SYLLABUS FOR
M.Sc., ELECTRONICS AND COMMUNICATION
(SEMESTER PATTERN)

(For Candidates admitted in the Colleges affiliated to
Periyar University from 2021-2022 onwards)
PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1: To improve the students ability to adapt to a rapidly changing environment by new skills and new competencies.

PEO 2: To promote the graduates to develop solutions to real problems in the areas of Electronics and communications.

PEO 3: To upgrade the graduates to the latest trends in technology and to pursue research to meet out the advanced developments in industries.

PEO 4: After successful completion of this course a student can pursue engineering courses like M.E/ M.Tech/M.S with good GATE Score.

PEO 5: To understand and appreciate professional ethics, community living and nation building initiatives.

PROGRAMME OUTCOMES

PO 1: Gaining the knowledge in the subject of Electronics and Communication and apply the principles of the same to the requirements of the employer or for entrepreneurship.

PO 2: Acquire in-depth knowledge in the broad area of Microcontrollers and Communication systems, with an ability to discriminate, evaluate, analyze and synthesize the acquired knowledge.

PO 3: Develop the ability to understand clearly the steps in designing communication systems which are in tune with recent technology and adaptable for future challenges.

PO 4: Learn and practice to use the engineering software, hardware, design and modeling techniques that are the latest in the field of electronics.

PO 5: Ability to design and develop practical solutions for real-time problems in the domain of Electronics and Communication.

Employment opportunities:
The students are able to get employment opportunities in the following areas,

1. IT sectors /Defense/Railways/ISRO/DRDO.
2. Electronics /Communications /Bio Medical sectors.
REGULATIONS

1. CONDITION FOR ADMISSIONS

A candidate who has passed B.Sc., Electronics and Communication/ B.Sc., Electronics and Communication systems / B.Sc., Electronics /B.Sc., Physics /B.Sc., Industrial Electronics /B.Sc., Telecommunication degree of this University or any of the above degree of any other university accepted by the syndicate as equivalent there to, subject to such condition as may be prescribed therefore shall be permitted to appear and qualify for the M.Sc., Electronics and Communication degree examination of this university after a course of study of two academic years.

2. DURATION OF THE COURSE

The course for the degree of Master of Electronics and Communication shall consist of two academic years divided into four semesters. Each semester consist of 90 working days.

3. COURSE OF STUDY

The course of study shall comprise instruction in the following subjects according to the syllabus and books prescribed from time to time.

4. EXAMINATIONS

The examination shall be three hours duration to each paper at the end of each semester. The candidate failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examination.

Extra Disciplinary Course (EDC) is introduced in the second semester. The Students should select any one EDC paper offered by other Department. Practical examinations for PG course should be conducted at the end of the ODD/ EVEN semester.

At the end of fourth semester viva-voce will be conducted on the basis of the dissertation / project report submitted by the student. The Viva – Voce will be conducted by one internal and one external examiner jointly.
## COURSE OF STUDY AND SCHEME OF EXAMINATION

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Paper Code</th>
<th>Subject Title</th>
<th>Hours</th>
<th>University Examination</th>
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<tbody>
<tr>
<td></td>
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<td>Lecture</td>
<td>Tutorial</td>
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<tr>
<td>1.</td>
<td>Core I</td>
<td>Applied Electronics</td>
<td>4</td>
<td>2</td>
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<tr>
<td>2.</td>
<td>Core II</td>
<td>ICs Fabrication and its Application</td>
<td>4</td>
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<td>3.</td>
<td>Core III</td>
<td>Industrial Electronics</td>
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<td>4.</td>
<td>Elective- I</td>
<td>(Any One Out of Two Electives )</td>
<td>2</td>
<td>4</td>
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<tr>
<td>5.</td>
<td>Core Practical- I</td>
<td>Applied Electronics and Digital Electronics Lab</td>
<td>1</td>
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<td>6.</td>
<td>Core Practical -II</td>
<td>Industrial Electronics Lab</td>
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<td>7.</td>
<td>Core IV</td>
<td>Advanced Microprocessors and Interfacing</td>
<td>4</td>
<td>2</td>
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<td>8.</td>
<td>Core V</td>
<td>Analog and Digital Communication System</td>
<td>4</td>
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<td>9.</td>
<td>Elective -II</td>
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<td>Core Practical -III</td>
<td>Advanced Microprocessor and Simulation Lab</td>
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<td>11.</td>
<td>Core Practical -IV</td>
<td>Analog and Digital Communication Lab</td>
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<td>12.</td>
<td>EDC (or) Online Course</td>
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<td>13.</td>
<td>Common Paper</td>
<td>Human Rights</td>
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<td>14.</td>
<td>Training</td>
<td>Summer Internship (15 - days)</td>
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<td>15.</td>
<td>Core VI</td>
<td>VLSI Design and VHDL Programming</td>
<td>4</td>
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<td>16.</td>
<td>Core VII</td>
<td>Industrial Automation</td>
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<td>17.</td>
<td>Core VIII</td>
<td>Microcontroller 8051</td>
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<td>Elective - III</td>
<td>(Any One Out of Two Electives)</td>
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<td>19.</td>
<td>Core Practical- V</td>
<td>Core Practical 5: Industrial Automation Lab.</td>
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<td>20.</td>
<td>Core Practical- VI</td>
<td>Core Practical 6: Microcontroller and VHDL Lab</td>
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<td>21.</td>
<td>Core IX</td>
<td>Embedded Systems</td>
<td>4</td>
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<td>22.</td>
<td>Core X</td>
<td>Computer Networks and Operating Systems</td>
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<td>23.</td>
<td>Elective - IV</td>
<td>(Any One Out Of Two Electives )</td>
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<td>Core Practical - VII</td>
<td>Core Practical VII :Embedded System Lab</td>
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<td>25.</td>
<td>Project</td>
<td>Project Viva-Voce</td>
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<td>7</td>
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<td><em><strong>TOTAL:</strong></em></td>
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<td><strong>90</strong></td>
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</table>
SUBJECT CREDITS : 90

TOTAL MARKS : $2400+100 \text{ (Internship)} = 2500$.

