| 4 | **SCR, DIAC, TRIAC & MOSFET:**<br>SCR – introduction – working – VI-characteristics -comparison between SCR and transistor – SCR as a switch, controlled rectifier.<br>TRIAC working principle Characteristics – DIAC – characteristics – DIAC as bi-directional switch.<br>MOSFET – types & characteristics of N channel MOSFET and P channel MOSFET- Characteristics of enhancement and depletion mode MOSFET – MOSFET as a switch.<br>Applications of SCR,TRIAC, DIAC and MOSFET. | 9<br><br>7 |
| 5 | **Opto Electronics Devices and wave shaping circuits:**<br>Classification of opto electronic devices – symbols, Characteristics, working of LDR, LED, 7 segment LED and LCD– opto coupler - Photo transistor. Clipper, Clamper Circuits and waveforms only – Solar Cell - Principles -Applications. | 16 |

| | | |
|---|---|---|
| | Astable, Monostable and Bi-stable Multivibrators using Transistors -Schmitt Trigger using Transistors. | |
| | Revision , Test and Model exam | 10 |

**Text Books:**


1. Electronics Devices & Circuits by Salivahanan S, N.Suresh Kumar, A.Vallavaraj Tata McGraw Publication 3rd Edition 2016

2. Electronics Devices and circuit theory by Boyestad & Nashelsky, PHI , New Delhi 2009


**Reference Books:**


1. Electronic Principles by Malvino,-Tata McGraw Hill Publication 2010.
2. Electronic Devices & Circuits by Allen Mottershed*An Introduction*, PHI
3. Electronics Devices & Circuits by Jacob Millman and Halkias3rd Edition 2010, Tata McGraw – Hill publication
4. Optical Fiber Communication by GerdKeise 5th Edition, Tata McGraw – Hill Publication

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**III SEMESTER**

**2015-2016 onwards**

# ELECTRICAL CIRCUITS AND INSTRUMENTATION

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject Code : 34032**

**Semester : III Semester**

**Subject Title : ELECTRICAL CIRCUITS AND INSTRUMENTATION**

## TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | |
| | Hrs Week | Hrs Semester | Internal Assessment | Board Examination | Total | Duration |
| Electrical Circuits and Instrumentation | 6 | 90 | 25 | 75 | 100 | 3 Hrs |

**TOPICS AND ALLOCATION:**

| UNIT | TOPIC | TIME(HRS) |
|---|---|---|
| I | DC Circuits and Theorems | 16 |
| II | AC Circuits and Resonance | 16 |
| III | Transformers and Machines | 16 |
| IV | Measuring Instruments and CRO | 15 |

| | | |
|---|---|---|
| V | Transducers, Sensors & Test Instruments | 15 |
| Revision – Test | | 12 |
| TOTAL | | 90 |

**RATIONALE:**

This subject enables the students with concepts of DC, AC circuits and fundamentals of Electrical Machines. The subject also deals with concepts, principles and working of analog and digital electronic measuring instruments. The introduction of this subject will enable the students to be well exposed to a wide area of various electronic measuring instruments and a thorough knowledge of the fundamentals of electrical circuits.

**OBJECTIVES:**

- To study ohm's law and Kirchhoff' s laws.
- To study the circuit theorems
- To learn about series and parallel Circuits.
- To learn various terms related to AC circuits.
- To understand concept of AC circuits
- To learn about series and parallel resonance circuits.
- To study about transformer and its working.
- To understand the working of DC machine.
- To know about Induction motors and stepper motor.
- To understand the basic measuring instruments.
- To learn about bridge circuits.
- To discuss about CRO and its types.
- To learn about transducers and its various types.
- To study about sensors.
- To know about test instruments.

## 34032 ELECTRICAL CIRCUITS AND INSTRUMENTATION

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **D.C. CIRCUITS AND THEOREMS**<br>Definition and unit for voltage, current, power, resistance, conductance, resistivity- Ohm's law – only simple problems in ohm's law- Kirchoff's current law and voltage law.<br>Series circuits –parallel circuits, series parallel circuits.<br>Mesh Method (simple problems)<br>Thevenin's - Norton's theorems, Super position and Maximum power transfer theorem – Statement and Explanation (simple problems) | 8<br><br>8 |
| 2 | **A.C. CIRCUITS AND RESONANCE**<br>**A.C. CIRCUITS**<br>AC through single pure resistance, pure inductance, pure capacitance - voltage and current relationship and (to mention only) the equation for power and power factor in each case ( only simple problems).<br>Definition for impedance, reactance, admittance, conductance, impedance, Phase angle, power factor and power.<br>AC circuits – Derivation for impedance and admittance, power and power factor in Series and Parallel R-L ,R-C ,R-L-C circuits. Analysis of Parallel R-L circuit, R-C circuit, R-LC circuit (qualitative treatment only).<br>**RESONANCE**<br>Resonance- series resonance – parallel resonance - condition for resonance- resonant frequency-Q factor - resonance curve-bandwidth (only simple problems). | 11<br><br>5 |
| 3 | **TRANSFORMERS AND MACHINES**<br>**TRANSFORMERS** | 8 |

| | | |
|---|---|---|
| | Transformer – Ideal transformer – construction - working principle –EMF equation Losses in transformer- core loss, copper loss- Efficiency- Regulation OC, SC test on transformer -List of applications (qualitative treatment only)<br>**MACHINES**<br>D.C. Machines - DC–Generator –Working principle - Types- Applications DC motor- working principle - types- applications (qualitative treatment only )<br>Single phase induction motor- types- construction and principle of operation of capacitor start induction motor- Applications - stepper motor-working principle-uses (qualitative treatment only)- Universal Motor (qualitative treatment only)<br>Difference between single phase and three phase supply. | **8** |
| **4** | **MEASURING INSTRUMENTS AND CRO**<br>**MEASURING INSTRUMENTS**<br>Definition for Measurement, Instrument- Errors in Measurement - Calibration- Indicating instruments – Basic forces for indicating instruments - construction and operation of permanent magnet moving coil Instrument -Advantages – Disadvantages of PMMC - Shunts and Multipliers - DC ammeter-DC voltmeter-voltmeter sensitivity.<br>Bridges- Types - Wheat stone bridge - applications -Universal impedance bridge arrangements to measure R, L,C<br>**CRO**<br>CRO- Block diagram and principle of operation of CRO- operation of CRT Electrostatic focusing- Electrostatic deflection (no derivation ) - Block diagram of vertical deflection system- Applications of CRO - Types of CRO- Block diagram and operation of dual trace CRO- Dual beam CRO - Comparison between dual trace and dual beam CRO – Digital storage Oscilloscope - Block diagram- advantage. Block diagram-working principle of Function Generator | **8**<br><br>**7** |
| **5** | **TRANSDUCERS , SENSORS & TEST INSTRUMENTS**<br>**TRANSDUCERS**<br>Transducers –Classification of transducers<br>Strain gauge - Types-uses.<br>Construction, operation and applications of photo electric transducer, LVDT, RVDT and Load cell.<br>Principle of working of Thermocouple- Temperature measurement using thermocouple - list of applications-<br>Principle of working of Thermistor –Temperature measurement using thermistors - Types (NTC, PTC) – List of applications.<br>**SENSORS**<br>IR range sensor – IR proximity sensor- Ultrasonic range sensor- Touch Sensor.<br>**TEST INSTRUMENTS**<br>Digital voltmeter –Types ( to list only ) - Basic block diagram of DVM - Block diagram of Digital multimeter- Advantages over analog instruments - Block diagram of Digital frequency counter– Simple PC based Data Acquisition system – Block | **8**<br><br>**7** |

| | | |
|---|---|---|
| | diagram. | |
| | Revision – Tests | **12** |

**REFERENCE BOOKS:**

| SL.No | Title | Author | Publisher with Edition |
|---|---|---|---|
| 1. | Electrical Technology | B.L. Theraja | Division of Nirja constructions and development co. (P) Ltd., -1994. |
| 2. | Electric Circuit Theory | Dr. M. Arumugam, N. Premkumaran | Kanna Publisher, Delhi -1997 |
| 3. | Electronic Measurements and Instrumentation | R.K.Rajput | S. Chand (Third Edition)-2009 |
| 4. | Electronic Measurements and Instrumentation | Sanjay Talbar & Akhilesh Upadhyaya. | Dhanpat Rai Publications (p) Ltd-2004 |
| 5. | Modern Electronic Instrumentation and Measurement Techniques | Albert D.Hel frick and Willam David cooper | Prentice Hall of India Pvt. Ltd., 1996 |
| 6. | Electrical and Electronic-Measurements and Instrumentation | A.K.Sawheney | Dhanpat rai and Sons -1993. |
| 7. | Electronic Instrumentation | Kalsi | Kalsi H S. Tata McGraw-Hill Education, 2004 |
| 8. | Measurement systems-Application and Design | Ernest O. Doebelin | McGraw hill -2004 |
| 9. | Transducers and Instrumentation | D.V.S.Murty | McGraw hill -2004 |
| 10. | Electrical & Electronics Measurements and instrumentation | Umesh Sinha | Satyaprakashan Tech,1992 |

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**M-SCHEME**

**2015- 2016**

# PROGRAMMING IN "C"

## DIRECTORATE OF TECHNICAL EDUCATION

## GOVERNMENT OF TAMILNADU

**M-SCHEME**
**(Implemented from the Academic year 2015-2016 onwards)**

Course Name : Electronics and Communication Engineering
Subject code : **34033**
Semester : III Semester
Subject title : **PROGRAMMING IN "C"**

**TEACHING AND SCHEME OF EXAMINATION :**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| PROGRAMMING IN "C" | Hrs/ week | Hrs/ semester | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 5 | 75 | 25 | 75 | 100 | 3Hrs |

## TOPICS & ALLOCATION OF HOURS

| Unit No. | Topics | No. of Hours |
|---|---|---|
| I | PROGRAM DEVELOPMENT AND INTRODUCTION TO C | 12 |
| II | C OPERATOR, I/O STATEMENT and DECISION MAKING, | 13 |
| III | ARRAYS AND STRINGS and FUNCTIONS | 14 |
| IV | STRUCTURES AND UNIONS, DYNAMIC MEMORY MANAGEMENT | 13 |
| V | "C" PROGRAMMING | 13 |
| | TEST AND REVISION | 10 |
| | **TOTAL** | **75** |

## RATIONALE

C' is the most widely used computer language, which is being taught as a core course. C is general purpose structural language that is powerful, efficient and compact, which combines features of high level language and low-level language. It is closer to both Man and Machine. Due to this inherent flexibility and tolerance it is suitable for different development environments. Due to these powerful features, C has not lost its importance and popularity in recently developed and advanced software industry. C can also be used for system level programming and it is still considered as first priority programming language. This course covers the basic concepts of C. This course will act as "Programming concept developer" for students. It will also act as "Backbone" for subjects like OOPS, Visual Basic, Windows Programming, JAVA etc.

**OBJECTIVES**

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

- Define Program, Algorithm and flow chart
- List down and Explain various program development steps
- Write down algorithm and flow chart for simple problems.
- Describe the concepts of Constants, Variables, Data types and operators.
- Develop programs using input and output operations.
- Understand the structure and usage of different looping and branching statements.
- Define arrays and string handling functions.
- Explain user-defined functions, structures and union.
- To understand the dynamic data structure and memory management.

**34033- PROGRAMMING IN "C"**
**DETAILED SYLLABUS**

| UNIT | NAME OF THE TOPICS | HOURS |
|---|---|---|
| I | **Program Development & Introduction to C**<br>1.1 Program, Algorithm & flow chart:- Program development cycle- Programming language levels & features. Algorithm – Properties & classification of Algorithm, flow chart – symbols, importance & advantage of flow chart.<br><br>1.2 Introduction to C: - History of C – features of C- structure of C program – Compile, link & run a program. Diagrammatic representation of program execution process.<br><br>1.3 Variables, Constants & Data types:. C character set-Tokens-Constants- Key words – identifiers and Variables – Data types and storage – Data type Qualifiers – Declaration of Variables – Assigning values to variables- Declaring variables as constants-Declaring variables as volatile- Overflow & under flow of data. | **3 Hrs**<br><br>**4 Hrs**<br><br>**5 Hrs** |
| II | **C OPERATORS, I/O STATEMENT and DECISION MAKING**<br>2.1 C operators:-Arithmetic, Logical, Assignment .Relational, Increment and Decrement, Conditional, Bitwise, Special Operator precedence and Associativity. C expressions – Arithmetic expressions – Evaluation of expressions- Type cast operator<br><br>2.2 I/O statements: Formatted input, formatted output, Unformatted I/O statements<br><br>2.3 Branching:- Introduction – Simple if statement – if –else – else-if ladder , nested if-else-Switch statement – go statement.<br><br>2.4 Looping statements:- While, do-while statements, for loop, break &continue statement. | **3 Hrs**<br><br>**3 Hrs**<br><br>**4 Hrs**<br><br>**3 Hrs** |
| III | **ARRAYS and STRINGS FUNCTIONS**<br>3.1 Arrays:- Declaration and initialization of One dimensional, Two dimensional and Character arrays – Accessing array elements – Programs using arrays.<br><br>3.2 Strings :- Declaration and initialization of string variables, Reading String, Writing Strings – String handling functions (strlen(),strcat(),strcmp()) – String manipulation programs.<br><br>3.3 Built –in functions: -Math functions – Console I/O functions – Standard I/O functions – Character Oriented functions.<br>3.4 User defined functions:- Defining functions & Needs-, Scope and Life time of Variables, , Function call, return values, Storage classes, Category of function – Recursion. | **3 Hrs**<br><br>**3 Hrs**<br><br>**3 Hrs**<br><br>**5 Hrs** |

| | | |
|---|---|---|
| **IV** | **STRUCTURES AND UNIONS, DYNAMIC MEMORY MANAGEMENT**<br>4.1 Structures and Unions:- Structure – Definition, initialization, arrays of structures, Arrays with in structures, structures within structures, Structures and functions – Unions – Structure of Union – Difference between Union and structure.<br>4.2 Dynamic Memory Management:- introduction – dynamic memory allocation – allocating a block memory (MALLOC) – allocating multiple blocks of memory (CALLOC) –releasing the used space: free – altering the size of a block (REALLOC). | **7 Hrs**<br><br>**6 Hrs** |
| **V** | **"C" PROGRAMMING**<br>5.1 Program to find Sum of Series using "while" loop- Program to find Factorial of N numbers using functions- Program to swap the values of two variables.<br><br>5.2 Program to implement Ohms Law- Program to find Resonant Frequency of RLC Circuit- Program to find equivalent resistance of three resistances connected in series and parallel- Program to draw the symbol of NPN transistor using Graphics- Program to draw the symbol of diode using Graphics. | **5 Hrs**<br><br>**8 Hrs** |
| **Revision & Test** | | **10 hrs** |

**Text book:**

1. Programming in ANSI C 4E by Prof. E. BALAGURUSAMY, the TATA McGRAW –HILL publications.

**REFERNCES**

| S.No | Title | Author | Publisher | Year of Publication /Edition |
|---|---|---|---|---|
| **1** | Programming and Problem solving using C | ISRD Group, Lucknow | Tata Mc-GrawHill, New Delhi Sixth Reprint | 2010 |
| **2** | Let us C | Yeswanth | Kanetkar BPB Publications | Fourth Revised Edition |
| **3** | A TextBook on C | E.Karthikeyan | PHI Private Limited, New Delhi | 2008 |
| **4** | Programming in C | D.Ravichandran | New Age International Publishers | C FirstEdition 1996 Reprint2011 |
| **5** | Computer Concepts And Programming in C | Dr.S.S.Khandare | S.Chand & Company Ltd. New Delhi | First Edition 2010 |
| **6** | Complete Knowledge in C | Sukhendu Dey, Debobrata Dutta | Narosa Publishing House, New Delhi | Reprint2010 |
| **7** | Programming in C | Reema Theraja | Oxford University Press | First Edition 2011 |
| **8** | Practical C Programming | Steve Oualline | O'Reilly, Shroff Publishers | Eleventh Indian ReprintOct2010 |

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**III SEMESTER**

**2015-2016 onwards**

# ELECTRONIC DEVICES AND CIRCUITS PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34034**

**Semester : III**

**Subject title : Electronic Devices and Circuits Practical**

**TEACHING AND SCHEME OFEXAMINATION:**

Number of Weeks/
Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| Electronic Devices and Circuits Practical | 4 | 60 | 25 | 75 | 100 | 3 Hrs |

**ALLOCATION OF MARKS**

| | | |
|---|---|---|
| CIRCUIT DIAGRAM | : | 20 |
| CONNECTION | : | 25 |
| EXECUTION & HANDLING OF EQUIPMENT | : | 15 |
| OUTPUT / RESULT | : | 10 |
| VIVA – VOCE | : | 05 |
| TOTAL | : | 75 |

**EQUIPMENTS REQUIRED:**

| S.NO | Name of the Equipments | Range | Required Nos. |
|---|---|---|---|
| 1. | DC Regulated power supply | 0-30V, 1A | 10 |
| 2. | High Voltage Power Supply | 0-250V, 1A | 2 |
| 3. | Signal Generator | 1MHz | 4 |
| 4. | Dual trace CRO | 20 MHz / 30MHz | 5 |
| 5. | Digital Multi meter | - | 10 |
| 6. | DC Voltmeter (Analog/Digital) | Different Ranges | 15 |
| 7. | DC Ammeter (Analog/Digital) | Different Ranges | 15 |
| 8. | Computers for simulation Experiments | | 2 |
| 9. | Software - **PSPICE/ multisim / orcad / tina(Any 1)** | | |

## 34034 - ELECTRONIC DEVICES AND CIRCUITS PRACTICAL

**Note:**

**1. At least 5 experiments should be constructed using breadboard/soldering**

**STUDY EXPERIMENT (Not for Examination)**

Identify and check the working condition of passive & active components and switches.