ELECTIVE: I
1. NETWORK AND JAVA PROGRAMMING
2. MOBILE COMMUNICATION

ELECTIVE: II
1. BIO MEDICAL INSTRUMENTATION
2. ROBOTICS AND AUTOMATION

ELECTIVE: III
1. INTERNET OF THINGS
2. ANDROID DEVELOPMENT TOOLS AND APPLICATIONS

ELECTIVE: IV
1. AUTOMOTIVE ELECTRONICS
2. THIN FILM AND NANO TECHNOLOGY

Question Paper Pattern for Theory Examination

Time: Three Hours

Maximum Marks: 75

Part - A (15 X 1 = 15 Marks)
Answer ALL Questions Multiple Choice

Part - B (2 X 5 = 10 Marks)
Answer ANY TWO Questions out of Five

Part - C (5 X 10 = 50 Marks)
Answer ALL Questions
Either (or) Type Five Questions
(One question from Each Unit)

Internal
Max Marks: 25

Test : 10
Assignment : 5
Seminar : 5
Attendance : 5
Total : 25

For Practical’s
Max Marks: 60

One Question (Either or type)
1. **DISSERTATION (100 Marks)**

a. **Topic**

The topic of the dissertation shall be assigned to the candidate before the end of first semester and a copy of the same should be submitted to the University for Approval.

b. **Advisory committee**

Each guide shall have a maximum of five students in science and maximum of seven for all Arts subjects. There will be an advisory committee consisting of the guide as chairman and one member from the same department or allied departments of the college and a third member should be from other college preferably from Aided/Government colleges in the case of self financing college and vice–versa.

c. **Plan of work**

The student should prepare a plan of work for the dissertation, get the approval of the advisory committee and should be submitted to the university during the second semester of their study. In case the student wants to avail the facility from other University/Laboratory, they will undertake the work with the permission of the guide and acknowledge the alien facilities utilized by them. The duration of the dissertation research shall be a minimum of three months in the fourth semester.

d. **Dissertation workout side the college of study**

In case the student stays away for work from the college for more than one month, specific approval of the University should be obtained.

e. **No. of Copies/ Distribution of Dissertation**

The students should prepare three copies of dissertation and submit the same for the evaluation by examiners. After evaluation one copy is to be retained in the college library and one copy is to be submitted to the University (Registrar) and one copy can be held by the student.

f. **Format to be followed**

The formats / certificate for dissertation to be submitted by the students are given below:

Format for the preparation of project work:

i. Title page

ii. Bonafide certificate

iii. Acknowledgement

iv. Table of content
CONTENTS

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<td>4</td>
<td>Results</td>
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<td>5</td>
<td>Discussion</td>
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<td>6</td>
<td>Summary</td>
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<td>7</td>
<td>Reference</td>
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</tbody>
</table>

1. Format of the title page

TITLE OF THE DISSERTATION

Dissertation submitted in partial fulfillment of the requirements for the degree of

Master of Science / Master of Arts in

to the

Periyar University, Salem - 11

By

NAME OF THE STUDENT

REG. NO.

[College emblem]

COLLEGE NAME

(AFFILIATED TO PERIYAR UNIVERSITY)

PLACE with Pin Code

MONTH – YEAR

2. Format of the Certificate

Name and Address of the Internal Guide

Place

Date

CERTIFICATE

This to certify that the dissertation entitled… ………………………………………Submitted in partial fulfillment of the requirement degree of Master Of Science / Master Of Arts in………………… to Periyar University, Salem is a record of bonofide research work carried out by…under my supervision and guidance and that no part of the Dissertation has
been submitted for the award of any degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in any scientific or popular journals or magazines.

Date:
Place:
Chairman, Advisory Committee

Approved by
Chairman:
Members:

1. External Examiner
   The person seeking for recognition as guide should have.
   a) M.Phil /M.A/M.Sc degree with first class/second class
   b) Should have 3 years of active teaching/research experience.

1. They should have published at least one research paper in a National journal authored solely or jointly. Procedure for submitting application for approval as guides
   a) The University will on request give prescribed application form.
   b) The filled in applications should be submitted before the close of said date by the University.
   c) All such applications should be routed through the Principal of the irrespective institutions with specific recommendations.
   d) All relevant proofs should be submitted along with the applications.

2. Approval
   The committee constituted for the purpose will scrutinize the applications and recommend for approval/rejection. Orders will then be passed by the authority of the university and communicated to each member individually through the Principal.

1. PASSING MINIMUM
   The candidate shall be declared to have passed the examination if the candidate secures not less than 50 marks out of 100 marks in the University examination in each paper.
   For the practical paper, a minimum of 50 marks out of 100 marks in the University examination and the record notebook taken together. There is no passing minimum for the record notebook. However submission of a record note book is a must.
For the project work and viva voce a candidate should secure 50% of the marks for pass. The candidate should compulsory attend viva voce examination to secure pass in that paper. Candidate who does not obtain the required minimum marks for a pass in a paper/ project report shall be required to appear and pass the same at a subsequent appearance.

2. **CLASSIFICATION OF SUCCESSFUL CANDIDATES**
Candidates who secure not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in First Class.
All other successful candidates shall be declared to have passed in Second Class.
Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed the examination in First Class with Distinction provided they pass all the examinations prescribed for the course at the first appearance.
Candidates who pass all the examinations prescribed for the course in first instance and within a period of two academic years from the year of admission to the course only are eligible for University Ranking.