**List of experiments to be conducted**

1. Construct and plot the VI characteristics of PN junction diode and find the cut-in voltage.
2. Construct and plot the VI characteristics of Zener diode and find the break down voltage.
3. Construct and plot the regulation characteristics (by varying either load or line voltage) of Half wave rectifier with and without filters.
4. Construct and plot the regulation characteristics (by varying either load or line voltage) of Full wave rectifier with and without filters.
5. Construct and plot the regulation characteristics (by varying either load or line voltage) of Bridge rectifier with filters.
6. Construct and draw the Input and output characteristics of CE Transistor configuration and find its input & output resistance.
7. Construct and draw the frequency response of RC coupled amplifier and determine the 3-db bandwidth.
8. Construct and plot the drain characteristics of JFET and find its pinch off voltage.
9. Construct and plot UJT characteristics and find its Ip and Vv.
10. Construct and draw SCR characteristics and find its break over voltage.
11. Construct and plot the DIAC and TRIAC characteristics.
12. Construct and draw the waveforms of positive clipper and clamper.
13. Construct and draw the characteristics of LDR and a photo transistor.
14. Simulate the half wave, full wave and bridge rectifier using the simulation tool like PSPICE/ multisim/orcad/tina
15. Simulate the astable and mono stable multi vibrator using the simulation tool like PSPICE/ multisim/orcad/tina

**DIPLOMA IN ELECTRONICS AND COMMUNICAITON**

**ENGINEERING**

**IIYEAR**

**III SEMESTER**

**M - SCHEME**

**2015 - 2016 onwards**

# ELECTRICAL CIRCUITS AND INSTRUMENTATION PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject Code: 34035**

**Semester : III Semester**

**Subject Title : ELECTRICAL CIRCUITS AND INSTRUMENTATION PRACTICAL**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 Weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | |
| | Hrs Week | Hrs Semester | Internal Assessment | Board Examination | Total | Duration |
| Electrical Circuits and Instrumentation Practical | 4 | 60 | 25 | 75 | 100 | 3 Hrs |

## ALLOCATION OF MARKS

| | | |
|---|---|---|
| CIRCUIT DIAGRAM | : | 20 |
| CONNECTION | : | 25 |
| EXECUTION & HANDLING OF EQUIPMENT | : | 15 |
| OUTPUT / RESULT | : | 10 |
| VIVA – VOCE | : | 05 |
| **TOTAL** | **:** | **75** |

## MAJOR EQUIPMENT REQUIRED

| S.No | Name of the Equipments | Range | Required Nos |
|---|---|---|---|
| 1. | DC regulated power supply | (0-30V),1A | 8 |
| 2. | Signal generators | 1MHZs | 3 |
| 3. | Dual trace CRO | 20MHZ | 4 |
| 4. | DC Voltmeter | (0-15V) | 8 |
| 5. | DC Ammeter | (0-300μA) | 6 |
| 6. | DC Ammeter | (0-100mA) | 8 |
| 7. | Digital Multimeter | - | 4 |
| 8. | Galvanometer | - | 1 |
| 9. | Decade Resistance Box | - | 1 |

## 34035 - ELECTRICAL CIRCUITS AND INSTRUMENTATION PRACTICAL

## LIST OF EXPERIMENTS

**Note: Atleast 5 experiments should be constructed using breadboard/ soldering.**

1. Construct a circuit to verify Ohm's law.
2. Construct a circuit to verify Kirchoff's voltage and current law.
3. Construct a circuit to verify Super position theorem.
4. Construct a circuit to verify Thevenin's Theorem.
5. Construct a circuit to verify Norton's Theorem.
6. Construct a circuit to verify Maximum power transfer Theorem.
7. Construct and test the performance of series resonant circuit and parallel resonant circuit.
8. Calibrate the given ammeter and voltmeter.
9. Construct and test the performance of Wheatstone bridge.
10. Measure the amplitude and frequency of signals using dual trace CRO.
11. Measure the frequency and phase angle using CRO by Lissajous figure.
12. Test the performance of LVDT.
13. Measure strain using strain gauge.
14. Determine the characteristics of a thermistor
15. Test the performance of a load cell.

# DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

## M-SCHEME

## 2015- 2016

# PROGRAMMING IN “C” PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**
**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**
**Subject code : 34036**
**Semester : III Semester**
**Subject title : PROGRAMMING IN "C" PRACTICAL**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| PROGRAMMING IN "C" PRACTICAL | Hrs/ week | Hrs/ semester | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 5 | 75 | 25 | 75 | 100 | 3Hrs |

**RATIONALE:**

This subject is a fundamental for the student to learn how to write a program in high level language . so it will be useful for Electronics and Communication Engineers to write coding and to develop the software. Further practice for writing simple program for Electronics application is insisted.

**OBJECTIVES:**

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

Analyze the given problem.

Think the logic to solve the given problem.

Describe the concepts of constants, variables, data types and operators.

Develop programs using input and output operations.

Write programs using different looping and branching statements.

Write programs based on arrays.

Write programs for solving simple equations used in circuit theory.

## 34036- PROGRAMMING IN "C" PRACTICAL
## LIST OF EXPERIMENTS

1. Write C language program to find the solution of a quadratic equation.

2. Write C language program to find whether the given number is a positive number, negative number or zero.

3. Write C language program to find the sum of series using While loop.

4. Write C language program to perform the Arithmetic operation based on the numeric key press using switch case statement. (1-Addition, 2-Subtraction, 3 – multiplication, 4 - Division).

5. Write C language program to implement Ohms Law.

6. Write C language program to find factorial of given N numbers using function.

7. Write C language program to prepare the total marks for N students by reading the Name, Reg.No, Marks 1 to Marks 6 using array of structure.

8. Write C language program to swap the values of two variables.

9. Write C language program to calculate the equivalent resistance of three resistances connected in series and parallel.

10. Write C language program to calculate the equivalent Capacitance of three Capacitors connected in series and parallel.

11. Write C language program to find Resonant Frequency of RLC Series and Parallel Circuits.

12. Write C language program to find the power factor of series RL circuits.

13. Write C language program to find the Q factor for series and parallel resonant circuits.

14. Write C language program to draw the symbol of NPN transistor using Graphics.

15. Write C language program to draw the symbol of Diode using Graphics.

**ALLOCATION OF MARKS**

| PROGRAMMING IN "C" PRACTICAL | | |
|---|---|---|
| **No.** | **Allocation** | **Marks** |
| 1 | Writing Algorithm | 20 |
| 2 | Writing Program | 20 |
| 3 | Executing program | 25 |
| 3 | Result | 05 |
| 4 | Viva Voce | 05 |
| Total | | 75 |

**HARDWARE REQUIRMENT:**

Desktop/laptop computers : 15 nos
Laser printer : 01 no

**Software requirement:**

C-compiler and editor

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**III SEMESTER**

**2015-2016 onwards**

# COMPUTER APPLICATIONS PRACTICAL IN ELECTRONICS

**CURRICULAM DEVELOPMENT CENTRE**

**M- SCHEME**

**(to be implemented to the student Admitted from the Year 2015-2016 on wards)**

**Course Name : ELECTRONICS AND COMMUNICATION ENGINEERING**

**Subject Code : 34037**

**Semester : III**

**Subject title : COMPUTER APPLICATIONS PRACTICAL IN ELECTRONICS**

**TEACHING & SCHEME OF EXAMINATION:**

No. of weeks per Semester: 15 Weeks

| Course | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Max. Marks | | | Duration |
| | Hours/ Week | Hours Semester | Continuous Assessment | Semester-End Examination | Total | |
| COMPUTER APPLICATIONS PRACTICAL IN ELECTRONICS | 4 Hrs | 60 Hrs | 25 | 75 | 100 | 3 Hrs |

**RATIONALE:**

The Computer Application Practical in Electronics facilitates the necessary knowledge and skills regarding creating, working and maintaining the documents, analyzing the data with charts manipulation of databases, presentation of documents with audio visual effects in a computer and provides the latest tools and technologies in helping the students to fetch better employment.

**OBJECTIVES:**

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

- Understand the Windows operating systems,

  word processing

- Analyze the data sheet
- Create and manipulate the database Prepare PowerPoint presentation
- Understand Internet concepts and usage of e-mail
- Understand simulation of characteristics of various electronic components using electronics device automation tools.

## ALLOCATION OF MARKS

| CONTENT | Max. Marks | |
|---|---|---|
| | Section I | Section II |
| Procedure | 15 | 15 |
| Execution | 15 | 15 |
| Result with printout | 5 | 5 |
| viva | 5 | |
| Total | 75 | |

## LIST OF EXPERIMENTS

## SECTION I

**Exercise in WINDOWS:**

1. a. Install screen saver and change the monitor resolution by 1280X960
   b. Setting wall papers
   c. Creating, moving, deleting and renaming a folder
   d. Copying files into CD/DVD
   e. Recording and saving an audio file
   f. Set/Change the date and time.

**Exercise in WORD PROCESSING:**

2. Create a standard covering letter and use mail merge to generate the customized letters for applying to a job in various organizations. Also, create a database and generate labels for the applying organizations.
3. Create a news letter of three pages with two columns text. The first page contains some formatting bullets and numbers. Set the document background colour and add 'confidential' as the watermark. Give the document a title which should be displayed in the header. The header/ footer of the first page should be different from other two pages. Also, add author name and date/ time in the header. The footer should have the page number.

**Exercises in SPREADSHEET**

4. Create a table of records with columns as Name and Donation Amount. Donation amount should be formatted with two decimal places. There should be at least twenty records in the table. Create a conditional format to highlight the highest donation with blue colour and lowest donation with red colour. The table should have a heading.

5. Prepare line, bar and pie chart to illustrate the subject wise performance of the class for any one semester.

**Exercise in DATABASE**

6. Prepare a payroll for employee database of an organization with the following details:

Employee Id, Employee name, Date of Birth, Department and Designation, Date of appointment, Basic pay, Dearness Allowance, House Rent Allowance and other deductions if any.

Perform simple queries for different categories.

**Exercise in POWER POINT**

7. Create a Presentation on a mini project with ten different slide transitions with sound effect.

**Exercise in INTERNET**

a. Create e-mail id and perform the following.

i. Write an e-mail inviting your friends to your birthday party.
ii. Make your own signature and add it to the e-mail message.
iii. Add a word attachment of the venue route

b. Send the e-mail to at least 2 of your friends.

**SECTION II**

**Exercises in SIMULATION TOOLS**

9. Simulate VI characteristics of PN junction diode.

10. Simulate VI characteristics of LED.

11. Simulate VI characteristics of Zener diode.

12. Simulate VI characteristics of NPN transistor.

13. Simulate VI characteristics of FET.

14. Simulate VI characteristics of UJT.

15. Simulate VI characteristics of SCR.

**SOFTWARE REQUIREMENTS**

**SECTION I**

| | | |
|---|---|---|
| Operating System | : | Windows XP or Windows Vista or Windows 7 / Linux |
| Office Package | : | Microsoft office 2000 or Office 2003 or Office 2007/Open Office |

**SECTION II**

| | | |
|---|---|---|
| SPICE simulation tools | : | PSPICE or Multisim or Lab VIEW / OrCAD / TINA |

**HARDWARE REQUIREMENTS**

| | | |
|---|---|---|
| Desktop/Laptop Computer System | : | 15 Nos |
| Laser Printer | : | 1 No |

# IV SEMESTER

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**IV SEMESTER**

**2015-2016 onwards**

# INDUSTRIAL ELECTRONICS

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34041**

**Semester : IV**

**Subject title : INDUSTRIAL ELECTRONICS**

## TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| INDUSTRIAL ELECTRONICS | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

## TOPICS AND ALLOCATION:

| Unit | Topic | Time (Hrs.) |
|---|---|---|
| I | Power devices and Trigger circuits | 13 |
| II | Converters and choppers | 13 |
| III | Inverters and applications | 13 |
| IV | Programmable logic controller | 14 |
| V | DCS | 12 |
| VI | Revision – Tests – Model (3 +4+3) | 10 |
| | TOTAL | 75 |

**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 & DCS 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.
- know about the architecture of DCS
- know about LCU and display units of DCS

## 34041 -- INDUSTRIAL ELECTRONICS

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **POWER DEVICES AND TRIGGER CIRCUITS**<br>**POWER DEVICES**<br>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[5](page – 298)<br>**TRIGGER CIRCUITS**<br>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<br>6 |
| 2 | **CONVERTERS AND CHOPPERS** (Qualitative treatment only)<br>**CONVERTERS**<br>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<br>**CHOPPERS**<br>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<br>4 |
| 3 | **INVERTERS & APPLICATIONS**<br>**INVERTERS**<br>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<br>**INVERTER APPLICATIONS**<br>SMPS Types - Block diagram of SMPS – advantages and disadvantages. UPS-Type (ON Line, OFF Line), Comparison.- Battery Banks. | 8<br>5 |

| | | |
|---|---|---|
| **4** | **PROGRAMMABLE LOGIC CONTROLLER**<br><br>Evolution – advantages over relay logic [webb - 7]Introduction to PLC – Relays- Block diagram of PLC - PLC Programming Languages - Arithmetic Functions – (add, sub, mul, div, sqr)[petruzela](P304-313) – Comparison of functions[ Webb - 7] (P190-199) - Basics of Input and output module (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 | 14 |
| **5** | **Distributed Control Systems**<br><br>Evolution - Hybrid system Architecture(Page -7) – Central system Architecture(Page - 7) – Generalized Distributed Control - Architecture(Page 10,11) – comparison of architectures(Page 12) – Local control unit(Page 19) –Basic Elements of LCU(Page 19-21) – Displays – Plant – Area – Group- Loop(Page 189-201) – Features of DCS – Advantages of DCS (SK singh Page 698) | 12 |
| | Revision-Test | 10 |

## TEXT BOOKS


1. Power Electronics by M.H.Rashid - PHI Publication-3rd Edition-2005
2. Industrial Electronics and control by Biswanath Paul –PHI publications-2nd Edition -2010
3. Programmable Logic Controllers - “Frank D.Petruzela “PHI publications
4. Power Electronics by Dr.P.S.Bimbhra, Khanna publishers -2nd Edition-1998


## REFERENCE BOOKS


**1.** Industrial & Power Electronics By Harish C.Rai, Umesh Publication, 5th Edition 1994

**2.** ‘Programmable Logic Controllers – Principles and applications - John W. Webb. Ronald A. Reis PHI publications 2017

**3.** Programmable Logic Controller –Pradeep Kumar& Srivashtava- BPB Publications

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**IV SEMESTER**

**2015-2016 onwards**

# COMMUNICATION ENGINEERING

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34042**

**Semester : IV Semester**

**Subject title : COMMUNICATION ENGINEERING**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| Communication Engineering | Hrs / week | Hrs/ semester | Marks | | | Duration |
| | | | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 6 | 90 | 25 | 75 | 100 | 3Hrs |

**TOPICS AND ALLOCATION:**

| Unit | TOPIC | Hrs |
|---|---|---|
| I | Networks, Antenna and Propagation | 16 |
| II | Introduction to Modulation and Amplitude Modulation | 16 |
| III | Frequency and Pulse Modulation | 16 |
| IV | Audio Systems | 15 |
| V | Video systems | 15 |
| | Revision – Test | 12 |
| | TOTAL | 90 |

**RATIONALE:**

Today communication engineering has developed to a great extent that there is always the need for study of various communication concepts. This subject fulfills the need for students to have a thorough knowledge of various types of networks, modulation, audio systems and video systems.

**OBJECTIVES:**

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

- Understand the principles of working of antennas
- Understand the theory of Propagation
- Understand the concept of modulation
- Study Amplitude Modulation Process
- Learn about different types of AM Transmitter & receiver
- Study the Frequency Modulation Process
- Learn about different types of FM Transmitters & Receivers
- Understand the concept Phase Modulation
- Understand the concept Pulse Modulation
- Learn Different types of Microphones
- Learn Different types of Loudspeakers
- Understand the different methods of Audio Recording & Reproduction
- Understand the principles of Monochrome & colour TV Related Topics

## 34042 - COMMUNICATION ENGINEERING

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **UNIT 1: Networks, Antenna and Propagation**<br><br>**Networks:** Symmetrical and asymmetrical networks, characteristic impedance and propagation constant.<br>**Equalizer:** Definition, types and applications.<br>**Attenuator:** Definition, types - symmetrical T and Pi attenuators- simple problems – applications.<br>**Filters:** Definition, types – circuit elements and cutoff frequencies of LPF, HPF and BPF - simple problems-applications.<br>**Antennas:** Definition-types of antenna: Mono pole and dipole antenna, directional and omni directional antenna ,Dipole arrays, Yagi antenna, parabolic antenna- Antenna parameters: directive gain, directivity, radiation pattern and polarization-applications.<br>**Propagation:** Ground wave propagation, sky wave propagation and space wave propagation | 16 |
| 2 | **UNIT 2: Introduction to Modulation and Amplitude Modulation**<br><br>**Introduction to Modulation:** Definition- Need for modulation- types of modulation - Frequency spectrum - relationship between wavelength and frequency.<br>**Amplitude modulation:** Definition - Simple signal diagram for amplitude modulation, Expression for amplitude modulation, expression for modulation index – sidebands: DSB,SSB and VSB.<br>**AM Transmitter:** Types of transmitters : high level AM transmitter, low level AM transmitter and SSB transmitter.<br>**AM Receiver:** Types of receiver: TRF receiver, super heterodyne receiver and SSB receiver.- Selection of IF-AGC types: simple and delayed AGC. | 16 |
| 3 | **UNIT 3 : Frequency and Pulse Modulation**<br><br>**Frequency modulation:** Definition-Simple signal diagram for frequency modulation, Expression for frequency modulation, expression for modulation index.<br>**FM Transmitter:** Types of transmitters : Direct FM transmitter, Indirect FM transmitter and stereophonic FM transmitter. | 16 |

| | | |
|---|---|---|
| | **FM Receiver:** stereophonic FM receiver-AFC. Comparison of FM and AM. **Pulse modulation:** Definition- Types: Generation and detection of PAM, PWM, PPM,PCM & DPCM | |
| 4 | **UNIT 4: Audio systems** **Microphones:** Definition-Construction and performance of the following microphones: carbon, condenser, piezo-electric, moving coil and velocity ribbon. **Loud speakers:** Definition-Constructional details of dynamic cone type, Horn type and electro-static loud speakers, woofer, midrange and tweeter, cross-over network. Surround-sound systems. **Audio recording and reproduction:** Compact disc system- MP3 system - DVD system - stereophonic system - Hi-Fi system principles-DTS. | 15 |
| 5 | **UNIT 5 : Video systems** **Monochrome Television:** Scanning principles - synchronization - aspect ratio- composite video signal- TV broadcasting standards. TV transmitter- TV receiver. **Color TV :** Principles of color transmission and reception-color CCD camera, LCD, LED display unit – plasma display - Principles of Handy cam, CCTV and cable TV. | 15 |
| | Revision & Test | 12 |

**REFERENCE BOOKS**


1. Networks lines and fields – John D.Ryder, PHI

2. Electronic communication Systems – Kennedy – TMH

3. Electronic Communication – Dennis Roddy and John colen – PHI

4. Fundamentals of Acoustics – Kingsler & frey – Wiley Eastern ltd.

5. TV and Video engineering – Arvind M.Dhake – TMH.

6. Communication Electronics – Principles and application – Louis E Frenzel, Third

Edition, Tata McGrawhill publication

7. Audio and Video system – Principles, maintenance and Troubleshooting by R.Gupta

Second Edition McGrawHill Education (P) Ltd.

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**III SEMESTER**

**2015-2016 onwards**

# DIGITAL ELECTRONICS

**CURRICULAM DEVELOPMENT CENTRE**

**M SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject Code : 34043**

**Semester : IV Semester**

**Subject Title : DIGITAL ELECTRONICS**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | |
| | Hrs Week | Hrs Semester | Internal Assessment | Board Examination | Total | Duration |
| Digital Electronics | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

**TOPICS AND ALLOCATION:**

| UNIT | TOPIC | TIME(HRS) |
|---|---|---|
| I | Number System, Boolean Algebra, Logic Gates and Digital Logic Families | 13 |
| II | Combinational Logic | 13 |
| III | Sequential Logic | 13 |
| IV | Memory Devices | 12 |
| V | Microprocessor – 8085 | 12 |
| Revision Test | | 12 |
| TOTAL | | 75 |

**RATIONALE:**

The subject of Digital Electronics holds applications in all branches of engineering. This subject will impart in depth knowledge of Number systems, Logics of Combinational & Sequential circuits and also about various & recent Memory devices and microprocessor. The concept of Digital Electronics will be implemented in all processor.