3. **MAXIMUM DURATION FOR THE COMPLETION OF THE PG PROGRAMME**
The maximum duration for completion of the PG programme shall not exceed eight semesters.

4. **COMMENCEMENT OF THIS REGULATION**
These regulations shall take effect from the academic year 2020-21, i.e., for students who are to be admitted to the first year of the course during the academic year 2020-21 and thereafter.

5. **TRANSITORY PROVISION**
Candidates who were admitted to the PG course of study before 2017-2018 shall be permitted to appear for the examinations under those regulations for a period of three years i.e., up to and inclusive of the examination of April/May 2015.
Thereafter, there will be permitted to appear for the examination only under the regulations then in force.

6. **REGULATIONS OF PROJECT WORK**
   a. Students should do their three months project work in company/institutions.
   b. The candidate to the department should submit the format which includes the topic of the dissertation, and the same should be submitted to the University for Approval.
   c. Each internal guide shall have maximum of FIVE students.
d. Periodically the project should be reviewed minimum three times by the advisory committee consisting of the guide and one member from the same department and the third member (Minimum 5 years experience) should be from other institutions / organization.

e. The students should use OHP/Power Point Presentation during their project Viva Voce examinations.

**Internship Training:**

Students have to undergo the internship training for 15 days in a company during the first semester vocation period. The Internal 40 mark is awarded by the concern Guide (internal examiner) and the External 60 mark is awarded by the relevant organization (Technical Manager/Research Manager of the company).

**Certificate (Sample):**

![Certificate Sample Image]
SEMESTER - I

CORE I: APPLIED ELECTRONICS

OBJECTIVES

- To update the knowledge about analog circuits and its characteristics.
- To develop the basic concepts of analog circuit design.
- To impart the knowledge in the oscillators and its design.

Expected Course Outcomes (CO):

After the completion of the course, the student will be able to:

| CO1 | Understand and analyze about the various diode characteristics and applications. | K2,K4 |
| CO2 | Comprehend the characteristics of various types of rectifiers and analyze the regulations with its applications. | K2,K4 |
| CO3 | Design the transistors and implementing the biasing concepts and study the amplifications with its application | K3,K4 |
| CO4 | Analyze the transistor characteristics, types of amplifiers and the various types of feedback circuits. | K1,K4,K5 |
| CO5 | Develop an ability to differentiate the oscillators and its applications. | K2,K6 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Mapping with Programme Outcomes:

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<th>PO/CO</th>
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<th>PO2</th>
<th>PO3</th>
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<th>PO5</th>
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<tr>
<td>CO1</td>
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<td>CO2</td>
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<tr>
<td>CO3</td>
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<tr>
<td>CO4</td>
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<tr>
<td>CO5</td>
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*S-Strong; M-Medium; L-Low

Unit –I Diodes


Unit-II Rectifiers

Half Wave Rectifier - Full Wave Rectifier – Bridge rectifier - % of regulation – RMS value – peak value – Average value – application.

Unit-III Bipolar Junction Transistors

Bipolar Junction Transistors Construction and Operation – Transistor Biasing - Configurations and Characteristics-Current Gains-H-Parameters and Analysis of Transistor Amplifier Using H-Parameter-Inter Conversions in Different Configuration-Thermal Instability and
Bias Stabilization-Cascaded Transistors.

UNIT – IV Amplifiers


UNIT – V Oscillators


TEXT BOOKS

1. Applied Electronics –R.S.SEDHA
2. Electronic Device and Circuits-“TATA MCGRAW HILLS” BY S.SALIVAHAANAN

N.SURESH REFERENCE BOOKS

1. “Electronic devices Application and Integrated CIRUITS “UMESH PUBLICATION” by ATHUR, KULSHRESHTHA, CHADHA.KUMAR
2. CORE-II: IC'S FABRICATION AND ITS APPLICATIONS

OBJECTIVES

- To design the integrated circuits based on our applications.
- To develop the knowledge in the basic digital filters circuit design.
- To understand the concepts of multivibrators and design.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>K1, K2, K3, K4, K5, K6</th>
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</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understand the fundamentals of IC’s and the active and passive components. Analyzing the FET fabrication, study the thin and thick film technology.</td>
<td>K1, K2, K3, K4, K5, K6</td>
</tr>
<tr>
<td>CO2</td>
<td>Understand the OP AMP circuits and its various applications.</td>
<td>K1, K2, K3, K4, K5, K6</td>
</tr>
<tr>
<td>CO3</td>
<td>Study the output waves based on design and how to regulate the voltages using op amp.</td>
<td>K1, K2, K3, K4, K5, K6</td>
</tr>
<tr>
<td>CO4</td>
<td>Understand the filters and to find the concepts of ADC/ DAC converters.</td>
<td>K1, K2, K3, K4, K5, K6</td>
</tr>
<tr>
<td>CO5</td>
<td>Describe the functions of Multivibrators, PLL and understand the various applications of 555 IC.</td>
<td>K1, K2, K3, K4, K5, K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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</table>

*S-Strong; M-Medium; L-Low

UNIT I


UNIT II

UNIT III


UNIT IV

Active Filters-First Order and Second Order Low Pass Filter-High Pass Filter-Band Pass Filter-Band Rejection Filters. Voltage to Frequency and Frequency Converters–Analog to Digital and Digital to Analog Converters

UNIT V

Introduction to IC 555-IC 555 as a Monostable Multivibrator–Applications-IC555as Astable Multivibrator-Applications. Phase Locked Loop (PLL)-Operating Principles- Monolithic Phase Locked Loop-IC 555 Applications.

TEXT BOOKS:


REFERENCE BOOKS:

SEMESTER-I

3. CORE- III: INDUSTRIAL ELECTRONICS

OBJECTIVES

- To learn the characteristics of different types of semiconductor devices and the operation of controlled rectifiers.
- To understand the operation of choppers and inverters.
- To learn the concept of electric drives and its functions

Expected Course Outcomes (CO):

After the completion of the course, the student will be able to:

| CO1 | Understanding the types and the operations of thyristors and its characteristics. Study the firing angle. Design the converter circuits and study the outputs. | K1,K2 |
| CO2 | Understands the concepts of single phase and three phase controllers outputs. | K2,K3,K4 |
| CO3 | Analyze the thyristors commutation methods and comparisons with its application | K1,K4 |
| CO4 | Ability and understand the choppers and switches with its applications. | K5,K6 |
| CO5 | Determine the drivers and the various phase controllers. To know the current control and voltage control concepts. | K4,K6 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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<td>CO4</td>
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<tr>
<td>CO5</td>
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</table>

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UNIT I

Thyristors and Converters

UNIT II

AC Voltage Controller


UNIT III

Thyristors Commutation Techniques


UNIT IV

DC Choppers and Static Switches


UNIT–V DC Drives and AC Drivers


TEXT BOOKS


REFERENCE BOOKS


SEMESTER-I: 4.ELECTIVE -I
SEMESTER-I5.CORE PRACTICAL- I: APPLIED ELECTRONICS AND DIGITAL ELECTRONICS LAB

OBJECTIVES

- To design power supply systems and to study the outputs..
- To create multiplexer and demultiplexer circuits and verifying of outputs.
- To develop circuit for counters, flip-flops and registers.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

| CO1 | Understand the concepts of power supply, oscillator, multivibrator, flip-flop and counters. | K2, K3 |
| CO2 | Identify The Different Ways operations and designing. | K1, K6 |
| CO3 | Developing the various digital circuits like counters, flip-flops and registers. | K4, K5 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Mapping with Programme Outcomes:

<table>
<thead>
<tr>
<th>PO/CO</th>
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<tbody>
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<td>CO1</td>
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<td>CO3</td>
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</tr>
</tbody>
</table>

*S-Strong; M-Medium; L-Low

Any TEN Experiments

1. Construction of Dual Power Supply
3. Characteristics of Transistor under CE Configuration.
4. Characteristics of UJT and Construction of UJT Relaxation Oscillator
6. Construction of Phase Shift Oscillator
7. Construction of astable, monostable and bistable multivibrators using transistor.
8. Full adder and Full Subtractor
9. Study of multiplexer, De multiplexer.
10. Encoder and decoder.

11. Study of RS and D, JK, master slave and T flip flop.

12. Construction of shift registers

SEMESTER-I

6. CORE PRACTICAL II: INDUSTRIAL ELECTRONICS LAB

OBJECTIVES

- To study the V-I characteristics of various power devices.
- To create the circuits of commutations and verifying its outputs.
- To develop circuit for motor speed control for various applications.

Expected Course Outcomes (CO):

After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Understand the concepts of power supply, SCR, Commutation and LDR applications.</th>
<th>K2, K5</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2</td>
<td>Identify The Different Ways operations and designing.</td>
<td>K3</td>
</tr>
<tr>
<td>CO3</td>
<td>Develop circuit construction skills and verifying of outputs.</td>
<td>K4, K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Mapping with Programme Outcomes:

<table>
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</tbody>
</table>

*S-Strong; M-Medium; L-Low

Any TEN Experiments

1. Firing Characteristics of SCR and TRIAC.
2. Half Wave Gate Controlled Rectifier using one SCR.
3. Illumination Control using TRIAC.
4. Single Phase Half Controlled Full Wave Rectifier Using Two SCR'S.
5. Single phase half controlled rectifier using two Diodes.
7. Forced Commutation.
8. Single Phase Inverter.
10. Speed Control of DC Motor using Thyristors.
11. LDR Application in a Light Activated Turn-OFF Circuit.
REFERENCE BOOK

SEMMESTER - II

7. CORE-IV: ADVANCED MICROPROCESSORS AND INTERFACING

OBJECTIVES

- To learn the concepts of x86 processors.
- To understand the operation of RISC architecture.
- To learn the concept of paging and segmentation.

Expected Course Outcomes (CO):

After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO1</th>
<th>Understand the 8085/8086 microprocessor and its operations. Know the concepts of memory management.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2</td>
<td>Design the simple programs of 8086. Learning the procedures of time delay, looping and addressing modes.</td>
</tr>
<tr>
<td>CO3</td>
<td>Design of 80386 architecture, addressing modes and to know the concepts of paging and segmentations.</td>
</tr>
<tr>
<td>CO4</td>
<td>Understand the functions of Pentium and intel processors.</td>
</tr>
<tr>
<td>CO5</td>
<td>Know the RISC processor and its architecture issues.</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

<table>
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<td>CO5</td>
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</tbody>
</table>

*S-Strong; M-Medium; L-Low

UNIT I: 8085 MICROPROCESSOR

Introduction To 8085-Bus Structure - Register Set – Pin Details And Functions – Architecture Of 8085-Addressing Mode – Instruction Set –Timing Diagram

UNIT II

INTEL 8086 MICROPROCESSOR

UNIT III

8086 ASSEMBLY LANGUAGE PROGRAMMING


UNIT IV

ADVANCED MICROPROCESSORS


UNIT V

RISC ARCHITECTURE


TEXT BOOKS


REFERENCE BOOKS


SEMESTER - II

8. CORE V: ANALOG AND DIGITAL COMMUNICATION SYSTEM

OBJECTIVES

- To learn the concepts about analog and digital modulation and detection.
- To understand the operation TV scanning procedures.
- To implementing the concepts of HV deflections.