**OBJECTIVES:**

- To understand various Number System.
- To understand basic Boolean postulates and laws.
- To understand the De-Morgan's theorem.
- To understand the concept of Karnaugh Map.
- To Learn about Basic logic Gates.
- To Study about Boolean techniques.
- To learn the different digital logic families
- To learn arithmetic circuits-adder/subtractor, BCD adder.
- To understand the encoder/decoder & MUX / DEMUX
- To understand the concept of parity Generator, and checkers
- To understand various types of flip-flops.
- To understand various types of counters.
- To understand various modes of shift registers
- To understand the concept of RAM & ROM and its types.
- To understand the history and need of Microprocessor.
- To understand the internal architecture details of 8085 Microprocessor.
- To know the instruction set of 8085
- To understand Interrupt Structure of 8085

## 34043 DIGITAL ELECTRONICS

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HRS |
|---|---|---|
| 1 | **NUMBER SYSTEM AND BOOLEAN ALGEBRA**<br>Binary, Octal, Decimal, Hexadecimal - Conversion from one to another. Binary codes – BCD code, Gray code, Excess 3 code.<br>Boolean Algebra- Boolean postulates and laws- De-Morgan's theorem- Simplification of Boolean expressions using Karnaugh map (up to 4 variables-pairs, quad, octets)- Don't care conditions and constructing the logic circuits for the Boolean expressions.<br>**LOGIC GATES AND DIGITAL LOGIC FAMILIES:**<br>Gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR - Implementation of logic functions using gates - Realization of gates using universal gates- Simplification of expression using Boolean techniques- Boolean expression for outputs.<br>Digital logic families –Fan in , Fan out, Propagation delay - TTL,CMOS Logics and their characteristics - comparison and applications -Tristate logic. | 7<br>6 |
| 2 | **COMBINATIONAL CIRCUITS**<br>Arithmetic circuits - Binary – Addition, subtraction, 1's and 2's complement - Signed binary numbers- Half Adder- Full Adder- Half Subtractor - Full Subtractor- Parallel and serial Adders- BCD adder.<br>Encoder and decoder – 3 to 8 decoder, BCD to seven segment decoder- Multiplexer- basic 2 to 1 MUX, 4 to 1 MUX, 8 to 1 MUX - applications of the MUX – Demultiplexer - 1 to 2 demultiplexer, 1 to 4 demultiplexer, 1 to 8 demultiplexer - Parity Checker and generator. | 7<br>6 |
| 3 | **SEQUENTIAL CIRCUITS**<br>FLIP FLOPS – SR, JK, T, D FF, JK- MS FF - Triggering of FF – edge & level , Counters – 4 bit Up - Down Asynchronous / ripple counter - Decade counter- Mod 3, Mod 7 counter.<br>4 bit Synchronous Up - Down counter - Johnson counter, Ring counter<br>**REGISTERS**<br>4-bit shift register- Serial IN Serial OUT- Serial IN Parallel OUT - Parallel IN Serial OUT- Parallel IN Parallel OUT | 7<br>6 |
| 4 | **MEMORY DEVICES**<br>Classification of memories - RAM organization - Address Lines and Memory Size- Read /write operations- Static RAM - Bipolar RAM cell- Dynamic RAM- SD RAM- DDR RAM.<br>Read only memory – ROM organization- Expanding memory- PROM- EPROM- and EEPROM - Flash memory- Anti Fuse Technologies. | 12 |

| | | |
|---|---|---|
| **5** | **MICROPROCESSOR – 8085**<br>Evolution of microprocessor 8085 – Architecture of 8085-<br>Instruction sets- Addressing modes - Memory mapped I/O and I/O mapped I/O and its Comparison.<br>Machine cycle – Opcode fetch - memory read- memory write- I/O read, I/O write - Instruction cycle (Timing diagram) for MOV r1, r2 instruction.<br>Interrupts (types & Priorities) | **12** |
| | Revision & Test | **12** |

**REFERENCE BOOKS:**

| SL.No | Title | Author | Publisher with Edition |
|---|---|---|---|
| 1. | Principles of Digital Electronics | K.Meena | PHI – 2011 |
| 2. | Modern Digital Electronics | R.P.Jains | TMH -2003 |
| 3. | Microprocessor architecture programming and application | Ramesh S. Gaonkar, | Wiley Eastern Limited. |
| 4. | Digital principles & Applications | Albert Paul Malvino & Donald P.Leach | TMH - 4th Edition 2002 |
| 5. | Digital Electronics | William H.Gothmann | prentice Hall of India – 2nd Edition ,1995 |
| 6. | Introduction to Microprocessor | Aditya P Mathur | Tata McGraw-Hil publishing Company Limited |
| 7. | Digital Electronics | Roger L.Tokheim Macmillan | McGraw hill -1994 |
| 8. | Digital Electronics- an introduction to theory and practice | William H.Gothmann | PHI 1998 |

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**IV SEMESTER**

**2015-2016 onwards**

# LINEAR INTEGRATED CIRCUITS

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name: Electronics and Communication Engineering**

**Subject code : 34044**

**Semester : IV Semester**

**Subject title : LINEAR INTEGRATED CIRCUITS**

**TEACHING AND SCHEME OF EXAMINATION**:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| Linear integrated circuits | Hrs/ week | Hrs/ semester | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 4 | 60 | 25 | 75 | 100 | 3Hrs |

**TOPICS AND ALLOCATION:**

| Unit | TOPICS | Hrs |
|---|---|---|
| I | Introduction to operational amplifiers | 10 |
| II | Opamp applications | 10 |
| III | PLL & Waveform generators | 11 |
| IV | D/A and A/D Converters | 10 |
| V | Special Function ICS | 9 |
| | Revision – Test | 10 |
| | TOTAL | 60 |

**RATIONAL** IC technology needs the fundamentals of Integrated Circuits for students regarding the application and special function ICs.

**OBJECTIVES:**

- To understand the basics of operational amplifier.
- To study the op-amp applications.
- To understand PLL & waveform generators.
- To study D/A and A/D converters and special function ICs.

## 34044 LINEAR INTEGRATED CIRCUITS

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **UNIT 1: INTRODUCTION TO OPERATIONAL AMPLIFIERS**<br><br>Integrated circuit - Classification of IC - Advantages of IC over discrete components –Types of IC Packages - Operational amplifier IC 741 – Schematic symbol for opamp – pin diagram of IC 741 –Block diagram of an opamp – Characteristics of an Ideal opamp - Simple Equivalent circuit of an opamp – virtual ground – opamp parameters – CMRR –Slewrate<br>Basic linear circuits- Inverting Amplifier, Non Inverting amplifier – Differential Amplifier – sign changer – scale changer. | 10 |
| 2 | **UNIT 2: OPAMP APPLICATIONS**<br><br>Summing amplifier- Multiplier – Divider – Voltage follower – comparator – zero crossing detector - Integrator – Differentiator – Voltage to current converter – current to voltage converter – Instrumentation amplifier<br>Waveform generators – square wave, triangular wave, sine wave, saw tooth wave generators. (Qualitative treatment only) | 10 |
| 3 | **UNIT 3: PLL & APPLICATIONS (Qualitative treatment only)**<br><br>PLL – Basic principles of PLL – Basic Block schematic of PLL – Lock range – capture range - -Basic components of PLL – Phase detector, LPF –VCO<br>Monolithic VCO 566- Pin diagram –Basic Block diagram of VCO 566.<br>Monolithic PLL 565-Pin diagram - Functional Block diagram of PLL IC 565,Applications of PLL – frequency translation – frequency multiplication | 11 |

| | | |
|---|---|---|
| 4 | **UNIT 4: D/A AND A/D CONVERTERS**<br><br>**D/A CONVERTERS**<br>Digital to analog converter – Basics of D/A conversion –weighted Resistor D/A Converter – R-2R Ladder D/A Converter – Specifications of DAC-Accuracy, Resolution, Monotonocity, Settling time.<br>**A/D CONVERTERS**<br>Analog to digital converter – Basics of A/D conversion – sampling – Sample and hold circuit – quantization – Types of A/D converter – Block diagram of Flash, Successive approximation, Ramp, Dual Slope ADC – Specifications of ADC – Accuracy, Resolution, conversion time – Functional Block diagram of IC ADC 0808 | 10 |
| 5 | **UNIT 5: SPECIAL FUNCTION ICs: (qualitative treatment only )**<br><br>IC 555 Timer – pin diagram of IC 555 – Functional Block diagram of IC555 – Applications – Astable multi vibrator – mono stable multi vibrator – Schmitt trigger .<br>IC voltage regulators – linear fixed voltage regulator – Positive voltage regulator using IC 78xx, negative voltage regulator using IC 79xx General purpose regulator using LM 723-Pin diagram of LM723- Low voltage and High voltage regulator using LM 723. | 09 |
| Revision-Test | | 10 |

**Text Books:**

1. Linear Integrated circuits – D.Roychoudhury&Shail.B. Jain – New age International

Publishers – II Edition – 2004.

2. “Integrated circuits” – K.R. Botkar – KhannaPulbisher’s – 1996

**REFERENCE BOOKS:**

1.Introduction to system design using IC “-B.S. Sonde – Wiley Eastern Limited

– II Edition– 1992

2. “Operational Amplifiers and Linear Integrated circuits”- Ramakant .A Gayakwad –

Prentice Hall – 2000.

3. Digital Integrated Electronics –Taub&Schlling – Mcgraw Hill – 1997

4. Operational amplifiers and Linear Integrated circuits by Robert F.Coughlin and

Frederick F.Driscoll –PHI –publications –sixth Edition-2009.

5. Linear Integrated Circuits by Salivahanan&V.S.Kanchana Baskaran-TMH-2008

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**IV SEMESTER**

**2015-2016 onwards**

# INDUSTRIAL ELECTRONICS AND COMMUNICATION ENGINEERING PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject Code : 34045**

**Semester : IV Semester**

**Subject title : INDUSTRIAL ELECTRONICS AND COMMUNICATION ENGINEERING**

## TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| Industrial Electronics and Communication Engineering | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

## MAJOR EQUIPMENT REQUIRED

| 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 | - | 2 |
| 7 | Computers | - | 2 |
| 8 | Software:PSPICE/ multisim/orcad/tina | - | - |

## ALLOCATION OF MARKS

| | | |
|---|---|---|
| CIRCUIT DIAGRAM | : | 20 |
| CONNECTION | : | 20 |
| EXECUTION & HANDLING OF EQUIPMENT | : | 20 |
| OUTPUT / RESULT | : | 10 |
| VIVA – VOCE | : | 05 |
| TOTAL | : | 75 |

## 34045 - INDUSTRIAL ELECTRONICS & COMMUNICATION ENGINEERING PRACTICAL

**LIST OF EXPERIMENTS:**

**Note: At least 5 experiments should be constructed using breadboard or by soldering.**

### INDUSTRIAL ELECTRONICS PRACITCAL

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.

### COMMUNICATION ENGINEERING PRACTICAL

9. Simulate the circuit of AM Modulation and Demodulation using the simulation tool like PSPICE/ multisim/orcad/tina.
10. simulate the circuit of FM Modulation and Demodulation using the simulation tool like PSPICE/ multisim/orcad/tina.
11. Construct & test Symmetrical t & Pi attenuators.
12. 4.Construct & test Constant K Passive Low Pass & High Pass Filter.
13. Construct & test PAM Generation circuit & Detection circuit.
14. Construct & test PCM Transmitter & Receiver circuit.
15. Construct & Test a three way cross over network.

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**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**IV SEMESTER**

**2015-2016 onwards**

# INTEGRATED CIRCUITS PRATICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34046**

**Semester : IV Semester**

**Subject title : INTEGRATED CIRCUITS PRACTICAL**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| Integrated Circuits Practical | Hrs/ week | Hrs/ semester | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 5 | 75 | 25 | 75 | 100 | 3Hrs |

**ALLOCATION OF MARKS**

| | |
|---|---|
| CIRCUIT DIAGRAM : | 20 |
| CONNECTION : | 25 |
| EXECUTION & HANDLING OF EQUIPMENT : | 15 |
| OUTPUT / RESULT : | 10 |
| VIVA – VOCE : | 05 |
| TOTAL : | 75 |

## 34046 - INTEGRATED CIRCUITS PRACTICAL

### List of experiments

**Note: At least 5 experiments should be constructed using breadboard**

1. Verification of truth table of OR, AND, NOT, NOR, NAND, EX-OR gates.
2. Realization of basic gates using NAND & NOR gates.
3. Realization of logic circuit for a given Boolean expression.
4. Half adder, Full adder using IC's.
5. Half subtractor, full subtractor using IC's.
6. Construction and verification of truth table for Decoder/Encoder.
7. Multiplexer/De-multiplexer using multiplexer IC's.
8. Parity generator and checker using parity checker/ generator IC's.
9. Construction and verification of truth table for RS, D, T & JK flip-flop.
10. 4- bit ripple counter using FF
11. Construct a Single digit Decade Counter with 7 segment display.
12. Astable Multi vibrator using IC 555.
13. Simulate the Clippers and clampers using the simulation tool like PSPICE/ multisim/orcad/tina.
14. simulate the inverting and non inverting amplifier, voltage follower, integrator, differentiator, summing amplifier, difference amplifier(Any 3) using the simulation tool like PSPICE/ multisim/orcad/tina.
15. simulate the Hartley and phase shift oscillator, sine, square and triangular waveform generators and precision rectifiers(Any 3) using the simulation tool like PSPICE/ multisim/orcad/tina.

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**II YEAR**

**M – SCHEME**

**IV SEMESTER**

**2015 – 2016 onwards**

# 30002 – LIFE AND EMPLOYABILITY SKILL PRACTICAL

**CURRICULUM DEVELOPMENT CENTRE**

**M Scheme**

(Being implemented from the Academic Year 2015-2016 onwards)

Course Name : **ELECTRONICS AND COMMUNICATION ENGINEERING**

Subject Code : **30002**

Semester : **IV**

Subject Title : **LIFE AND EMPLOYABILITY SKILLS PRACTICAL**

**Teaching and Scheme of Examination:**

No. of Weeks per Semester: 15 Weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | |
| | Hours / Week | Hours / Semester | Internal assessment | Board Examination | Total | Duration |
| Life and Employability Skills | 4 Hours | 60 Hours | 25 | 75 | 100 | 3 Hours |

**Topics and Allocation of Hours:**

| Sl. No. | Section | No. of Hours |
|---|---|---|
| **1** | **Part – A**<br>Communication | **30** |
| **2** | **Part – B**<br>Entrepreneurship, Project Preparation, Productivity, Occupational Safety, Health, Hazard, Quality Tools & Labour Welfare | **20** |
| **3** | **Part – C**<br>Environment, Global Warming, Pollution | **10** |
| **TOTAL** | | **60** |

## RATIONALE

Against the backdrop of the needs of the Industries, as wells as based on fulfilling the expectations of the Industries, the Diploma Level students have to be trained directly and indirectly in toning up their competency levels. Proficiency in Communication only, equips them with confidence and capacity to cope with the employment. Hence, there is a necessity to focus on these in the curriculum. At the end of the Course, the student is better equipped to express himself in oral and written communication effectively.

## SPECIFIC INSTRUCTIONAL OBJECTIVES

1. **Emphasize and Enhance Speaking Skills**

2. **Increase Ability to Express Views & Opinions**

3. **Develop and Enhance Employability Skills**

4. **Induce Entrepreneurship and Plan for the Future**

5. **Expose & Induce Life Skills for Effective Managerial Ability**

## 30002 - LIFE AND EMPLOYABILITY SKILLS PRACTICAL

## SYLLABUS

| Unit | Topics | Activity | Hours |
|---|---|---|---|
| I | **Communication, Listening, Training, Facing Interviews, Behavioural Skills** | -- instant sentence making<br>– say expressions/phrases<br>-- self- introduction / another higher official in company<br>– describe/explain product<br>– frame questions based on patterns<br>– make sentences based on patterns | **30** |
| II | **Entrepreneurship, Project Preparation, Marketing Analysis, Support & Procurement** | -- prepare an outline of a project to obtain loan from bank in becoming an entrepreneur<br>– prepare a resume | **10** |
| III | **Productivity – comparison with developed countries, Quality Tools, Circles, Consciousness, Management, House Keeping** | -- search in the website<br>-- prepare a presentation<br>– discuss & interact | **05** |
| IV | **Occupational Safety, Health Hazard, Accident & Safety, First-Aid, Labour Welfare Legislation, Welfare Acts** | -- search in the website<br>-- prepare a presentation<br>– discuss & interact | **05** |
| V | **Environment, Global Warming, Pollution** | -- taking down notes / hints<br>– answering questions<br>-- fill in blanks the exact words heard | **10** |

**LEARNING STRUCTURE** **100 Marks**

**-- Focus more on Speaking & Listening Skills**
**-- Attention less on Reading & Writing Skills**
**-- Apply the skills in fulfilling the Objectives on Focused Topics**

**a) Listening** **25 Marks**

1. Deductive Reasoning Skills (taking down notes/hints) **10**
2. Cognitive Skills (answering questions) **10**
3. Retention Skills (filling in blanks with exact words heard) **05**

**b) Speaking Extempore/ Prepared** **30 Marks**

1. Personality/Psychological Skills (instant sentence making) **05**
2. Pleasing & Amiable Skills (say in phrases/expressions) **05**
3. Assertive Skills (introducing oneself/others) **05**
4. Expressive Skills (describe/explain things) **05**
5. Fluency/Compatibility Skills (dialogue) **05**
6. Leadership/Team Spirit Skills (group discussion) **05**

**c) Writing & Reading** **20 Marks**

1. Creative & Reasoning Skills (frame questions on patterns) **05**
2. Creative & Composing Skills (make sentences on patterns) **05**
3. Attitude & Aim Skills (prepare resume) **05**
4. Entrepreneurship Skills (prepare outline of a project) **05**

**d) Continuous Assessment (Internal Marks)** **25 Marks**
(search, read, write down, speak, listen, interact & discuss)

1. Cognitive Skills (Google search on focused topics)
2. Presentation Skills & Interactive Skills (after listening, discuss)

**Note down and present in the Record Note on any 5 topics 10 Marks**
**Other activities recorded in the Record note 10 Marks**
**Attendance 05 Marks**
**INTERNAL MARKS 25 Marks**
**EXTERNAL MARKS AT END EXAMINATION 75 Marks**

**MODEL QUESTION**

**Time: 3 Hours** **Maximum Marks: 75**

**A. LISTENING** **25**
**Marks**

1. Listen to the content and take down notes/hints 10
2. Listen to the content and answer the following questions. 10
3. Listen to the content and fill in the blanks the exact words heard. 05

**B. SPEAKING** **30**
**Marks**

1. Say in a sentence instantly on hearing the word (5 words, one after another). 05
2. Say any five expressions commonly used in communication. 05
3. Imagine, a consultant has come to your department.
   Introduce him to your subordinates. 05
4. Explain/describe the product you are about to launch in the market. 05
5. Speak with your immediate boss about the progress you have made. 05
6. Discuss within the group on the topic of focus in the syllabus. 05

**C. WRITING & READING** **20**
**Marks**

1. Frame new questions from the pattern given by changing sets of words with your own. 05

| | | | | |
|---|---|---|---|---|
| a. | When | Do | you | return? |
| b. | How | Is | his performance? | |
| c. | Where | Has | the manager | gone? |
| d. | What | Is | the progress | today? |
| e. | Why | Are | the machines | not functioning? |

2. Make sentences from the pattern given by changing sets of words with your own. 05

| | | | | | |
|---|---|---|---|---|---|
| a. | The workers | are | on strike | | |
| b. | The labourers | are paid | well | in this factory | |
| c. | There | is | a rest room | for the workers | |
| d. | These | are | the new products | launched | by our company |
| e. | Almost everyone | come | to the company | on motorbikes | |

3. Prepare a resume for the post of Department Manager. 05

4. Prepare an outline of a project to obtain a loan. (Provide headings and subheadings) 05

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## I. Guidelines for setting the question paper:

**A. LISTENING :**

ONLY TOPICS related to
POLLUTION /
ENVIRONMENT /
GLOBAL WARMING are to be taken.
These topics are common for all the three types of evaluation.