**Expected Course Outcomes (CO):**

After the completion of the course, the student will be able to:

| CO1  | Remembering the various waves and antennas for transmission. | K1,K2 |
| CO2  | Remembering of various analog modulations and its applications. | K1,K3 |
| CO3  | To know the concepts of pulse modulations and its types. | K4,K6 |
| CO4  | Understand the concepts of digital modulations and comparisons. | K2,K5 |
| CO5  | Analyzing of TV circuits and evaluating the signals in various stages. | K4,K5 |

**PO/CO:**

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*S-Strong; M-Medium; L-Low

**UNIT I**


Antenna - Basic Consideration - Wire Radiators In Space - Term and Definitions – Effects of Ground on Antennas-Directional High Frequency Consenters-Microwave Antennas-Wide Band Antennas-Folded Dipole-Helical Antenna.

**UNIT II**

Amplitude Modulation Theory-Frequency Spectrum of the AM Wave-Representation of AM – Power Relations in the AM Wave - Generation of AM - Basic Requirements - Grid Modulated Class C Amplifiers - Modulated Transistor Amplifier - System Summary.

UNIT III
Introduction - Pulse Amplitude Modulation (PAM) - **Sampling Theorem** Quantization & Quantization Error - Pulse Code Modulation (PCM) modulation and detection - Pulse Frequency Modulation (PFM) - Pulse TIME Modulation (PTM) - Pulse Position Modulation (PPM) - Pulse With Modulation (PWM).

UNIT IV
Companding - modulation and detection of ASK, FSK, BPSK, QPSK and DPSK – comparison of ASK, FSK and PSK.

UNIT V

TEXT BOOKS

REFERENCE BOOKS
OBJECTIVES

- To write the assembly language for various operations and various conversions.
- To create the coding of various applications and interfacing.
- To develop the skills for various applications.
- To develop circuit for motor speed control for various applications

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>Mapping with Programme Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understand the concepts of arithmetical operations, ADC, DAC, and ON/OFF relay control.</td>
<td>K1.K4.K5</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Mapping with Programme Outcomes:

<table>
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<td>CO2</td>
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</table>

*S-Strong; M-Medium; L-Low

Any TEN Experiments (Using Simulation or 8085 or 8086 Kit)

1. 8-Bit Addition, Subtraction, Multiplication, and Division and using 8085/8086 μp Kit.
2. 16-Bit Addition, Subtraction, Multiplication, and Division and using 8085/8086 μp Kit.
3. Digital Clock using 8085/8086 μp Kit.
4. Stepper Motor Interface using 8085/8086 μp Kit.
5. DC Motor Speed Control using 8085/8086 μp Kit.
7. Interfacing ADC 0809 with using 8085/8086 μp Kit.
8. DAC Interface with 8085/8086 μp Kit and Wave Form Generations using DAC.
9. ON and OFF Relay Control using 8085/8086 interrupts.
10. Addition of two 16-Bit Numbers and Double Precision Addition using 8085/8086 μp Kit.
11. Subtraction of two 16-Bit Numbers and Double Precision Subtraction using 8085/8086 μp Kit.
12. 16-Bit Multiplication and 32-Bit Division using Addition of two 16-bit Numbers and Double Precision Addition using 8085/8086 μp Kit.
OBJECTIVES

- To study the various modulation techniques and verifying its outputs.
- To create the circuits of commutations applications.
- To develop the circuit skills of communications devices.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>K1, K2, K3, K4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understand the concepts of analog modulation, pulse modulation and CCTV concepts.</td>
<td>K2, K3, K4</td>
</tr>
<tr>
<td>CO2</td>
<td>Identify The Different Ways operations and designing.</td>
<td>K1, K4, K6</td>
</tr>
<tr>
<td>CO3</td>
<td>Develop the circuit skills and verifying of outputs.</td>
<td>K4, K5, K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Any TEN Experiments

1. AM Modulation and Demodulation.
2. FM Modulation and Demodulation
3. Automatic Gain Control.
4. Voltage Control Oscillator.
5. Pulse Amplitude Modulation.
6. Pulse Width Modulation.
10. Digital Phase Detector.
11. Installation of CCTV.
12. DVR of CCTV.
13. Study of Cable TV System.

*S-Strong; M-Medium; L-Low
OBJECTIVES

- To learn the basics of VLSI technology and VHDL programming.
- To promoting the knowledge in modeling techniques and features.
- **Expected Course Outcomes (CO):**

  After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>K1</th>
<th>K2</th>
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<th>K4</th>
<th>K5</th>
<th>K6</th>
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<tbody>
<tr>
<td>CO1</td>
<td>Understands the MOS devices and fabrications process. How the n-MOS AND p-MOS processed.</td>
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<tr>
<td>CO2</td>
<td>Know the basics of VHDL.</td>
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<tr>
<td>CO3</td>
<td>Understand the modeling techniques of VHDL Design the multiple process concepts.</td>
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<tr>
<td>CO4</td>
<td>Ability and to understand the data flow style modeling for various statements.</td>
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<tr>
<td>CO5</td>
<td>Applying the advanced concepts in VHDL. Applying the overloading techniques.</td>
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</table>