**B. SPEAKING :**

1. WORDS of common usage
2. Fragments – expression of politeness, courtesy, cordiality
3. Introduce yourself as an engineer with designation or Introduce the official visiting your company/department
4. Describe/Explain the product/machine/department
5. Dialogue must be with someone in the place of work.
6. Group of six/eight
   Discuss the focused topic prescribed in syllabus

**C. WRITING & READING:**

1. Provide five different structures.
   Students are to substitute at least one with some other word/words
2. Provide five different structures.
   Students are to substitute at least one with some other word/words
3. Provide some post related to industries.
4. Outline of the project (skeleton/structure)
   Only the various headings and subheadings
   Content is not needed

## II. Guidelines for recording the material on the Focused Topics in the Record note.

Write in the record note, **on any five topics**, from the list of topics given below. **10 Marks**
**(**5 topics x 10 marks = 50 marks. Thus, the **Average of 5 topics is 10 Marks)**

1. Productivity in Industries – Comparison with developed countries

2. Quality Tools, Quality Circles and Quality Consciousness
3. Effective Management
4. House Keeping in Industries
5. Occupational Safety and Hazard
6. Occupational Accident and First Aid
7. Labour Welfare Legislations
8. Labour Welfare Acts and Rights
9. Entrepreneurship
10. Marketing Analysis, Support and Procurement

**LABORATORY REQUIREMENT:**

1. An echo-free room
2. Necessary furniture and comfortable chairs
3. A minimum of two Computers with internet access
4. A minimum of two different English dailies
5. A minimum of Three Mikes with and without cords
6. Colour Television (minimum size – 29")
7. DVD/VCD Player with Home Theatre speakers
8. Smart board
9. Projector

## Suggested Reading:


1. Production and Operations Management by S.N. Chary, TMH
2. Essentials of Management by Koontz & Weihrich, TMH
3. Modern Production / Operations Management by E.S. Buffa and R.K. Sarin, John Wiley & Sons
4. Production Systems: Planning, Analysis and Control by J.L.Riggs, 3rd ed., Wiley.
5. Productions and Operations Management by A.Muhlemann, J.Oakland and K.Lockyer, Macmillan
6. Operations Research - An Introduction by H.A.Taha, Prentice Hall of India
7. Operations Research by J.K.Sharma, Macmillan
8. Business Correspondence & Report Writing by R.C. Sharma and K.Mohan, TMH
9. How to prepare for Group Discussion & Interview (With Audio Cassette) by Prasad, TMH
10. Spoken English – A self-learning guide to conversation practice (with Cassette)
11. Introduction to Environmental Engineering by Mackenzie, L. Davis and A. David, Cornwell, McgrawHill, 3rd Ed.
12. Environmental Engineering by Peary, Rowe and Tchobanoglous, McgrawHill
13. Total Quality Management – An Introductory Text by Paul James, Prentice Hall
14. Quality Control and Applications by Housen & Ghose
15. Industrial Engineering Management by O.P. Khanna

# V SEMESTER

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**V SEMESTER**

**2015-2016 onwards**

# ADVANCED COMMUNICATION SYSTEMS

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34051**

**Semester : V Semester**

**Subject title : ADVANCED COMMUNICATION SYSTEMS**

## TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| Advanced Communication Systems | 6 | 90 | 25 | 75 | 100 | 3 Hrs |

## TOPICS AND ALLOCATION:

| Unit | Topic | Time (Hrs) |
|---|---|---|
| I | Radar, navigational aids, telephony and fax, facsimile communication system | 16 |
| II | Digital Communication and Digital codes | 15 |
| III | Optical Communication | 16 |
| IV | Satellite Communication and Microwave Communication | 17 |
| V | Mobile Communication and Satellite multiple access techniques | 16 |
| | Revision, Test | 10 |
| | **TOTAL** | 90 |

## RATIONALE

The introduction of this subject 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, Fax, digital communication, digital codes, fiber optical communication, satellite communication, microwave communication, mobile communication and Satellite multiple access techniques.

## OBJECTIVES

- To understand principles of Radar.
- To understand principles of navigation aids.
- To study electronics exchange and principles of facsimile communication.
- To study basic digital communication system and digital codes.
- To learn error detection and correction codes.
- To learn various digital modulation techniques.
- To understand optical communication system and discuss about fiber nodes, configurations and losses.
- To learn optical sources, optical detectors.
- To discuss the application of fiber optic communication.
- To study satellite system, orbits, antennas
- To study about satellite services.
- To understand fundamentals of microwave communication
- To study fundamental cellular concepts such as frequency reuse, had off
- To learn multiple access techniques.
- To learn digital cellular systems – GSM.

## 34051 ADVANCED COMMUNICATION SYSTEMS

### DETAILED SYLLABUS

| Units | NAME OF THE TOPIC | HOURS |
|---|---|---|
| I | **RADAR AND NAVIGATIONAL AIDS:**<br>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.<br>**TELEPHONY AND FAX:**<br>Telephone System–Public Switched Telephone Network (PSTN) - Electronic Switching System – Block Diagram – ISDN – Architecture, Features - Video Phone – Block Diagram.<br>**FACSIMILE COMMUNICATION SYSTEM:**<br>Facsimile Sender-Cylindrical Scanning – Facsimile Receiver-Synchronization – Phasing - Index Of Cooperation (IOC) - Direct Recording. | 16 |
| II | **DIGITAL COMMUNICATION:**<br>Basic Elements Of Digital Communication System - Block Diagram-Characteristics Of Data Transmission Circuits - Bandwidth Requirement – Speed - Baud Rate - Noise - Crosstalk – Distortion.<br>**DIGITAL CODES:**<br>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). | 15 |
| III | **OPTICAL COMMUNICATION:**<br>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 Optical Sources – LED - Semiconductor LASER – Principles – Optical Detectors – PIN And APD Diodes - Connectors - Splices – Couplers – Optical Transmitter – Block Diagram – Optical Receiver – Block Diagram - Application Of Optical Fibers – Networking, Industry And Military Applications. | 16 |

| | | |
|---|---|---|
| | | |
| **IV** | **SATELLITE COMMUNICATION:**<br>**Satellite 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.<br>**Antenna:** Parabolic reflector antenna – cassegrain antenna.<br>Space segment: Power supply- Attitude control- station keeping – Transponders – TT and C subsystem – Antenna subsystem.<br>**Earth segment:** Block diagram of Transmit receive earth station - Satellite mobile services - Basics of GPS.<br>**MICROWAVE COMMUNICATION:**<br>Microwave frequency ranges - microwave devices – Parametric amplifiers –Travelling wave tubes – simple block diagram of microwave transmitter, receiver and microwave link repeater | **17** |
| **V** | **MOBILE COMMUNICATION:** (Qualitative Treatment only)<br>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.<br>**SATELLITE MULTIPLE ACCESS TECHNIQUES:**<br>TDMA, FDMA, CDMA. Digital cellular system – Global system for mobile communications (GSM) –GSM services - GSM System Architecture – Basics of GPRS. | **16** |
| Revision & Test | | **10** |

**Reference Books:**


- Electronic communication systems - Kennedy - Davis -Fourth Edition - Tata McGraw Hill - 1999.
- Electronics communication - Dennis Roddy and John coolen - Third Edition - PHI - 1988
- Optical fiber communication - Gerd Keiser - Third Edition - McGraw Hill - 2000
- Satellite communication - Dr. D.C. Agarwal - Third Edition - Khanna publishers - 1995
- 5 Electronic Communications systems - Fundamentals through Advanced - Wayne Tomasi – Fifth
- Edition - Pearson Education – 2005

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**V SEMESTER**

**2015-2016 onwards**

# MICROCONTROLLER

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34052**

**Semester : V Semester**

**Subject title : MICROCONTROLLER**

**TEACHING AND SCHEME OFEXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| MICROCONTROLLER | 6 | 90 | 25 | 75 | 100 | 3 Hrs |

**TOPICS AND ALLOCATION:**

| Unit | Topic | Time (Hrs.) |
|---|---|---|
| I | Architecture & Instruction set of 8051 | 19 |
| II | Programming Examples | 13 |
| III | I/O and Timer | 15 |
| IV | Interrupt and Serial Communication | 16 |
| V | Interfacing Techniques | 19 |
| | Revision – Test | 8 |
| | **TOTAL** | 90 |

## RATIONALE:

The exponential growth of Engineering and Technology has benefited the mankind with

extreme sophistication and comfort. To sustain this development, continuous research and

development should take place not only in Engineering and Technology but also in Basic Science

such as Physics.

The various divisions of Physics like Optics, Acoustics, Dynamics, Semiconductor Physics,

Surface Physics, Nuclear Physics, Energy Studies, Materials Science, etc provide the Foundation

by enlightening the Fundamental facts, Principles, Laws and Correct sequence of events to

develop the Engineering and Technology field for the prosperity of human beings.

## OBJECTIVES:

- On completion of the following units of syllabus contents, the students must be able to
- Explain Architecture of 8051 Microcontroller.
- Explain the functions of various registers.
- Understand interrupt structure of 8051.
- Understand serial data communication concepts.
- Understand the programming techniques.
- Explain various addressing modes.
- Write simple programs using 8051.
- Understand the block diagram and control word formats for peripheral devices.
- Understand how to interface with RS232C.
- Understand how to interface with 8255.
- Understand various application of 8051 Microcontroller

## 34052-MICROCONTROLLER

| Unit | Name of the Topic | Hours |
|---|---|---|
| I | **ARCHITECTURE & INSTRUCTION SET OF 8051**<br><br>**1.1 ARCHITECTURE OF 8051**<br><br>Comparison of Microprocessor and Microcontroller - Block diagram ofMicrocontroller –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 –<br><br>Serial Port – Oscillator and Clock - Clock Cycle – State - Machine Cycle –Instruction cycle – Reset – Power on Reset – Overview of 8051 family<br><br>**1.2 INSTRUCTION SET OF 8051**<br><br>Instruction set of 8051 – Classification of 8051 Instructions - Data transfer instructions – Arithmetic Instructions – Logical instructions –Branching instructions – Bit Manipulation Instructions | 14 Hrs<br><br>5 Hrs |
| II | **PROGRAMMING EXAMPLES:**<br><br>**2.1 ASSEMBLER AND ADDRESSING MODES**<br><br>Assembling and running an 8051 program –Structure of Assembly Language –Assembler directives - Different addressing modes of 8051<br><br>**2.2 PROGRAMMES**<br><br>Multibyte Addition – 8 Bit Multiplication and Division – Biggest Number / Smallest Number – Ascending order / Descending order BCD to ASCII Conversion – ASCII to Binary Conversion – Odd Parity Generator – Even Parity Generator -Time delay routines | 6 Hrs<br><br>7 Hrs |

| | | |
|---|---|---|
| III | **I/O AND TIMER:**<br>**3.1 I/O**<br>Bit addresses for I/O and RAM – I/O programming – I/O bitmanipulation programming.<br>**3.2 TIMER**<br>Programming 8051 Timers – Timer 0 and Timer 1 registers – Differentmodes of Timer – Mode 0 Programming – Mode 1 Programming - Mode 2Programming - Counter programming – Different modes of Counter – Mode 0 Programming – Mode 1 Programming -Mode 2 Programming (simple programs) | 6 Hrs<br><br>9 Hrs |
| IV | **INTERRUPT AND SERIAL COMMUNICATION**<br>**4.1 SERIAL COMMUNICATION**<br>Basics of Serial programming – RS 232 Standards - 8051 connection to RS 232 – 8051 Serial Communication Programming – Programming 8051 to transmit data serially - Programming 8051 to Receive data serially.<br>**4.2 INTERRUPT**<br>8051 Interrupt s – Programming Timer Interrupts – Programming external hardware interrupts – Programming the serial communication interrupt –Interrupt priority in 8051 (simple programs). | 9 Hrs<br><br>7 Hrs |
| V | **INTERFACING TECHNIQUES**<br>**5.1. IC 8255**<br>IC 8255 – Block Diagram – Modes of 8255.<br>**5.2. INTERFACING TECHNIQUES**<br>Interfacing external memory to 8051– 8051 interfacing with the 8255 – ASM Programming – Relays – Sensor interfacing – ADC interfacing – DAC interfacing - Keyboard interfacing – Seven segment LED Display Interfacing - Stepper Motor interfacing – DC motor interfacing using PWM | 6 Hrs<br><br>13 Hrs |
| Revision & Test | | **8** |

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

- 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi,Mazidi and D.MacKinlay, 2006 Pearson Education Low Price Edition.
- Microprocessor and Microcontroller by R.Theagarajan, Sci Tech Publication, Chennai.

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**V SEMESTER**

# VERY LARGE SCALE INTEGRATION

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

Course Name : Electronics and Communication Engineering

Subject code : 34053

Semester : V Semester

Subject Title **: VERY LARGE SCALE INTEGRATION**

**TEACHING AND SCHEME OF EXAMINATION:**

No of weeks per semester: 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| Very Large Scale Integration | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

**Topics and Allocation of Hours:**

| Unit | Topic | Time (Hrs.) |
|---|---|---|
| I | Combinational Logic Circuits | 14 |
| II | VHDL for combinational logic circuit | 13 |
| III | Sequential Logic circuits | 13 |
| IV | VHDL for sequential Logic circuits | 12 |
| V | PLDS and FPGA circuits | 11 |
| | Test & Revision | 12 |
| | TOTAL | 75 |

**RATIONALE:**

Very Large Scale integration technology, when especially used for digital integrated circuitdesign,is that it is mandatory the behaviour of the required system to be described (modelled) and verified(simulated) before synthesis tools translate the design into real hardware fabrication in the foundry(gates and wires). Hardware Description Language (HDL) allows designs to be described using any methodology - top down, bottom up or middle out. VHDL can be used to describe hardware at the gate level or in a more abstract way. This course is to introduce the digital system design concepts through hardware description Language, VHDL programming, design flow of VLSI, and architectures of CPLD and FPGA. It is mainly aimed at design of combinational and sequential functions at gate / behavioural level and simulates and verifies their functionality using the Hardware description Language (VHDL)

**OBJECTIVES:**

On successful completion of the course the students must be able to

- Understand device level implementation of digital gates.
- Understand the combinational circuit design and optimizing of the gate
- Design a combinational circuit for any custom made application
- Explain the building blocks for the combinational circuit
- Understand the VHDL code and circuit design process.
- Develop a VHDL code for any combinational circuit
- Answer the VHDL primitives and the importance of VHDL code in a digital circuit
- Design a digital circuit with Muxes and Encoders
- Understand the functionality of various flipflops through its excitation table.
- Design of a sequential circuit for any custom made application
- Explain the style of moore and mealy type machines
- Understand to implement VHDL code for various flipflops
- Design of sequential circuit and implementation with VHDL code
- Explain the importance of PROM, PLA, PAL and PLD
- Differentiate between the PROM,PLA and PAL.
- Develop the circuit using PROM,PAL and PLA.
- Understand the CPLD and FPGA hardware.
- Describe ASICs

## VERY LARGE SCALE INTEGRATION

## DETAILED SYLLABUS

| Unit | Name of the Topic | Hours |
|---|---|---|
| I | **1.1 COMBINATIONAL CIRCUIT DESIGN:** NMOS andCMOS logic implementation of Switch, NOT, AND, OR, NAND, and NOR Gates CMOS Transmission Gate. Digital logic variable, functions, inversion, gate/circuits, Boolean algebra and circuit synthesis using gates (Up to 4 variables).<br><br>**1.2 COMBINATIONAL CIRCUIT BUILDING BLOCKS**:<br><br>Circuit synthesis using Multiplexer, Demultiplexer, Encoders and Decoders, Arithmetic adder, Sub tractor and Comparator circuits. Hazards and races | **7 Hrs**<br><br>**7Hrs** |
| II | **2.1 VHDL FOR COMBINATIONAL CIRCUIT**: Introduction to VLSI and its design process. Introduction to CAD tool and VHDL: Design Entry, Synthesis, and Simulation. Introduction to HDL and different level of abstractions. HDL Statements and Assignments<br><br>**2.2 VHDL CODE:** AND, OR, NAND, NOR gates, Implementation of Mux, Demux, Encoder, decoder. Four bit Arithmetic adder, sub tractor and comparator in VHDL | **8 Hrs**<br><br>**5Hrs** |
| III | **3.1 SEQUENTIAL CIRCUIT DESIGN**: Introduction/Refreshing to Flip-flops and its excitation table, counters and Shift registers<br><br>**3.2 DESIGN STEPS:** State diagram, State table, state assignment. Example for moore and mealy machines. Design of modulo counter (upto 3 bit) with only D flip-flops through state diagram | **13 Hrs** |
| IV | **4.1 VHDL FOR SEQUENTIAL CIRCUIT:** VHDL constructs for storage elements. VHDL code for D Latch / D, JK and T Flip-flops withorwithout reset input.<br><br>**4.2 VHDL EXAMPLES**: Counters :Synchronous counters-2 bit &3 bit up counter. 3 bit up/down counter Decade counter, Johnson Counter | **5 Hrs**<br><br>**7 Hrs** |

| | | |
|---|---|---|
| **V** | **5 PLDS AND FPGA**: Introduction to PROM,PLA and PAL. Implementation of combinational circuits with PROM, PAL and PLA<br>(up to 4 variables).Comparison between PROM, PAL and PLA<br>.Introduction to Complex Programmable Logic device, Field Programmable Gate Array Introduction to ASIC. Types Of ASIC | **11 Hrs** |
| **Revision & Test** | | **12 Hrs** |

**TEXT BOOK:**


1. “Digital Design” M.Morris Mano Michael D Ciletti Pearson Education 2008

2. “Fundamentals of Digital Logic with VHDL design” Stephen brown and Vranesic 2nd edition

McGrawHill,2008

3. “VHDL Primer” Bhasker J Prentice Hall India -2009


**REFERENCES:**


1. “Digital Electronics with PLD Integration” Nigel P. Cook, Prentice Hall, 2000

2. “Programmable Logic Handbook: PLD, CPLD, and FPGA” Ashok K.Sharma, Mcgraw-Hill, 1998

3. “Digital Logic Simulation and CPLD Programming with VHDL” Steve Waterman Prentice Hall,

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**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**V SEMESTER**

**2015-2016 onwards**

# DIGITAL COMMUNICATION

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**
**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**
**Subject Code : 34071**
**Semester : V Semester**
**Subject Title : DIGITAL COMMUNICATION**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | Hrs./ Week | Hrs./ Semester | Marks | | | Duration |
| | | | Internal Assessment | Board Examination | Total | |
| Digital Communication | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

**TOPICS AND ALLOCATION:**

| UNIT | TOPIC | TIME (HRS) |
|---|---|---|
| I | Basics of digital communication | 13 |
| II | Formatting and Base Band Modulation | 13 |
| III | Baseband Coding Techniques | 13 |
| IV | Digital Modulation Techniques | 12 |
| V | Spread Spectrum Techniques | 12 |
| | Revision Test | 12 |
| | **Total** | **75** |

**RATIONALE**:

Today, the growth of any industry depends upon electronics and communication. There is the need for digital techniques in each and every field. The reason behind the introduction of this subject is to impart technical excel hence in the field of digital communication by analyzing the various digital transmission methods, error control methods and understanding about the multiple access communication.

**OBJECTIVES :**

- To know the Basics of Digital Communication
- To study about the various types of signals
- To study about the data transmission
- To understand the Baseband system and sampling
- To learn about PCM waveform types
- To study about M-ary pulse modulation
- To learn about rationale for coding
- To learn about types of coding methods
- To study about various error control codes
- To know the Digital modulation techniques
- To learn about TDM frame structure
- To study about coherent detection of PSK, FSK
- To understand the Spread spectrum communication
- To study the Jamming consideration
- To study about CDMA Digital cellular system

## 34071 DIGITAL COMMUNICATION

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **BASICS OF DIGITAL COMMUNICATION**<br><br>Digital communication signal processing – Typical Block diagram and transformations - Advantages over analog communication – Channels for Digital communication- Telephone, Optical fiber, Satellite.<br>Classification of signals- deterministic and random signals - periodic and non-periodic signals – analog and discrete signals - energy and power signals - unit impulse function.<br>Information capacity (Definition only) – Shannon's limit for information capacity (Definition only) - Data transmission - Serial and parallel transmission -Synchronous and asynchronous transmission. | **13** |
| 2 | **FORMATTING AND BASE BAND MODULATION**<br><br>Base band system - The Sampling Theorem –impulse sampling- natural sampling- sample and hold operation - Spectra- Nyquist Theorem - Aliasing – signal interface for a digital system – sampling and quantizing effects- Quantization noise – channel effects – channel noise – PCM - Uniform and Non-uniform Quantization,<br>**Baseband transmission**<br>PCM waveform types- non return-to-zero(NRZ)- return-to-zero (RZ)- phase encoded – multilevel binary – spectral attributes of PCM waveforms – Bits per PCM word and Bits per symbol- PCM word size - M-ary pulse modulation waveforms. | **13** |
| 3 | **BASEBAND CODING TECHNIQUES**<br><br>Rationale for coding – Types of codes – Discrete memoryless channel – Error control coding methods – forward error correction – error detection with retransmission – types of errors – random error and burst error – Principles of linear block codes – Hamming code – Binary cyclic codes – Cyclic redundancy check code (CRC) – Convolution code. | **13** |

| | | |
|---|---|---|
| **4** | **DIGITAL MODULATION TECHNIQUES**<br><br>Digital modulation techniques – Listing of various types – Coherent binary modulation techniques – Coherent quadrature modulation techniques – Non Coherent binary modulation techniques - Minimum shift keying (MSK) - Block diagram of MSK transmitter and receiver - TDM-Frame structure, ASCII framing- E1 Framing, T1 Framing for telephone.<br><br>Detection of signals – coherent detection of PSK – sampled matched filter – coherent detection of FSK – Non-coherent detection - Binary differential PSK. | **12** |
| **5** | **SPREAD SPECTRUM TECHNIQUES**<br><br>Spread spectrum communication - Beneficial attributes of spread spectrum systems – Pseudo noise sequences – Randomness properties – Balance property, Run property and Correlation property - Direct sequence spread spectrum systems – Processing gain and performance – Frequency hopping systems – Frequency hopping with diversity – fast hopping versus slow hopping – Synchronization – Jamming consideration – Commercial application – CDMA Digital cellular system. | **12** |
| Revision & Test | | 12 |

**REFERENCE BOOKS:**

| SL.No | Title | Author | Publisher with Edition |
|---|---|---|---|
| 1 | Digital communications Fundamentals & Applications | Bernard Sklar & Pabitra Kumar Ray | Pearson -Second edition - 2009 |
| 2 | Digital Communications | Simon Haykin | John Wiley India edition - 2006 |
| 3 | Digital communication | Dr. J.S.Chitode | Technical Publications -Pune Second edition,2011 |
| 4 | Digital and analog communication system | B.P.Lathi .Zhi Ding | International 4th Edition - OXFORD university press. |
| 5 | Digital Communication | P.Ramakrishna Rao | TMH<br>2011 |

| | | | |
|---|---|---|---|
| 6 | Principles of Communications system | Taub &Schilling | TMH<br>Third edition,2008 |
| 7 | Digital communications | John G.Prokais | 2011 |
| 8 | Digital communications | Dr.K.N.Hari Bhat<br>Dr.D.Ganesh Rao | Sanguine Technical Publisher<br>2005 |

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**V SEMESTER**

**2015-2016 onwards**

# PROGRAMMABLE LOGIC CONTROLLERS

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**Course Name : ELCTRONICS AND COMMUNICATION ENGINEERING**

**Subject code : 34272**

**Semester : V Semester**

**Subject title : PROGRAMMABLE LOGIC CONTROLLERS**

## TEACHING AND SCHEME OF EXAMINATION

No. of weeks / Semester: 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| PROGRAMMABLE LOGIC CONTROLLERS | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

**Topics and Allocation of Hours:**

| UNIT | TOPICS | TIME (Hrs) |
|---|---|---|
| I | Architecture and operation of PLC | 13 |
| II | Programming of PLC | 13 |
| III | PLC Timers and counters | 13 |
| IV | Advanced instructions | 12 |
| V | I/O Module Communication and networking | 12 |
| | Revision – Test | 12 |
| | Total | 75 |

**RATIONALE:**

Programmable Logic Controller is the mandatory for the control Engineers in any Process Industry. As it is the default controller being used in the industries in automation of process such as packing, discrete control etc., It is obvious for the instrumentation and control Engineer to understand Hardware and programming the PLC.

**OBJECTIVES:**

- To understand the detailed Hardware of PLC and its parts
- To understand the working of PLC and scan cycle
- T o understand the program and data memory organization
- To know the Different timers of PLC and programming them
- To know the different counters of PLC and its parameters
- To understand the Ladder logic programming of PLC
- To develop simple ladder programs
- To study the Advanced instructions of PLC
- To understand the communication module of PLC

## 34272- PROGRAMMABLE LOGIC CONTROLLERS
## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| I | **ARCHITECTURE AND OPERATION OF PLC**<br><br>Evolution of PLCs – Hard-wired control systems. PLC – definition, features, Advantages, Relays .PLC parts and architecture – CPU – I/O section – Programming device - Memory - input field devices – output field devices - input module wiring connections, output module wiring connections- Power Supply -PLC versus computer - Types of PLC – single ended – multitask – control management- unitary - modular- small – medium – large.Developing circuits from Boolean expression – Hardwired logic to programmed logic – programming word level logic instruction – processor memory organization program files – data files – program scan. | 13 Hrs |
| II | **PROGRAMMING OF PLC**<br><br>PLC Programming languages -Standard languages- Ladder diagram (LD) - Function block diagram (FBD) Sequential function chart(SFC)- Statement List(STL) (each one example program)-Symbols of a PLC Input and output contact graphical languages(IES)– program format – Typical Numbering mode – Equivalent ladder diagram of AND, OR, NOT, XOR, NAND AND NOR gate equivalent ladder diagram to demonstrates De Morgan's theorem, Ladder design switches- Develop elementary program design of a 4:1 Multiplexer using ladder logic programming wired level logic instructions input, output, flag, timer, counter, latch. | 13 Hrs |
| III | **PLC TIMERS AND COUNTERS**<br><br>Definition and Classification of a timer. Characteristics of a PLC timer – functions in a timer – resetting –retentive functions and function block format- non-retentive – classification – Timer ON-delay- Timer-OFF delay- Simple problems using timer<br><br>PLC counter – Operation of a PLC counter – Counter parameters – Format of counter instruction and counter data file - count up (CTU)- count down(CTD) simple | 13 Hrs |

| | | |
|---|---|---|
| | problems using counter. | |
| IV | **ADVANCED INSTRUCTION**<br><br>Introduction - comparison instructions- Addressing format for micro logic system - Different addressing types - Data movement instructions - Mathematical instructions- Program flow control instructions - PID instructions.<br><br>Program development and execution using Allen bradly PLC. Simplified start up process of a coal feeding to a boiler plant - elevator for 3 floor building - Traffic light control -conveyor belt<br><br>Selection of PLC - Safety considerations built in the PLC's. | 12 Hrs |
| V | **I/O MODULE COMMUNICATION AND NETWORKING**<br><br>Introduction – classification of I/O Module Input – Output system – Direct I/O, parallel I/O – Sourcing and sinking of serial I/O system. PLC interfacing-Discrete Input module –DC - AC – Discrete output module – Analog input module single ended and output module - RTD input modules- Thermocouple- High speed Encoder-Stepper motor- RS-232 interface module-Differential input module. Types of Communication Interface. Parallel – serial – Parallel – IEEE 488 BUS- Serial _ balanced – unbalanced- communication mode- simplex – Half duplex – full duplex features of good interface. Serial interface RS 232c. DB-9 connection of Rs232C Network Topology, Bus Ring, Star, Tree. | 12 Hrs |
| | Revision and Test | 12 Hrs |

**REFERENCE BOOKS:**


- 1.Madhuchhanda Mitra ,Samarjit sen Gupta,"PLC and Industrial Automation an introduction", Penram international Publishing (India) Pvt Ltd.
- 2.Pradeep Kumar Srivastava, "Exploring Programmable Logic Controller with applications", BPB Publication
- 3.W. Bolton," Programmable logic controller" IV Edition Reed Elsevier India pvt ltd.
- 4.Gary Dunning," Introduction to PLC", III$^{rd}$ edition Thomson del mar learning

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**III YEAR**

**M SCHEME**

**V SEMESTER**

**2015-2016 onwards**

# ELECTRONIC SYSTEM DESIGN

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**Course Name : Electronics and Communication Engineering**

**Subject Code : 34073**

**Semester : V Semester**

**Subject Title : ELECTRONIC SYSTEM DESIGN**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | Hrs./ Week | Hrs./ Semester | Marks | | | Duration |
| | | | Internal Assessment | Board Examination | Total | |
| Electronic System Design | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

**TOPICS AND ALLOCATION:**

| UNIT | TOPIC | TIME (Hrs) |
|---|---|---|
| I | Power supplies | 13 |
| II | Amplifier, Voltage to current and current to voltage converter | 13 |
| III | ADC, DAC, Instrumentation amplifier and transducer | 13 |
| IV | Signal generators | 12 |
| V | Microcontroller based application | 12 |
| | Revision ,Test | 12 |
| TOTAL | | 75 |

**RATIONALE:**

The rationale behind introducing this subject is to make the students understand the structure, working and all other relevant aspects of electronic systems which has become an integral part of Electronic media which is growing at an exponentially high rate all around the world.

**OBJECTIVES:**

- To understand to design of DC regulated power supply of various voltages with different protection circuits.
- To understand the design of different types of amplifiers for various application.
- To understand the use of various transducers and make use them.
- To design various systems using the analog data collected from transducers
- To understand the use of microcontrollers for various application

## 34073-ELECTRONIC SYSTEM DESIGN

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **DESIGN OF POWER SUPPLY**<br>DC power supply with filters - Regulators and their types - Protection circuits - Multi output and variable power supply design - Rectifiers – types - half wave, full wave. | 13 |
| 2 | **DESIGN OF SMALL SIGNAL AMPLIFIERS**<br>CB,CE configuration - Emitter follower - Darlington pair amplifiers with and without – Bootstrapping - Two stage direct coupled amplifiers - Design of audio power amplifier with drivers - Design of simple PA system - Voltage to current converter, current to voltage converter | 13 |
| 3 | **DATA ACQUISITION SYSTEM**<br>Analog to digital converter (ADC) - Digital to analog converter (DAC) - Design of Instrumentation amplifier with the bridge type – transducer - Temperature measurement - Design of Electronic voltmeter and ammeter - Design of – multimeter - Display system. | 13 |
| 4 | **DESIGN OF FUNCTION GENERATORS**<br>Design of AM signal using multiplier IC - AM signal demodulation using envelope detector - Design of FM signal using VCO (using IC NE566) -<br>FM signal demodulation using phase discriminator and ratio detector. | 12 |
| 5 | **HIGH VOLTAGE/HIGH CURRENT DRIVER**<br>Circuit for Relay and motor control applications - Microcontroller based closed loop system - Security systems, Scrolling display - Microcontroller based stepper motor - Microcontroller based temperature sensor and relay | 12 |
| | Revision & Test | 12 |

**REFERENCE BOOKS:**

| SL.No | Title | Author | Publisher with Edition |
|---|---|---|---|
| 9. | A Monograph on Electronic s Design Principles, | N.C.Goyel, R.K.Khetan, | Khanna Publishers -Second Edition |
| 10. | Electronic devices and circuits | Allen Mottershead | Prentice hall of india pvt limited, 19th edition, 1997 |
| 11. | A Monograph on Electronic s Design Principles, | N.C.Goyel, R.K.Khetan, | Khanna Publishers -Second Edition |
| 12. | Electronic devices and circuits | Allen Mottershead | Prentice hall of india pvt limited, 19th edition, 1997 |
| 13. | The art of electronics | Paul Horowitz | Cambridge University-2nd edition Press -2003 |
| 14. | Electronic principles and applications | Charles.A.Schuler | Mc graw hill international edition, 3rd edition, 1989 |
| 15. | 8051 Micro controllers | Mazidi and D.Mackinlay | Pearson education , low price edition, 2006 |

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**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**V SEMESTER**

**2015-2016 onwards**

# ADVANCED COMMUNICATION SYSTEMS PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34055**

**Semester : V Semester**

**Subject title : ADVANCED COMMUNICATION SYSTEMS PRACTICAL**

## TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| Advanced Communication Systems Practical | 4 | 60 | 25 | 75 | 100 | 3 Hrs |

**ALLOCATION OF MARKS**

| | |
|---|---|
| CIRCUIT DIAGRAM/BLOCK DIAGRAM | 20 |
| CONNECTION : | 25 |
| EXECUTION & HANDLING OF EQUIPMENT : | 15 |
| OUTPUT / RESULT : | 10 |
| VIVA – VOCE : | 05 |
| TOTAL : | 75 |

## 34055 - ADVANCED COMMUNICATION SYSTEMS PRACTICAL

**LIST OF EXPERIMENTS:**

1. Simulate the ASK Modulation and demodulation using the simulation tool like PSPICE/ multisim/orcad/tina
2. Simulate the FSK Modulation using the simulation tool like PSPICE/ multisim/orcad/tina
3. Simulate PSK Modulation and demodulation. using the simulation tool like PSPICE/ multisim/orcad/tina.
4. Simulate the Instrumentation amplifier using the simulation tool like PSPICE/ multisim/orcad/tina
5. Construct the circuit of a FSK Modulator & determine the output. waveform
6. Construct the circuit of a FSK Demodulator & determine the output waveform.
7. Construct the circuit to determine the output of a TDM signal. .
8. Construct and test a fiber optic analog link.
9. Construct and test a fiber optic digital link.
10. Construct a suitable circuit & find the bending loss and propagation loss in fiber optics.
11. Construct and test the performance of Manchester encoder and decoder.
12. Construct and measure the Numerical aperture of optical fiber.
13. Construct and test a voice link (with telephone handset both at transmitter and receiver using optical fiber)
14. Install a DTH system. & test it.
15. Construct a LED circuit to find the photo diode characteristics.

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**III YEAR**

**M SCHEME**

**V SEMESTER**

**2015-2016 onwards**

# MICROCONTROLLER PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34056**

**Semester : V Semester**

**Subject title : Microcontroller practical**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| Microcontroller practical | 4 | 60 | 25 | 75 | 100 | 3 Hrs |

**ALLOCATION OF MARKS**

I. Algorithm or Flow chart : 15 Marks

II. Program : 25 Marks

III. Execution : 20 Marks

IV. Result :10 Marks

V. Viva : 5 marks

Total : 75 Marks

## 34056 – MICROCONTROLLER PRACTICAL

## LIST OF EXPERIMENTS

### Part-A

1. Write an Assembly Language Program for Multi-byte Addition and execute the same in the 8051 Kit.

2. Write an Assembly Language Program for Multiplication and Division of two numbers and execute the same in the 8051 Kit.

3. Write an Assembly Language Program for Arranging the given data in Ascending order and execute the same in the 8051 Kit.

4. Write an Assembly Language Program for ASCII to Binary and execute the same in the 8051 Kit.

5. Write an Assembly Language Program for Parity bit generation and execute the same in the 8051 Kit.

6 Write an Assembly Language Program for using timer / Counter and execute the same in the 8051 Kit.

### Part – B INTERFACING WITH APPLICATION BOARDS

7. Write an Assembly Language Program for interfacing Digital I/O board and test it.

8. Write an Assembly Language Program for interfacing Matrix keyboard and test it.

9. Write an Assembly Language Program for interfacing seven segment LED displays and test it.

10. Write an Assembly Language Program for interfacing Traffic light control and test it.

11. Write an Assembly Language Program for interfacing 8 bit ADC and test it.

12. Write an Assembly Language Program for interfacing 8 bit DAC and test it.

13. Write an Assembly Language Program for interfacing STEPPER MOTOR and test it.

14. Write an Assembly Language Program for interfacing DC motor and test it.

15. Write an Assembly Language Program for Sending data through serial port between controller kits and test it.

## EQUIPMENTS REQUIRED

| S.No | Name of the Equipments | Required Nos |
|---|---|---|
| 1. | 8051 Microcontroller Kit | 14 Nos |
| 2. | Digital I/O Interface Board | 02 Nos |
| 3. | Matrix keyboard Interface Board | 02 Nos |
| 4. | Seven segment LED display Interface Board | 02 Nos |
| 5. | Traffic light Interface Board | 02 Nos |
| 6. | 8 bit ADC Interface Board | 02 Nos |
| 7. | 8 bit DAC Interface Board | 02 Nos |
| 8. | STEPPER MOTOR CONTROL Interface Board | 02 Nos |
| 9. | DC motor control Interface Board | 02 Nos |
| 10. | RS232 serial port cable | 02 Nos |

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**V SEMESTER**

**2015-2016 onwards**

# VERY LARGE SCALE INTEGRATION PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Course Code : 34057**

**Semester : V semester**

**Subject Title : Very Large Scale Integration Practical**

## TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs./ Week | Hrs./ Semester | Internal Assessment | Board Examination | Total | |
| Very Large Scale Integration Practical | 4 | 60 | 25 | 75 | 100 | 3 Hrs |

## RATIONALE:

VHDL is a versatile and powerful hardware description language which is useful for modeling digital systems at various levels of design abstraction. This language is for describing the structural, physical and behavioral characteristics of digital systems. Execution of a VHDL program results in a simulation of the digital system allows us to validate the design prior to fabrication of Digital Integrated circuit. This practical introduces basic on VHDL concepts and constructs. It introduces the VHDL from simulation cycle to synthesis level in combinational and sequential circuits.