* S-Strong; M-Medium; L-Low

**UNIT -I: CMOS Circuits & Processing Technology**


**UNIT -II: Introduction and Basic Concept of VHDL**

UNIT -III: Modeling Techniques of VHDL


UNIT -IV: Data Flow Style of Modeling


UNIT- V: Advanced Features in VHDL


TEXT BOOKS

1. Neil H.E. Westw Kamaran Eshraghin, „”Principles of CMOS VLSI Design””

REFERENCE BOOKS

OBJECTIVES

- To provide knowledge about data acquisition and control an external measuring device by interfacing to a computer.
- To familiarize in signal conditioning and various processing tools.
- To become competent in designing virtual instruments for various industrial measurements and applications.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understand the basics of LABVIEW and its tools.</td>
<td>K1,K2</td>
</tr>
<tr>
<td>CO2</td>
<td>Know the arrays and clusters concepts .</td>
<td>K3,K4</td>
</tr>
<tr>
<td>CO3</td>
<td>Understand the Data acquisition procedure and hardware configuration.</td>
<td>K2,K5</td>
</tr>
<tr>
<td>CO4</td>
<td>Design the software solutions for DAQ.</td>
<td>K2,K5</td>
</tr>
<tr>
<td>CO5</td>
<td>Creating the PLC programming and intermediate functions.</td>
<td>K3,K6</td>
</tr>
<tr>
<td>CO6</td>
<td>Develop the ability for Data handling and PLC functions.</td>
<td>K5,K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

UNIT I: INTRODUCTION TO LABVIEW AND LOOPS

Introduction- Advantages of Lab VIEW- Software Environment – Front Panel Control and Indicators- Block diagram- Data Types- Data Flow Program- LOOPS: For Loop- While Loop-

Structure Tunnels- Shift registers- Feedback Nodes- Control Timing- Communication among multiple loops- Local variables- Global variables.

UNIT II: ARRAYS AND CLUSTERS

Introduction- Arrays in Lab VIEW- One Dimensional array- Two Dimensional array- Multi-dimensional array- Initializing arrays- Deletion, Inserting and Replacing – Array functions-
Matrix operations with array. Clusters: Introduction- creating controls, Indicators and constant,- Cluster operations- Assembling and Disassembling clusters- conversion between arrays and clusters. Waveforms - waveform chart- XY graphics.
UNIT III: DATA ACQUISITION

Introduction - signals - signal conditioning - DAQ hardware configuration - DAQ hardware - Analog Inputs - Analog outputs - Counters - DAQ software architecture - DAQ assistant - Selecting and configuring a data acquisition device - Components of computer based measurements system.

UNIT IV: BASIC PLC PROGRAMMING & FUNCTION AND INTERMEDIATE FUNCTION


UNIT V

DATA HANDLING FUNCTIONS AND PLC FUNCTIONS WORKING WITH BITS

The PLC SKIP and MASTER CONTROL RELAY functions - JUMP Functions - Data Move Systems - Other PLC Data Handling Functions - Digital Bit Functions and Applications - Sequencer functions - Controlling Robot with a PLC - Matrix functions.

TEXT BOOKS

REFERENCE BOOKS
3. David Bailey, Edwin Wright, Practical SCADA for industry, Newnes, 2003
SEMESTER-III

17. CORE VIII – MICROCONTROLLER 8051

OBJECTIVES

- Familiarize the basic architecture of 8051 microcontroller.
- Program 8051 microprocessor using Assembly Level Language and C.
- Interface 8051 to external memory and I/O devices using its I/O ports.

Expected Course Outcomes (CO):

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>K1, K2, K3, K4, K5, K6</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Remember the 8051 architecture and memory concepts</td>
<td></td>
</tr>
<tr>
<td>CO2</td>
<td>Understands the various instructions of 8051.</td>
<td></td>
</tr>
<tr>
<td>CO3</td>
<td>Design of the stack and analyzing the interfacing concepts</td>
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<tr>
<td>CO4</td>
<td>Classify the assembly language programming and the port operations.</td>
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<td></td>
<td>Understand that how to apply C language in the controllers</td>
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<tr>
<td>CO5</td>
<td>Create the interfacing concepts for stepper motor and traffic light controllers.</td>
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<tr>
<td></td>
<td>analyzing the ADC and DAC conversions.</td>
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</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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<td>CO4</td>
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<td>CO5</td>
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*S-Strong; M-Medium; L-Low

UNIT -I


UNIT -II

8051 Instruction Set: Addressing Modes, Data Transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Bit manipulation instructions. Simple Assembly language program examples (with & without loops) to use these instructions.

UNIT-III

8051 Stack, I/O Port Interfacing and Programming: 8051 Stack, Stack and Subroutine instructions. Assembly language program examples on subroutine and involving loops - Delay subroutine, Factorial of an
8 bit number (result maximum 8 bit), Block move without overlap, Addition of N 8 bit numbers, Picking smallest/largest of N 8 bit numbers. Interfacing simple switch and LED to I/O ports to switch on/off LED with respect to switch status.

UNIT -IV
8051 Timers and Serial Port: 8051 Timers and Counters – Operation and Assembly language programming to generate a pulse using Mode-1 and a square wave using Mode-2 on a port pin. 8051 Serial Communication- Basics of Serial Data Communication, RS-232 standard, 9 pin RS232 signals, Simple Serial Port programming in Assembly and C to transmit a message and to receive data serially.

UNIT-V
8051 Interfacing: LCD interfacing, Keyboard interfacing. ADC 0808 interfacing to 8051, Serial ADC Max1112 ADC interfaces to 8051, DAC interfacing, Sensor interfacing and signal conditioning. stepper motor interfacing, DC motor interfacing and PWM.