**GUIDELINES:**

All the experiments given in the list of experiments should be completed and given for the end semester practical examination.

In order to develop best skills in handling Instruments/Equipment and taking readings in the

practical classes, every three students should be provided with a separate experimental setup fordoing experiments in the laboratory.

The external examiners are requested to ensure that a single experimental question should not be given to more than three students while admitting a batch of 30 students during Board Examinations.

**ALLOCATION OF MARKS**

| | |
|---|---|
| Interface circuit diagram | 10 marks |
| Algorithm or flow chart | 20 marks |
| Program | 20 Marks |
| Execution | 10 marks |
| Result | 10 marks |
| Viva Voce | 5 marks |
| Total | 75 Marks |

## 34057- VERY LARGE SCALE INTEGRATION PRACTICAL

## LIST OF EXPERIMENTS

### 1. SIMULATION OF VHDL CODE FOR COMBINATIONAL CIRCUIT

Optimize a 4 variable combinational function (SOP or POS), describe it in VHDL code and simulate it.

Example: F= ( 0,5,8,9,12) in sop or pos

### 2. SIMULATION OF VHDL CODE FOR ARITHMETIC CIRCUITS

Design and Develop the circuit for the following arithmetic function in VHDL Codes and Simulate it. Addition, Subtraction Multiplication (4 x 4 bits)

### 3. SIMULATION OF VHDL CODE FOR MULTIPLEXER

Design and develop a 2 bit multiplexer and portmap the same for developing upto 8 bit multiplexer.

### 4. SIMULATION OF VHDL CODE FOR DEMULTIPLEXER

Design and develop an 8 output demultiplexer. Simulate the same code in the software

### 5. VHDL IMPLEMENTATION OF MULTIPLEXER

Describe the code for a multiplexer and implement it in FPGA kit in which switches are connected for select input and for data inputs a LED is connected to the output.

### 6. VHDL IMPLEMENTATION OF DEMULTIPLEXER

Switches are connected for select inputs and a data input, Eight LEDs are connected to the output of the circuit.

## 7. VHDL IMPLEMENTATION OF 7 SEGMENT DECODER

Develop Boolean expression for 4 input variables and 7 output variables. Design and develop a seven segment decoder in VHDL for 7 equations. A seven segment display is connected to the output of the circuit. Four switches are connected to the input. The 4 bit input is decoded to 7 segment equivalent.

## 8. VHDL IMPLEMENTATION OF 7 SEGMENT DECODER BY LUT

Develop a 7 segment decoder using Look up table. Describe the seven segment decoder in VHDL using developed Look up table. A seven segment display is connected to the output of the circuit. Four switches are connected to the input. The 4 bit input is decoded into 7 segment equivalent.

## 9. VHDL IMPLEMENTATION OF ENCODER

Design and develop HDL code for decimal (Octal) to BCD encoder. There will be10 input switches (or 8 switches) and 4 LEDs in the FPGA kit. The input given from switches and it is noted that any one of the switch is active. The binary equivalent for the corresponding input switch will be glowing in the LED as output.

## 10. SIMULATION OF VHDL CODE FOR DELAY

Develop a VHDL code for making a delayed output for 1second or 2 seconds by assuming clock frequency provided in the FPGA Kit.

## 11. VHDL IMPLEMENTATION FOR BLINKING A LED

Develop a VHDL Code for delay and verify by simulating it. This delay output is connected to LED. Delay is adjusted such away LED blinks for every 1 or 2 seconds.

## 12. SIMULATE A VHDL TEST BENCH CODE FOR TESTING A GATE

Develop a VHDL test bench code for testing any one of the simple gate. Simulate the test bench code in the HDL software.

## 13. VHDL IMPLEMENTATION FOR BLINKING A ARRAY OF LEDS

Design and develop a VHDL Code for 4 bit binary up counter. Four LEDs are connected at the output of the counter. The counter should up for every one seconds.

## 14. VHDL IMPLEMENTATION OF A SPELLER WITH AN ARRAY OF LEDS

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

## 15. VHDL IMPLEMENTATION OF 7 SEGMENT DISPLAY

Design and develop a seven segment decoder in VHDL. Design and develop a 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 display shows 0,1, 2.. 9 for every one second

**LIST OF EQUIPMENTS:**

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

**NOTE:**

1. Gate level or behavioral level or structural model can be used for all experiments.

2. Manual for the FPGA Kit and interface kit can be given to students for the final exam.

# VI SEMESTER

# DIPLOMA IN ELECTRONICS AND COMMUNICAITON ENGINEERING

**M - SCHEME**

**2015 - 2016**

## COMPUTER HARDWARE SERVICING AND NETWORKING

**DIRECTORATE OF TECHNICAL EDUCATION**
**GOVERNMENT OF TAMILNADU**

**M – SCHEME**

**(Implements from the Academic Year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**
**Subject code : 34061**
**Semester : VI Semester**
**Subject Title : COMPUTER HARDWARE SERVICING AND NETWORKING**

**TEACHING AND SCHEME OF EXAMINATION:**

**No. of Weeks per Semester: 15 Weeks**

| Subject | Instructions | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hours / Week | Hours / Semester | Internal Assessment | Board Examination | Total | |
| COMPUTER HARDWARE SERVICING AND NETWORKING | 6 | 90 | 25 | 75 | 100 | 3 Hours |

**Topics and Allocation of Hours:**

| Unit No | Topics | No. of Hours |
|---|---|---|
| I | MOTHERBOARD COMPONENTS AND MEMORY STORAGE DEVICES | 16 |
| II | I/O DEVICES AND INTERFACE | 16 |
| III | TROUBLE SHOOTING OF DESKTOP AND LAPTOPS | 16 |
| IV | COMPUTER NETWORK DEVICES AND OSI LAYERS | 16 |
| V | 802.X AND TCP/IP PROTOCOLS | 16 |
| Revision and Examinations | | 10 |
| Total | | 90 |

## 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 of CPU.
- Understand the principle of operations of all the interfacing boards, IO/Memory slots and interfacing devices.
- Know the use of diagnostic Software.
- Trouble shoot the problems in Laptop.
- Understand the different layers of OSI and their functions. Compare different LAN protocols.
- Identify the protocols used in TCP /IP and compare with OSI model. Use of IP addressing and TCP/ IP protocols briefly.

## 34061 COMPUTER HARDWARE SERVICING AND NETWORKING

### DETAILED SYLLABUS

| Unit No. | Name of the Topic | Hours |
|---|---|---|
| I | **MOTHERBOARD COMPONENTS AND MEMORY STORAGE DEVICES**<br>**Introduction:**<br>Hardware, Software and Firmware.<br>Mother board, IO and memory expansion slots, SMPS, Drives, front panel and rear panel connectors.<br>**Processors:**<br>Architecture and block diagram of multicore Processor, Features of new processor(Definition only)-chipsets (Concepts only)<br>**Bus Standards:**<br>Overview and features of PCI, AGP, PCMCIA<br>**Primary Memory**: Introduction-Main Memory, Cache memory – DDR2, DDR3 and Direct RDRAM.<br>**Secondary Storage:** Hard Disk – Construction – Working Principle Specification of IDE, Ultra ATA, Serial ATA; HDD Partition - Formatting.<br>**Removable Storage:**<br>CD-R,CD-RW,DVD –ROM and DVD –RW**:** construction and reading & writing operations;<br>Blue-ray – Introduction –Disc Parameters. | 16 |
| II | **I/O DEVICES AND INTERFACE**<br>**Keyboard:** Signals – operation of membrane and mechanical keyboards–troubleshooting; wireless Keyboard.<br>**Mouse:** types, connectors, operation of Optical mouse and Troubleshooting.<br>**Printers**: Introduction – Types of printers- Dot Matrix, Inkjet, Laser, MFP (Multi Function Printer) and Thermal printer – Operation, Construction and Features-Troubleshooting<br>**I/O Ports:** Serial, Parallel, USB, Game Port and HDMI.<br>**Displays:** Principles of LED, LCD and TFT Displays.<br>**Graphic Cards:** VGA and SVGA card.<br>**Modem:** Working principle.<br>**Power Supply:** Servo Stabilizers, online and offline UPS - working principles; SMPS: Principles of Operation and block diagram of ATX Power supply, Connector Specifications. | 16 |
| III | MAINTENANCE AND TROUBLE SHOOTING OF DESKTOP AND **LAPTOPS**<br>**Bios-setup:** Standard CMOS setup, Advanced BIOS setup, Power | |

| | | |
|---|---|---|
| | management, advanced chipset features, PC Bios communication – upgrading BIOS, Flash BIOS -setup.<br>**POST:** Definition – IPL hardware – POST Test sequence – beep codes<br>**Diagnostic Software and Viruses:** Computer Viruses – Precautions –Anti-virus Software – identifying the signature of viruses – Firewalls and latest diagnostic softwares.<br>**Laptop:** Types of laptop –block diagram – working principles– configuring laptops and power settings -SMD components, ESD and precautions.<br>**Laptop components:** Adapter – types, Battery – types, Laptop Mother Board - block diagram,Laptop Keyboard and Touchpad .<br>**Installation and Troubleshooting:** Formatting, Partitioning and Installation of OS – Trouble Shooting Laptop Hardware problems - Preventive maintenance techniques for laptops. | **16** |
| IV | **COMPUTER NETWORK DEVICES AND OSI LAYERS**<br>**Data Communication:** Components of a data communication .<br>**Data flow:** simplex – half duplex – full duplex;<br>**Topologies:** Star,Bus, Ring, Mesh, Hybrid – Advantages and Disadvantages of each topology.<br>**Networks:** Definition -Types of Networks: LAN – MAN – WAN – CAN – HAN – Internet –Intranet –Extranet, Client-Server, Peer To Peer Networks.<br>**Network devices:** Features and concepts of Switches – Routers(Wired and Wireless) – Gateways.<br>**Network Models:** Protocol definition - standards - OSI Model – layered architecture – functions of all layers. | **16** |
| V | **802.X AND TCP/IP PROTOCOLS**<br>**Overview of TCP / IP:**TCP/IP – Transport Layers Protocol – connection oriented and connectionless Services – Sockets - TCP & UDP.<br>**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<br>**Network Layers Protocol:** IP –Interior Gateway Protocols (IGMP, ICMP, ARP, RARP Concept only).<br>**IP Addressing :** Dotted Decimal Notation –Subnetting & Supernetting.<br>**Application Layer Protocols:** FTP– Telnet – SMTP– HTTP – DNS -pop | **16** |

**TEXT BOOKS:**


1. IBM PC and CLONES, B.Govindrajalu, Tata McGrawhill 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,


**REFERENCE BOOKS:**


1. Computer Networks,Achyut Godbole,Tata Mc-Graw Hill -New Delhi

2. Principles of Wireless Networks– A unified Approach, Kaveh

Pahlavan and Prashant Krishnamurty, Pearson Education, 2002


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**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**VI SEMESTER**

**2015-2016 onwards**

# TEST ENGINEERING

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name: Electronics and Communication Engineering**

**Subject code : 34062**

**Semester : VI Semester**

**Subject title : TEST ENGINEERING**

## TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| Test Engineering | Hrs/ week | Hrs/ semester | Marks | | | Duration |
| | | | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 6 | 90 | 25 | 75 | 100 | 3Hrs |

## TOPICS AND ALLOCATION:

| Unit | TOPIC | Hrs |
|---|---|---|
| I | INTRODUCTION TO TEST ENGINEERING | 17 |
| II | AUTOMATED TESTING METHODS AND TECHNOLOGY | 17 |
| III | V-I(SIGNATURE) TESTING METHODS AND TECHNOLOGY | 15 |
| IV | BOUNDARY SCAN TESTING METHODS AND TECHNOLOGY | 15 |
| V | ATE TEST PROGRAM GENERATION AND SEMICONDUCTOR TESTING | 16 |
| | Revision & Test | 10 |
| | TOTAL | 90 |

## 34062 - TEST ENGINEERING

### DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **INTRODUCTION TO TEST ENGINEERING.**<br><br>Need and Importance of Test Engineering – Principles of Fundamental Testing Methods – Basic Principles of Memory Testing – PCB Track Short Testing Methods –Concepts of Trouble Shooting PCBs - Manual and Automated PCB Trouble Shooting Techniques. | 17 |
| 2 | **AUTOMATED TESTING METHODS AND TECHNOLOGY**<br><br>Introduction to Automated Test Techniques – Fundamental of Digital Logic Families - Concepts of Back-Driving / Node Forcing Technique and its International Defense Standard - Concepts of Digital Guarding - Auto Compensation - Clock Termination – Functional Test Methods - Functional Testing of Digital, Analog and Mixed Integrated Circuit – Different types of Memory Module Functional Test. | 17 |
| 3 | **V-I(Signature) TESTING METHODS AND TECHNOLOGY**<br><br>Fundamentals of Electrical Characteristics - Effects of Curve Trace, Characteristics of Passive and Active Components - Understanding Composite VI-Curve and it deviations – Component Identification of Ageing Effects with VI Curve Trace, Input and Output Characteristics of Digital Integrated Circuits - Good Versus Suspect interpretation Comparison. | 15 |
| 4 | **BOUNDARY SCAN TESTING METHODS AND TECHNOLOGY**<br><br>Introduction to Boundary Scan – Need of Boundary Scan Test Technique - Principle of Boundary Scan Test - Boundary Scan Architecture - Application of Boundary Scan Test- Boundary Scan Standards - Boundary Scan Description Language (BSDL) – Interconnect test – Serial Vector Format (SVF) Test - Basic of JTAG Port - Digital Integrated Circuit Test using Boundary Scan Techniques. | 15 |
| 5 | **ATE Test Program generation And Semiconductor testing**<br><br>ATE in PCB Test – Test Fixtures - Basics of Automatic Test Program Generation - Standard Test Data Format STDF – Basic of Digital Simulator - Introduction to Semiconductor Test, Use of Load Boards. | 16 |

**REFERENCE BOOKS**:


1. Test Engineering for Electronic Hardware – S R Sabapathi, Qmax Test Equipments P Ltd., 2011.
2. Practical El**e**ctronic Fault Finding and Trouble shooting by Robin Pain Newnes, Reed Educational and professional publishing Ltd., 1996
3. The Fundamentals of Digital Semiconductor Testing, Floyd, Pearson Education India, Sep-2005

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**VI SEMESTER**

**2015-2016 onwards**

# Elective Theory – II
# TELEVISION ENGINEERING

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34081**

**Semester : VI Semester**

**Subject title : TELEVISION ENGINEERING**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| Television Engineering | Hrs/ week | Hrs/ semester | Marks | | | Duration |
| | | | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 5 | 75 | 25 | 75 | 100 | 3Hrs |

**TOPICS AND ALLOCATION:**

| Unit | Topic | Time (Hrs.) |
|---|---|---|
| I | Television Fundamentals | 14 |
| II | Camera and picture tubes | 13 |
| III | Television transmitter | 10 |
| IV | Television Receiver | 13 |
| V | Advanced Television Systems | 15 |
| | Revision – Test – Model (3+4+3) | 10 |
| | TOTAL | 75 |

**RATIONALE**

One of the elements of mass media communication is the television. The TV has gone with different stages of development. So the electronics engineer must be able to service the TV receiver and its attachments after knowing the working of the TV right from the TV right from the Txr from where the signal is being produced for transmission

**OBJECTIVES:**

- Unit 1 To understand monochrome TV transmitter and receiver
- Unit 1 To understand principles of scanning
- Unit 1 To study about different TV standards
- Unit 1 To study fundamentals of color TV
- Unit 2 To learn about camera tube and its working.
- Unit 2 To understand the working of picture tubes monochrome
- Unit 3 To learn about color TV transmitter
- Unit 3 To know about monochrome TV Rxr.
- Unit 4 To Study about color TV receiver
- Unit 4 To know the video amplifier and HDFC
- Unit 5 To study fundamentals of CCTV
- Unit 5 To learn HD TV and 3D TV.
- Unit 5 To study the telecine equipment
- Unit 5 To study applications of Blu ray Disk, DVD players models, USB

## 34081 – TELEVISION ENGINEERING

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **Television Fundamentals**<br>**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 – Types – vertical and horizontal resolution – video bandwidth – composite video signal (CVS)– CVS for one horizontal line – Definitions for Vertical sync pulse, Serrated vertical pulse, Equalizing pulse – Positive & Negative modulation - TV Standards – List of Types of TV standards.<br><br>**Color T.V. Fundamentals:** Additive mixing of colors –Types – color perception – Chromaticity diagram – Definition for Luminance, Hue Saturation and Chrominance Formation of chrominance signal in PAL system with weighting factors. | 10<br><br>4 |
| 2 | **CAMERA AND PICTURE TUBES**<br><br>**CAMERA TUBE:** Characteristics – Types of camera tube – working principle of Vidicon and Plumbicon camera tube, CCD camera – Video processing of camera pick up signal – Block diagram and Principle of working of color TV camera tube.<br><br>**PICTURE TUBE :** Construction and working of Monochrome picture tube – screen phosphor – screen burn – Screen Persistance - Aluminized screen – Types of color picture tubes -construction and working principle of Delta gun and Trinitron Color picture tubes – Automatic degaussing. | 7<br><br>6 |
| 3 | **TELEVISION TRANSMITTER**<br><br>Types –Comparison - Principle – Block diagram of Low level IF Modulated TV transmitter –Visual Exciter –Aural Exciter – principle of working of CIN Diplexer –Block diagram of color TV transmitter – color compatibility – PAL color coder –functional blocks and working of each block – Merits and demerits of PAL system. | 10 |

| | | |
|---|---|---|
| 4 | **TELEVISION RECEIVER**<br>Block diagram of Monochrome Receiver – functions of each block – Need for AGC – Advantages of AGC – Video amplifier requirements –High frequency & Low frequency compensation – Block diagram of PAL color Receiver – Need for sync separator – Basic sync separator circuits– Vertical sync separation & Horizontal sync separation – AFC – Need for AFC – Horizontal AFC – Hunting in AFC – Anti Hunt network. | 13 |
| 5 | **ADVANCED TELEVISION SYSTEMS**<br>Block diagram of a digital color 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.<br>Blue Ray Disc(BD)- The DVD player – Block diagram- Desirable Features & outputs of DVD players-DVD player Models - USB flash drive(pen drive). | 15 |
| | Revision-Test | 10 |

**TEXT BOOKS:**

1. Modern Television Practice – Transmission, Reception, Applications R.R.Gulati New age international 5th Edition 2015
2. TV and Video Engg. By A.M.Dhake – Second Edition TMH -2003

**REFERENCE BOOKS:**

1. Monochrome & Color TV by R.R.Gulati - New Age publishers -2003.
2. Color TV, Theory and practice – by S.P.Bali-TMH – 1994.
3. Modern VCD-Video CD Player Introduction, servicing and troubleshooting By Manohar Lotia &Pradeep Nair BPB Publications 2002.

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**VI SEMESTER**

**2015-2016 onwards**

# BIO MEDICAL INSTRUMENTATION

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015 - 2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code : 34082**

**Semester : VI Semester**

**Subject title : BIO MEDICAL INSTRUMENTATION**

## TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | Hrs./ Week | Hrs./ Semester | Marks | | | Duration |
| | | | Internal Assessment | Board Examination | Total | |
| Bio Medical Instrumentation | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

## TOPICS AND ALLOCATION

| Unit | Topic | Time (Hrs) |
|---|---|---|
| I | Bio - electric signals, electrodes and clinical measurement | 13 |
| II | Bio - medical recorders | 13 |
| III | Therapeutic instruments | 13 |
| IV | Biotelemetry and patient safety | 14 |
| V | Modern imaging techniques | 12 |
| Vi | Revision, Test | 10 |
| | TOTAL | 75 |

## RATIONALE

Bio medical engineering education is in the growing stage. But every year, there is a tremendous increase in the use of modern medical equipment in the hospital and health care industry therefore it is necessary for every student to understand the functioning of various medical equipments. This subject to enable the students to learn the basic principles of different biomedical instruments vizClinical measurement, Bio - medical recorders, Therapeutic instruments, Biotelemetry and Modern imaging techniques instruments.

## OBJECTIVES

After learning this subject the student will be able to understand the about

- The generation of Bio-potential and its measurement using various electrodes.
- The measurement of blood pressure.
- The measurement of lung volume.
- The measurement of respiration rate.
- The measurement of body temperature and skin temperature.
- The principles of operations of ECG recorder.
- The principles of operations of EEG recorder.
- The principles of operations of ENG recorder.
- The working principles of audio meter.
- The principles of operations of pacemaker.
- The basic principle of dialysis.
- The basic principle of short wave diathermy.
- The basic principle of ventilators.
- The working principles of telemetry.
- The basic principle of telemedicine.
- To learn about patient safety.
- The various methods of accident prevention.
- The basic principle of various types of lasers.

- The basic principle of CT and MRI scanner.
- The principle of operation of various imaging techniques

## 34082 - BIO MEDICAL INSTRUMENTATION

## DETAILED SYLLABUS

| Units | Name of the topic | Hours |
|---|---|---|
| I | **BIO-ELECTRIC SIGNALS AND ELECTRODES**<br><br>Elementary ideas of cell structure, Bio – potential and their generation – resting and action potential – propagation of action potential. Electrodes – Micro – Skin surface – needle electrodes.<br>**CLINICAL MEASUREMENT:**<br>Measurement of Blood pressure (direct, indirect) – blood flow meter (Electro magnetic& ultrasonic blood flow meter) – blood pH measurement - Measurement of Respiration rate – measurement of lung volume – heart rate measurement – Measurement of body and skin temperature - Chromatography, Photometry, Flurometry. | 13 |
| II | **BIO - MEDICAL RECORDERS:**<br><br>Electro cardiograph (ECG) – Lead system – ECG electrodes – ECG amplifiers – ECG recording units – analysis of ECG curves. Nervous system – EEG recorder – 10-20 lead system – recording techniques – EEG wave types – Clinical use of EEG – brain tumour Electro – myograph (EMG) – EMG waves – measurement of conduction velocity – EMG recording techniques – Electro – retinograph (ERG) Audiometer – principle – types – Basics audiometer working. | 13 |
| III | **THERAPEUTIC INSTRUMENTS:**<br><br>Cardiac pacemaker – classification – External pace makers – implantable pacemaker – pacing techniques – programmable pacemaker – Cardiac defibrillators – types – AC and DC defibrillators - Heart lung machine with Block diagram. Dialysis – Hemo dialysis – peritoneal dialysis. Endoscopes Endoscopic laser coagulator and applications – physiotherapy equipment – short wave diathermy – micro wave diathermy – ultrasonic therapy unit (block / circuit) – Ventilators – types – modern ventilator block diagram. | 13 |
| IV | **BIOTELEMETRY AND PATIENT SAFETY:** | |

| | | |
|---|---|---|
| | Introduction to biotelemetry – physiological – adaptable to biotelemetry – components of a biotelemetry system – application of telemetry – elements of biotelemetry; AM, FM transmitter and receiver – requirements for biotelemetry system – radio telemetry with sub carrier – single channel and multi channel telemetry – Telemedicine; introduction, working, applications.<br>Patient safety: Physiological effects of electric current – Micro and macro shock – leakage current – shock hazards from electrical equipment. Methods of Accident Prevention – Grounding – Double Insulation – Protection by low voltage – Ground fault circuit interrupter – Isolation of patient connected parts – Isolated power distribution system. Safety aspects in electro surgical units – burns, high frequency current hazards, Explosion hazards. | 14 |
| V | **MODERN IMAGING TECHNIQUES:**<br><br>LASER beam properties – block diagram – operation of CO2 and NDYag LASER – applications of LASER in medicine. X ray apparatus – block diagram – operation – special techniques in X-ray imaging – Tomogram – computerized Axial tomography – Ultrasonic imaging techniques – Echo cardiography – Angiography – CT scanner - Magnetic resonance imaging techniques. | 12 |
| | Revision and Test | 10 |

**Text Book:**

Dr.M. Arumugam – Biomedical Instrumentation ,Anuradha publications, chennai (Page no. 1-15, 21-33, 117-136,142-159,164-179, 182-195, 202-209, 212-215, 255 – 256, 274-277, 285-286, 266-268, 293-297, 299- 310, 319-320, 329 – 340, 347-358, 360-367, 374-390, 390-400)

**Reference Books.**

- Leslie Cromwell –Fred j. Wibell, Erich A.P Feither – Bio medical Instrumentation and measurements, II Edition.
- (Page no. 49-64, 63-76, 93-97, 106-149,195-205, 260-276, 296-303, 316 – 339, 363- 383,430-439)
- Jacobson and Webstar – Medicine and clinical Engineering.
- R.S .Khandpur – Hand book of Bio –Medical Instrumentation.
- Medical Electronics - Kumara doss
- Introduction to Medical Electronics. B.R. Klin
- Introduction to Biomedical Instrumentation Mandeep Singh Printice Hall India 2010.

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**VI SEMESTER**

**2015-2016 onwards**

# MOBILE COMMUNICATION

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject Code : 34083**

**Semester : VI Semester**

**Subject Title : MOBILE COMMUNICATION**

## TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | |
| | Hrs/ Week | Hrs/ Semester | Internal Assessment | Board Examination | Total | Duration |
| Mobile Communication | 5 | 75 | 25 | 75 | 100 | 3 Hrs |

## TOPICS AND ALLOCATION:

| UNIT | TOPIC | TIME(HRS) |
|---|---|---|
| I | Introduction to Mobile Communication | 13 |
| II | Broadcast Systems | 13 |
| III | Wireless Transmission (2G) | 13 |
| IV | Wireless Networking (3G) | 12 |
| V | Mobile Network Layer & Transport Layer | 12 |
| Revision – Test | | 12 |
| TOTAL | | 75 |

## RATIONALE

Communication is one of the integral parts of science that has always been a focus point for exchanging information among parties at locations physically apart. After its discovery, telephones have replaced the telegrams and letters. Similarly, the term 'mobile' has completely revolutionized the communication by opening up innovative applications that are limited to one's imagination. Today, mobile communication has become the backbone of the society. All the mobile system technologies have improved the way of living. It's main plus point is that it has privileged a common mass of society. In this subject, the evolution as well as the fundamental techniques of the mobile communication is discussed.

## OBJECTIVES:

- To know the basics of Mobile Radio Communication
- To know about wireless communications systems
- To understand the Cellular concept
- To study broadcasting
- To learn the Digital audio and video broadcasting
- To learn the convergence of mobile communications
- To know wireless communications and the process of transmission
- To study about various architectures in wireless transmission
- To study the CDMA digital standards
- To understand Mobile Services (2G), (2.5G) and (3G)
- To know the GPRS and WAP
- To learn the manufacture and operator technologies
- To learn mobile network layer & transport layer
- To study the Dynamic host configuration protocol
- To know the TCP &its improvements

## 34083 - MOBILE COMMUNICATION

## DETAILED SYLLABUS

| UNIT | NAME OF THE TOPIC | HOURS |
|---|---|---|
| 1 | **INTRODUCTION TO MOBILE COMMUNICATION**<br>Evolution of Mobile Radio Communication, Mobile Radio Telephony in India and around the world, Examples of Wireless Communication Systems: Paging system, Cordless telephones systems, Cellular telephone Systems, Trends in Cellular Radio and personal Communications<br>**THE CELLULAR CONCEPT:** Frequency reuse, Channel Assignment strategies, Hand off Strategies, Prioritizing Handoffs, Interference and system capacity, Improving coverage and capacity in cellular systems ,Cell splitting ,Sectoring, Repeaters for range extension | **13** |
| 2 | **BROADCAST SYSTEMS**<br>Introduction – Cyclical repetition of data – Digital audio broadcasting – multimedia object transfer protocol – Digital video broadcasting – DVB data broadcasting, DVB for high speed internet access – Convergence of broadcasting and mobile communications | **13** |
| 3 | **WIRELESS TRANSMISSION (2G)**<br>Global system for mobile (GSM) - services and features - Radio subsystem - channel types - Example of a GSM call - Frame structure for GSM – DECT system architecture, protocol architecture – TETRA – UMTS and IMT-2000 - radio interface, UTRAN, core network, handover - CDMA digital cellular standard (IS – 95): Frequency and channel specifications -Forward CDMA channel and Reverse CDMA channel | **13** |
| 4 | **WIRELESS NETWORKING (3G)**<br>**Mobile Services (2.5G)**<br>**GPRS:** GPRS Functional groups – architecture - network nodes – procedures -billing.<br>**WAP:** WAP Model - WAP Gateway- WAP Protocols - WAP UA prof and caching, wireless bearers for WAP, WAP developer tool kits - Mobile station application execution environment.<br>**Mobile Services (3G):**<br>Paradigm Shifts in 3G Systems - W-CDMA and CDMA 2000 - Improvements on core network - Quality of service in 3G - Wireless OS for 3G handset - 3G systems and field trials - Other trail systems - Impact on manufacture and operator technologies. | **12** |
| 5 | **MOBILE NETWORK LAYER & TRANSPORT LAYER**<br>Mobile IP – Goals, assumptions and requirements, Entities and terminology, IP Packet delivery, Agent discovery, Registration, tunneling and encapsulation , Optimization, Reverse tunneling, IPv6, IP micro- mobility support - Dynamic host configuration protocol – mobile ad-hoc network – routing – destination sequence distance vector – Dynamic source routing – alternative metrics TCP – Congestion control – slow start – fast retransmit/ fast recovery – implications of mobility – Classical TCP improvements – indirect – snooping – Mobile–Transmission timeout freezing – selective retransmission- Transaction oriented – TCP over 2.5/3G wireless networks | **12** |
| | Revision & Test | 12 |

**REFERENCE BOOKS:**

| SL.No | Title | Author | Publisher with Edition |
|---|---|---|---|
| 11. | Wireless Communications Principles and Practice | Theodore S. Rappaport | Pearson Education, 2003 |
| 12. | Mobile Communications | Jochen Schiller | Pearson Education, 2009, Second edition |
| 13. | Wireless and Mobile Network Architectures | Yi-BingLin, Imrich Chlamtac | Wiley, 2001 |
| 14. | Mobile Cellular Communication | Gottapu Sasibhushana Rao | Pearson Education, 2012 |
| 15. | Wireless Digital Communications | Kamilo Feher | PHI, 2003 |
| 16. | Mobile Cellular Communications | W.C.Y. Lee | 2nd Edition, MC Graw Hill, 1995 |
| 17. | Wireless Networks | P. Nicopolitidis | Wiley, 2003 |
| 18. | Wireless Communications and Networks | William Stallings | 2nd Edition,Prentice Hall of India-2006 |

**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**III YEAR**

**M SCHEME**

**VI SEMESTER**

**2015-2016 onwards**

# EMBEDDED SYSTEMS PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subject code :34064**

**Semester : VI Semester**

**Subject title :EMBEDDED SYSTEMS PRACTICAL**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks / Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| Embedded systems Practical | Hrs/ week | Hrs/ semester | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 4 | 60 | 25 | 75 | 100 | 3Hrs |

**ALLOCATION OF MARKS**

I. Algorithm or Flow chart : 15 Marks

II. Program : 25 Marks

III. Execution : 20 Marks

IV. Result :10 Marks

VI. Viva : 5 marks

Total : 75 Marks

## LISTOF EXPERIMENTS

1. **STUDY OF ARM PROCESSOR KIT** (whatever the ARM processor kit the institution is having) Example: LPC2148 The student should able to Understand the memory mapping of the IO and peripherals List the peripherals present in the processor Explain that how to use an IO pin, related SFRs and instructions Explain that how to use timer, UART, its related SFR and instructions sets

2. **SIMULATION OF ARITHMETIC OPERATION ON ARM IN ASSEMBLY** Develop an assembly level code for the single precision (32 bit) arithmetic function. a. Addition, b. Subtraction and b. Multiplication (Note: simulate the program in the software)

3. **SIMULATION OF ASSEMBLY LEVEL PROGRAM FOR SOFT DELAY** Develop an assembly level code for the 32 bit or 64 bit delay routine. Calculate the no of clock taken for the routine and adjust the delay value for the desired. (Note: simulate the program in the software)

4. **SIMPLE LED BLINKING WITH VARIABLE SPEED IN ASM** Develop an assembly level program of ARM processor to blink a LED (including delay routine) in variable speed in the trainer kit. Upon change in the delay program the speed should vary. No need to change the speed dynamically. (Note: Student should study the list of special function registers associated for accessing the IO pin. Manual containing List of IO registers (SFR for IO) can be given to the students for the final exam)

5. **REALIZATION OF INPUT AND OUTPUT PORT IN ASM** Develop an assembly level program of ARM processor to read a port in which switches are connected in the trainer kit. Send back the receive input to output in which LEDs are connected in the trainer kit Note: Student should study the list of special function registers associated for accessing Port the read and write. Manual containing List of IO registers (SFR for IO) can be given to the students for the board exam)

6. **SIMPLE LED BLINKING WITH VARIABLE SPEED IN C** Develop a C program for ARM processor to blink a LED (including delay routine) in variable speed. Upon change in the input switch the speed should vary. (Note: The C code should be in while loop)

7. **SEVEN SEGMENT LED DISPLAY INTERFACE IN C** Develop a C program for ARM processor to interface a seven segment LED display. The display should count up for every one second.

8. **SEVEN SEGMENT LED DISPLAY INTERFACE IN C** Develop a C program for ARM processor to interface a seven segment LED display. The display should count up for every one second. The delay can be used from experiment

9. **REALIZING TIMER PERIPHERAL IN ARM BY POLLING METHOD** Develop a C program for ARM processor to run a timer peripheral in ARM. The timer flag can be pooled for timer end. As timer ends reset the timer and update new value to the LED display.

10. **REALIZING TIMER PERIPHERAL IN ARM BY INTERRUPT DRIVEN METHOD** Develop a C program for ARM processor to run a timer peripheral in ARM. The timer flag can be pooled for timer end. As timer ends reset the timer and update new value to the LED display.

11. **SERIAL TRANSMISSION AND RECEPTION OF A CHARACTER IN C BY POLLING METHOD** Write a C Programs for receiving a character from other device (Computer) and send the next character of the received one to the device back. Note: Student should understand the SFRs used for serial communication. Manual containing list of SFRs for the UART can be given to the students for their final examination

12. **SERIAL TRANSMISSION AND RECEPTION OF A CHARACTER IN C BY INTERRUPT METHOD** Write a C Programs for receiving a character from other device (Computer) and send the next character of the received one to the device back.

13. **DISPLAYING ALPHANUMERIC CHARACTERS IN 2X16 LINE LCD MODULE** Write a C Programs for displaying a number and an alphabet in the LCD module by just calling the built in LCD function. The display should come in the desired line and column. (Built in function for the LCD can be given in the manual)

14. **CONVERTING HEXADECIMAL TO DECIMAL AND TO DISPLAY IN LCD** Write a C Programs for converting the given 8 bit hexadecimal into decimal and there by converting into ASCII which is to be displayed in the LCD module. (Built in function for the LCD can be given in the manual)

15. **ACCESSING INTERNAL ADC OF THE ARM PROCESSOR AND TO DISPLAY IN LCD** Write a C Program for reading an ADC, convert into decimal and to display it The ADC input is connected to any analog sensor. (Note: Student should study the SFR associated with ADC, Manual containing List of SFR for accessing ADC can be given for the examination.)

## LIST OF EQUIPMENTS AND REQUIREMENTS:

1. ARM7 TDMI Kit – 10 nos with interface boards for the above experiments The Chip set may be TMS470, LPC2138, LPC2148, or STR7 etc

2. Interfaces:RTC, ADC, LCD, Seven segment display, LEDS and Switches.

3. Manual for the kit and for interfacing board with stepper motor

4. Manual for the built in function for the Board.

**NOTE:**

1. Manual for the ARM instructions 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 exam.

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

# DIPLOMA IN ELECTRONICS AND COMMUNICAITON ENGINEERING

**III YEAR**

**M - SCHEME**

**VI SEMESTER**

**2015-2016 onwards**

## COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M – SCHEME**

(Implemented from the academic year 2015 - 2016 onwards)

**Course Name : Electronics and Communication Engineering**
**Subject Code : 34065**
**Semester : VI Semester**
**Subject Title : COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL**

## SCHEME OF INSTRUCTION AND EXAMINATION

No. of weeks per semester: 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| | Hrs/ week | Hrs/ semester | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| COMPUTER HARDWARE SERVICING AND NETWORKING PRACTICAL | 4 | 60 | 25 | 75 | 100 | 3Hrs |

## 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 also 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 and formatting.
- Acquire the practical knowledge about the installation of various devices like printer, scanner, web camera and bio-metric devices.
- Assemble PC system and laptop and checking the working condition.
- Install Dual OS in a system.
- Enable to perform different cabling in a network.
- Configure Internet connection and able to debug network issues.