TEXT BOOKS

REFERENCE BOOKS
SEMESTER-III: 18.ELECTIVE-III

SEMESTER-III

19. CORE PRACTICAL-V: INDUSTRIAL AUTOMATION LAB

OBJECTIVES

- To designing virtual instruments for various industrial measurements for various applications.
- To create ladder diagrams from PLC functions and Data Handling Functions
- To create PLC systems in their applications to various industries.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>PO/K</th>
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</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understand the concepts of ADC, DAC using DAQ. Understand LVDT, instrumentation amplifier, flow measurements and ladder networks.</td>
<td>K1,K4,K6</td>
</tr>
<tr>
<td>CO2</td>
<td>Identify the Different Ways operations and designing.</td>
<td>K2,K4,K5</td>
</tr>
<tr>
<td>CO3</td>
<td>Develop the circuit skills and verifying of outputs.</td>
<td>K2,K5,K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Mapping with Programme Outcomes:

<table>
<thead>
<tr>
<th>PO/CO</th>
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<th>PO4</th>
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<tr>
<td>CO1</td>
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<tr>
<td>CO3</td>
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<td>S</td>
</tr>
</tbody>
</table>

*S-Strong; M-Medium; L-Low

Any TEN Experiments:

(USING Lab VIEW)

1. Converting VI in to Sub VI
2. ADC using DAQ Interface
3. DAC using DAQ Interface
4. Temperature control using WSN
5. Implementation of Digital filters using Lab VIEW DSP Module
6. ADC and LCD interface using Lab VIEW ARM Module
7. Tank level monitoring system using DAQ Interface
8. Traffic light control using DAQ Interface
9. Study the operation of a simple load using relays, switches and push buttons.

10. Study of Instrumentation amplifier


12. Study of Flow measurement

13. Study of Thermocouple characteristics

14. Study of traffic light controller.

15. Develop the Ladder diagram for the Arithmetic and Logic Gates.

16. Develop and test the control circuit for dynamic braking of DC motor using ladder programming (Timer and UP/Down Counter).

17. Develop and test the control circuit for Conveyor using ladder programming.
OBJECTIVES

- To writing assembly language programs for data transfer, arithmetic, Boolean and logical instructions.
- To writing assembly language programs for code conversions

**Expected Course Outcomes (CO):**

After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>K1,K3,K6</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understand the concepts of arithmetical , Boolean ,generation of wave forms using microcontroller. Understand the concepts of gates, adders , subtractors, multiplexers ,LCDs and coders using VHDL language.</td>
<td></td>
</tr>
<tr>
<td>CO2</td>
<td>Identify the Different Ways operations and designing.</td>
<td>K2,K3,K5</td>
</tr>
<tr>
<td>CO3</td>
<td>Develop the programming skills and verifying of outputs .</td>
<td>K3,K4,K5</td>
</tr>
</tbody>
</table>

**Mapping with Programme Outcomes:**

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<td>CO3</td>
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<td>M</td>
<td>S</td>
<td>S</td>
</tr>
</tbody>
</table>

*S-Strong; M-Medium; L-Low

Any Ten Experiments (MICROCONTROLLER)

1. Data transfer – Program for block data movement, sorting, exchanging, finding largest element in an array.
3. Counters.
4. Boolean and logical instructions (bit manipulation).
5. Conditional call and return instructions.
6. Code conversion programs – BCD to ASCII, ASCII to BCD, ASCII to decimal, Decimal to ASCII, Hex to decimal and Decimal to Hex.
7. Programs to generate delay, Programs using serial port and on-chip timer/counters.
8. Stepper motor interface.
9. DC motor interface for direction and speed control using PWM.
10. Alphanumerical LCD panel interface.
12. External ADC and Temperature control interface.
VHDL Lab

13. Write a program to Verify the Logic Gates
14. Write a program for Half Adder and Full Adder
15. Write a program for Half Subtractor and Full Subtractor
16. Write a program for Encoder
17. Write a program for Decoder
18. Write a program for Multiplexer
19. Write a program for De multiplexer.
SEMESTER-IV

21. CORE-IX: EMBEDDED SYSTEMS

OBJECTIVES:

- To understand the basics of embedded C.
- To study the architecture of PIC microcontroller.
- To familiarize in PIC programming.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>K1, K2, K3, K4, K5, K6</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understanding of C programming concepts and its applications.</td>
<td>K1, K2</td>
</tr>
<tr>
<td>CO2</td>
<td>Justifying the conditional and looping statements in C.</td>
<td>K2, K4</td>
</tr>
<tr>
<td>CO3</td>
<td>Designing the embedded system and its concepts with its application.</td>
<td>K4, K5</td>
</tr>
<tr>
<td>CO4</td>
<td>Ability and to understand PIC PROGRAMMING: PIC 16F877 and its instruction set uses.</td>
<td>K3, K5</td>
</tr>
<tr>
<td>CO5</td>
<td>Develops an analyze the interfacing techniques with applications.</td>
<td>K3, K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create
UNIT I

**INTRODUCTION TO C PROGRAMMING**: Structure of C programming - Various data types, C Tokens, Keywords and Identifier, Constants, Variables, Data types, Variable declarations. C-Operators: Arithmetic operators, relational operators, logical operators, assignment operators, increment and decrement operators, conditional operators, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators.

UNIT II

**DECISION MAKING, BRANCHING AND LOOPING**: Decision making - IF statement, Switch statement, Conditional operator. Go to statement. Looping: While loop, Do-While, and For Loops - Nesting of loops - skipping of loops (break and continue).

UNIT III

**INTRODUCTION TO EMBEDDED SYSTEMS**: Embedded Systems –processors embedded into a system, embedded hardware units and devices in system, embedded software in a system – Embedded System on chip – Design process in embedded systems – Examples of embedded system.