## ALLOCATION OF MARKS

| CONTENT | Max. Marks | |
|---|---|---|
| | Part A | Part B |
| Procedure | 15 | 15 |
| Execution | 15 | 15 |
| Result with printout | 5 | 5 |
| viva | 5 | |
| Total | 75 | |

## LIST OF EXPERIMENTS

**Part A – Computer Hardware servicing**

**1. IDENTIFICATION OF SYSTEM LAYOUT**

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. HARD DISK**

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

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

**3. DVD/BLU-RAY WRITER**

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**

**5.**

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) Install OS in the laptop.

**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

**10.** 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.** Share the files and folders in a LAN.

**13.** Share a printer in a LAN.

**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 or Routers

ii) Install and Configure NIC.

**COMPUTER HARDWARE SERVICING AND NETWORKING**
**PRACTICAL - REQUIREMENTS**

## Hardware Requirements :

| | |
|---|---|
| Computer with Pentium / Core processors with inbuilt NIC | -30 Nos |
| Hard disk drive | -02 Nos |
| CDD/ DVD Writer | -02 Nos |
| Blank Blu-ray disk | -30 Nos |
| Web camera | -02 Nos |
| Laser Printer | -02 Nos |
| Dot matrix Printer | -02 Nos |
| Blank DVD | -30 Nos |
| Scanner | -02 Nos |
| Laptop | -02 Nos |
| Bio metric device | -02 Nos |
| Crimping Tool | -06 Nos |
| Network Cables | |
| RJ45 Tester | -06 Nos |
| Modem with internet connection | -02 Nos |
| Hub | -02 Nos |
| Switch/ Router | -02 Nos |

## Software Requirements:

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

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**M SCHEME**

**VI SEMESTER**

**2015-2016 onwards**

# TEST ENGINEERING PRACTICAL

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name: Electronics and Communication Engineering**

**Subject code : 34066**

**Semester : VI Semester**

**Subject title : TEST ENGINEERING PRACTICAL**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| | | | Marks | | | Duration |
| TEST ENGINEERING PRACTICAL | Hrs/ week | Hrs/ semester | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 5 | 75 | 25 | 75 | 100 | 3Hrs |

**ALLOCATION OF MARKS**

CIRCUIT DIAGRAM : 20

PROCEDURE: 25

EXECUTION & HANDLING OF EQUIPMENT : 15

OUTPUT / RESULT : 10

VIVA – VOCE : 05

TOTAL : 75

**EQUIPMENTS REQUIRED**

| Sl.No | Name of the Equipments |
|---|---|
| 1 | PCB SHORTS LOCATOR TRAINER |
| 2 | V-I CHARACTERISTICS TRAINER SYSTEM |
| 3 | FUNCTIONAL TESTING TRAINER SYSTEM |
| 4 | IN-CIRCUIT MEASUREMENT TRAINER SYSTEM |
| 5 | BOUNDARY SCAN TEST TRAINER SYSTEM |
| 6 | DIGITAL and ANALOG SIMULATOR |

## 34066 - TEST ENGINEERING PRACTICAL

### List of experiments

1. Locate a Short in a circuit Board using Short Locator.

2.Test and verify the combinational logic circuits NAND, NOR, Half-Adder, Half-Subtractors, Multiplexers, De-multiplexer, Decoder & Encoder using functional test method.

3.Test and verify the Sequential Logic Circuits D-FF, RS-FF, Latch, Counter, Shift Register using functional test method.

4. Test and verify the Memory Devices SDRAM/DRAM Chip . using functional test method.

5. a. Test and verify the digital circuits in a circuit using auto compensation technique.

b.Test and verify the open emitter circuit using pull down resistor.

c. .Test and verify the open collector circuit using pull up resistor.

6. Test the functionality of operational amplifier in Inverting , Non-inverting and voltage follower mode.

7. Test the VI characteristics of R,L,C using signature method.

8.Test the VI characteristics of electronic components Diode, Zener Diode, NPN/PNP Transistor using signature method .

9. Test the VI characteristics of RC Filter, Low Pass Filter , Band Pass Filter using signature method.

10.Test the VI characteristics of electronic components MOSFET and Transistor using Trigger pulse and signature method.

11.Test the VI characteristics of electronic components SCR and Opto coupler using Trigger pulse and signature method.

12. Test RLC circuit using in-circuit measurement method.

13..Test the Boundary Scan IC using JTAG port and non boundary scan IC using boundary scan IC.

14.Detect and list down the stuck to VCC and stuck to Gnd pins in a boundary scan IC.

15.Develop a device model for NAND and NOR using device library and create a test pattern for testing.

# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING

**II YEAR**

**M SCHEME**

**VI SEMESTER**

**2015-2016 onwards**

## PROJECT WORK

**CURRICULAM DEVELOPMENT CENTRE**

**M-SCHEME**

**(Implemented from the Academic year 2015-2016 onwards)**

**Course Name : Electronics and Communication Engineering**

**Subjectcode : 34067**

**Semester : VI**

**Subject title : PROJECT WORK**

**TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

| Subject | Instruction | | Examination | | | |
|---|---|---|---|---|---|---|
| PROJECT WORK | Hrs/ week | Hrs/ semester | Marks | | | Duration |
| | | | INTERNAL ASSESMENT | BOARD EXAM | TOTAL | |
| | 4 | 60 | 25 | 75 | 100 | 3 Hrs |

**OBJECTIVES:**

- The project is aimed to assemble 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 technological knowledge acquired through curriculam and the actual industrial need and to compense it by acquiring additional knowledge as required.

| Detail OF ASSESSMENT | Period of assessment | Max. Marks |
|---|---|---|
| First Review | 6 th week | 10 |
| Second Review | 15 th week | 10 |
| Attendance | Entire semester | 5 |
| Total | | 25 |

**EVALUATION FOR BOARD EXAMINATION:**

| Details of Mark allocation | Max Marks |
|---|---|
| Marks for Report Preparation, Demo, Viva-voce | 65 |
| Marks for answers of 4 questions which is to be set by the external examiner from the given question bank consisting of questions in the following two topics Disaster Management and Environmental Management. Out of four questions two questions to appear from each of the above topics i.e. 2 questions x 2 topics = 4 questions<br><br>4 questions x 2 ½ marks = 10 Marks | 10 |
| **Total** | **75** |

## DETAILED SYLLABUS

### ENVIRONMENTAL & DISASTER MANAGEMENT

### 1. ENVIRONMENTAL MANAGEMENT

Introduction – Environmental Ethics – Assessment of Socio Economic Impact – Environmental Audit – Mitigation of adverse impact on Environment – Importance of Pollution Control – Types of Industries and Industrial Pollution.

Solid waste management – Characteristics of Industrial wastes – Methods of Collection, transfer and disposal of solid wastes – Converting waste to energy – Hazardous waste management Treatment technologies.

Waste water management – Characteristics of Industrial effluents – Treatment and disposal methods – Pollution of water sources and effects on human health.

Air pollution management – Sources and effects – Dispersion of air pollutants – Air pollution control methods – Air quality management.

Noise pollution management – Effects of noise on people – Noise control methods.

### 2. DISASTER MANAGEMENT

Introduction – Disasters due to natural calamities such as Earthquake, Rain, Flood, Hurricane, Cyclones etc – Man made Disasters – Crisis due to fires, accidents, strikes etc – Loss of property and life..

Disaster Mitigation measures – Causes for major disasters – Risk Identification – Hazard Zones – Selection of sites for Industries and residential buildings – Minimum distances from Sea – Orientation of Buildings – Stability of Structures – Fire escapes in buildings -

Cyclone shelters – Warning systems.

Disaster Management – Preparedness, Response, Recovery – Arrangements to be made in the industries / factories and buildings – Mobilization of Emergency Services - Search and Rescue operations – First Aids – Transportation of affected people – Hospital facilities – Fire fighting arrangements – Communication systems – Restoration of Power supply – Getting assistance of neighbors / Other organizations in Recovery and Rebuilding works – Financial commitments – Compensations to be paid – Insurances – Rehabilitation.

## LIST OF QUESTIONS

### 1. ENVIRONMENTRAL MANAGEMENT

1. What is the responsibility of an Engineer-in-charge of an Industry with respect to Public Health?
2. Define Environmental Ethic.
3. How Industries play their role in polluting the environment?
4. What is the necessity of pollution control? What are all the different organizations you know, which deal with pollution control?
5. List out the different types of pollutions caused by a Chemical / Textile / Leather / Automobile / Cement factory.
6. What is meant by Hazardous waste?
7. Define Industrial waste management.
8. Differentiate between garbage, rubbish, refuse and trash based on their composition and source.
9. Explain briefly how the quantity of solid waste generated in an industry could be reduced.
10. What are the objectives of treatments of solid wastes before disposal?
11. What are the different methods of disposal of solid wastes?
12. Explain how the principle of recycling could be applied in the process of waste minimization.
13. Define the term ‘Environmental Waste Audit’.
14. List and discuss the factors pertinent to the selection of landfill site.
15. Explain the purpose of daily cover in a sanitary landfill and state the minimum desirable depth of daily cover.
16. Describe any two methods of converting waste into energy.
17. What actions, a local body such as a municipality could take when the agency appointed for collecting and disposing the solid wastes fails to do the work continuously for number of days?
18. Write a note on Characteristics of hazardous waste.
19. What is the difference between municipal and industrial effluent ?
20. List few of the undesirable parameters / pollutants anticipated in the effluents from oil refinery industry / thermal power plants / textile industries / woolen mills / dye industries / electroplating industries / cement plants / leather industries (any two may be asked)

21. Explain briefly the process of Equalization and Neutralization of waste water of varying characteristics discharged from an Industry.
22. Explain briefly the Physical treatments “Sedimentation” and “Floatation” processes in the waste water treatment.
23. Explain briefly when and how chemical / biological treatments are given to the waste water.
24. List the four common advanced waste water treatment processes and the pollutants they remove.
25. Describe refractory organics and the method used to remove them from the effluent.
26. Explain biological nitrification and de-nitrification.
27. Describe the basic approaches to land treatment of Industrial Effluent.
28. Describe the locations for the ultimate disposal of sludge and the treatment steps needed prior to ultimate disposal.
29. List any five Industries, which act as the major sources for Hazardous Air Pollutants.
30. List out the names of any three hazardous air pollutants and their effects on human health.
31. Explain the influence of moisture, temperature and sunlight on the severity of air pollution effects on materials.
32. Differentiate between acute and chronic health effects from Air pollution.
33. Define the term Acid rain and explain how it occurs.
34. Discuss briefly the causes for global warming and its consequences
35. Suggest suitable Air pollution control devices for a few pollutants and sources.
36. Explain how evaporative emissions and exhaust emissions are commonly controlled.
37. What are the harmful elements present in the automobile smokes? How their presence could be controlled?
38. What is the Advantage of Ozone layer in the atmosphere? State few reasons for its destruction.
39. Explain the mechanism by which hearing damage occurs.
40. List any five effects of noise other than hearing damage.
41. Explain why impulsive noise is more dangerous than steady state noise.
42. Explain briefly the Source – Path – Receiver concept of Noise control.
43. Where silencers or mufflers are used ? Explain how they reduce the noise.
44. Describe two techniques to protect the receiver from hearing loss when design / redress for noise control fail.
45. What are the problems faced by the people residing along the side of a railway track and near to an Airport? What provisions could be made in their houses to reduce the problem?

**2. DISASTER MANAGEMENT**

1. What is meant by Disaster Management? What are the different stages of Disaster management?
2. Differentiate Natural Disasters and Man made Disasters with examples.

3. Describe the necessity of Risk identification and Assessment Surveys while planning a project.
4. What is Disasters recovery and what does it mean to an Industry?
5. What are the factors to be considered while planning the rebuilding works after a major disaster due to flood / cyclone / earthquake? (Any one may be asked)
6. List out the public emergency services available in the state, which could be approached for help during a natural disaster.
7. Specify the role played by an Engineer in the process of Disaster management.
8. What is the cause for Earthquakes? How they are measured? Which parts of India are more vulnerable for frequent earthquakes?
9. What was the cause for the Tsunami 2004 which inflicted heavy loss to life and property along the coast of Tamilnadu ? Specify its epicenter and magnitude.
10. Specify the Earthquake Hazard Zones in which the following towns of Tamilnadu lie: (a) Chennai (b) Nagapattinam (c) Coimbatore (d) Madurai (e) Salem.
11. Which parts of India are experiencing frequent natural calamities such as (a) heavy rain fall (b) huge losses due to floods (c) severe cyclones
12. Define basic wind speed. What will be the peak wind speed in (a) Very high damage risk zone – A, (b) High damage risk zone, (c) Low damage risk zone.
13. Specify the minimum distance from the Sea shore and minimum height above the mean sea level, desirable for the location of buildings.
14. Explain how the topography of the site plays a role in the disasters caused by floods and cyclones.
15. Explain how the shape and orientation of buildings could reduce the damages due to cyclones.
16. What is a cyclone shelter ? When and where it is provided ? What are its requirements ?
17. What Precautionary measures have to be taken by the authorities before opening a dam for discharging the excess water into a canal/river ?
18. What are the causes for fire accidents ? Specify the remedial measures to be taken in buildings to avoid fire accidents.
19. What is a fire escape in multistoried buildings ? What are its requirements ?
20. How the imamates of a multistory building are to be evacuted in the event of a fire/Chemical spill/Toxic Air Situation/ Terrorist attack, (any one may be asked).
21. Describe different fire fighting arrangements to be provided in an Industry.
22. Explain the necessity of disaster warning systems in Industries.
23. Explain how rescue operations have to be carried out in the case of collapse of buildings due to earthquake / blast / Cyclone / flood.
24. What are the necessary steps to be taken to avoid dangerous epidemics after a flood disaster?
25. What relief works that have to be carried out to save the lives of workers when the factory area is suddenly affected by a dangerous gas leak / sudden flooding ?
26. What are the difficulties faced by an Industry when there is a sudden power failure? How such a situation could be managed?

27. What are the difficulties faced by the Management when there is a group clash between the workers? How such a situation could be managed?
28. What will be the problems faced by the management of an Industry when a worker dies because of the failure of a mechanical device due to poor maintenance? How to manage such a situation ?
29. What precautionary measures have to be taken to avoid accidents to labourers in the Industry in a workshop / during handling of dangerous Chemicals / during construction of buildings / during the building maintenance works.
30. Explain the necessity of medical care facilities in an Industry / Project site.
31. Explain the necessity of proper training to the employees of Industries dealing with hazardous products, to act during disasters.
32. What type of disaster is expected in coal mines, cotton mills, Oil refineries, ship yards and gas plants?
33. What is meant by Emergency Plan Rehearsal? What are the advantages of such Rehearsals?
34. What action you will take when your employees could not reach the factory site because of continuous strike by Public Transport workers?
35. What immediate actions you will initiate when the quarters of your factory workers are suddenly flooded due to the breach in a nearly lake / dam, during heavy rain?
36. What steps you will take to avoid a break down when the workers union of your Industry have given a strike notice?
37. List out few possible crisis in an organization caused by its workers? What could be the part of the middle level officials in managing such crisis?
38. What types of warning systems are available to alert the people in the case of predicted disasters, such as floods, cyclone etc.
39. Explain the necessity of Team work in the crisis management in an Industry / Local body.
40. What factors are to be considered while fixing compensation to the workers in the case of severe accidents causing disability / death to them?
41. Explain the legal / financial problems the management has to face if safely measures taken by them are found to be in adequate.
42. Describe the importance of insurance to men and machinery of an Industry dealing with dangerous jobs.
43. What precautions have to be taken while storing explosives in a match/ fire crackers factory?
44. What are the arrangements required for emergency rescue works in the case of Atomic Power Plants?
45. Why residential quarters are not constructed nearer to Atomic Power Plants?

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**Electronics and Communication Engineering**

**Alternative Subjects for L Scheme with that of M Scheme**

| Subjects in L Scheme | | | Subjects in M Scheme | | |
|---|---|---|---|---|---|
| Semester | Subject code | Name of the Subjects | Semester | Subject code | Name of the Subjects |
| III W.E.F 'OCT '16 | 24031 | Electronic Devices and Circuits | III | 34031 | Electronic Devices and Circuits |
| | 24032 | Electrical Circuits and Instrumentation | III | 34032 | Electrical Circuits and Instrumentation |
| | 25233 | " C " Programming | III | 34033 | Programming in " C " |
| | 24034 | Electronic Devices and Circuits Practical | III | 34034 | Electronic Devices and Circuits Practical |
| | 24035 | Electrical Circuits & Instrumentation Practical | III | 34035 | Electrical Circuits and Instrumentation Practical |
| | 24036 | Programming in " C " Practical | III | - | No Equivalent paper |
| | 30001 | Computer Application Practical | III | - | No Equivalent paper |
| IV W.E.F. APR '17 | 24041 | Industrial Electronics | IV | 34041 | Industrial Electronics |
| | 24042 | Communication Engineering | IV | 34042 | Communication Engineering |
| | 24043 | Digital Electronics | IV | 34043 | Digital Electronics |
| | 24044 | Linear Integrated Circuits | IV | 34044 | Linear Integrated Circuits |
| | 24045 | Industrial Electronics and Communication Engineering Practical | IV | 34045 | Industrial Electronics and Communication Engineering Practical |
| | 24046 | Integrated Circuits Practical | IV | 34046 | Integrated Circuits Practical |
| | 20002 | Communication and Life Skill Practical | IV | 30002 | Life and Employability Skill Practical |
| V W.E.F. OCT '17 | 24051 | Advanced Communication Systems | V | 34051 | Advanced Communication Systems |
| | 24052 | Microcontroller | V | 34052 | Microcontroller |
| | 24053 | Very Large Scale Integration | V | 34053 | Very Large Scale Integration |
| | 24071 | Digital Communication | V | 34071 | Digital Communication |
| | 23072 | Programmable Logic Controller | V | 34272 | Programmable Logic Controller |
| | 24055 | Advanced Communication Systems_Practical | V | 34055 | Advanced Communication Systems_Practical |
| | 24056 | Microcontroller Practical | V | 34056 | Microcontroller Practical |

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| | 24057 | Very Large Scale Integration_Practical | V | 34057 | Very Large Scale Integration_Practical |
| VI W.E.F. APR '18 | 24061 | Embedded Systems | VI | - | No equivalent paper |
| | 24682 | Computer Hardware & Network | | 34061 | Computer Hardware Servicing & Networking |
| | 24081 | Television Engineering | VI | 34081 | Television Engineering |
| | 24082 | Biomedical & Telemedicine | VI | 34082 | Biomedical Instrumentation |
| | 24083 | Electronic System Design | V | 34073 | Electronic System Design |
| | 24064 | Embedded Systems Practical | VI | 34066 | Embedded Systems Practical |
| | 24684 | Computer Hardware & Network Practical | VI | 34064 | Computer Hardware Servicing and Networking Practical |
| | 24066 | Simulation Practical | | | No Equivalent Paper |
| | 24067 | Project Work | VI | 34067 | Project Work |