UNIT IV

UNIT V


TEXT BOOKS:


REFERENCE BOOKS

5. PIC16F87X datasheet.
SEMESTER-IV

22. CORE –X: COMPUTER NETWORKS AND OPERATING SYSTEMS

OBJECTIVES:

- To understand the principles of computer networks and operating systems
- To gain the concepts of networks and operating systems
- To get a knowledge in different network layers and IPC
- To know the principles of Linux.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>Ks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Remembering the networking concepts and illustrate the OSI model.</td>
<td>K1, K3</td>
</tr>
<tr>
<td>CO2</td>
<td>Understands the operations of various layers and apply the routing concepts</td>
<td>K2, K4</td>
</tr>
<tr>
<td>CO3</td>
<td>Design the transistors and implementing the biasing concepts and study the</td>
<td>K1, K4</td>
</tr>
<tr>
<td></td>
<td>amplifications with its application</td>
<td></td>
</tr>
<tr>
<td>CO4</td>
<td>Ability and designing the various layers and its applications. Study the</td>
<td>K5, K6</td>
</tr>
<tr>
<td></td>
<td>UDP/IP Functions and categories the role of WWW.</td>
<td></td>
</tr>
<tr>
<td>CO5</td>
<td>Develops an ability to LINUX COMMANDS, threads and dead locks.</td>
<td>K4, K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

UNIT I


UNIT II

UNIT III:


UNIT IV:


UNIT V:


TEXT BOOKS


REFERENCE BOOKS

24. CORE PRACTICAL-VII: EMBEDDED SYSTEMS AND SIMULATION LAB

OBJECTIVES

- Write simple programs in PIC microcontroller and ARM Processor.
- Understand the functions of peripherals in PIC microcontroller.
- Solve the real world problems through embedded System.

Expected Course Outcomes (CO):

After the completion of the course, the student will be able to:

| CO1 | Understand the concepts of PIC based embedded systems and ARM based embedded systems. |
| CO2 | Identify the Different Ways operations and designing. |
| CO3 | Develop the coding skills and verifying of outputs. |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Mapping with Programme Outcomes:

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<tr>
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<tr>
<td>CO3</td>
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<td>S</td>
</tr>
</tbody>
</table>

*S-Strong; M-Medium; L-Low

LIST OF EXPERIMENTS (Any 10 experiments)

**PIC BASED EMBEDDED SYSTEMS**

1. Arithmetic and logical operation
2. Single digit timer using seven segment displays.
3. DAC interface.
4. ADC INTERFACE.
5. LCD interface.
7. Serial communication using RS232C.
8. PWM
9. 4X4 matrix Keypad interfacing

**ARM BASED EMBEDDED SYSTEMS (2148 IC)**

1. LED interfacing.
2. 4X4 matrix Keypad interfacing
3. Graphics LCD interface
4. Sensor interfacing using CAN
5. LED interfacing and Switch
6. Keypad interfacing
7. LCD interface (16*2)
8. ADC interface
OBJECTIVES

- To understand the principles of computer networks and operating systems
- To gain the concepts of networks and its standards.
- To get a knowledge in different network layers and its protocols.
- To know the principles of JAVA and its operators concepts.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

| CO1  | Understanding and analyzing about the various networks and its applications. | K1, K2 |
| CO2  | Study the characteristics of various OSI layers and applications.          | K3, K4 |
| CO3  | Discussion and Design the C languages and JAVA languages.                  | K3, K5 |
| CO4  | Ability and to understand classes and objects.                             | K5, K6 |
| CO5  | Developing of packages and its uses.                                      | K3, K6 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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<td>CO3</td>
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<tr>
<td>CO4</td>
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</tr>
<tr>
<td>CO5</td>
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<td>M</td>
<td>M</td>
<td>S</td>
</tr>
</tbody>
</table>

*S-Strong; M-Medium; L-Low

UNIT I


UNIT II LAYER AND THE IR FUNCTIONS

MODEM: Modulation Techniques–Multilevel Transmission
–Advance in Modem. SWITCHING: Circuit Switching – Message Switching
– Compressing.
UNIT III  NETWORK HARDWARE LAN

UNIT IV
JAVA Evolution: History – Features – How Java differs from C and C++ - Java and Internet - Simple
Java program - Constants- variables – Data types – Operators and Expressions. Decision Making and
Branching: If, If. Else, else. If ladder, Switch, operator Decision Making and Looping: While, do, for–
jump sinloops-labeled loops. Classes, Objects and Methods.

UNIT V
Arrays, Strings- Interfaces: Multiple Inheritances-Packages : Putting classes together
– MultiThreaded Programming- Applet programming. Files: Introduction– concept of streams–
Streamclasses– Usingstreams–I/O Classes-Fileclass–I/OExceptions – creation of files-
Reading/ Writing characters/ Bytes.

TEXT BOOKS
1. Data communication and networking – BEHROUZAFOROUZAN.(2NDEDITION).
2. Programming with java(2ndedition). - E. BALAGURUSAMY.

REFERENCE BOOKS
1. Computer networks- ANDREWS.TANENBAUM.
3. Java how to program(5th edn)H.M.DEITEL, P.J.DEITEL.
SEMESTER – I

ELECTIVE-I: MOBILE COMMUNICATION

OBJECTIVES

- To develop a fundamental understanding of mobile Communication Systems.
- To impart knowledge on basics of cell structure and their applications.
- To expose the basics of GSM and telecommunication architecture.

- **Expected Course Outcomes (CO):**

  After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>K1, K3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understanding the concepts of mobile communications and its frequency. Analyze the hand off, cell splitting and frequency reuse.</td>
<td>K3, K4</td>
</tr>
<tr>
<td>CO2</td>
<td>Discussion of antennas and its concepts. How the power is controlled and the concepts of MTSO.</td>
<td>K4, K6</td>
</tr>
<tr>
<td>CO3</td>
<td>Categorize the multiplexing techniques and its comparisons.</td>
<td>K5, K6</td>
</tr>
<tr>
<td>CO4</td>
<td>Ability and to understand the GSM concepts, handoff, Bluetooth and IEEE procedures.</td>
<td>K1</td>
</tr>
<tr>
<td>CO5</td>
<td>How to construct intelligence cell and the concepts of macro and micro cells.</td>
<td>K2</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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<tr>
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</table>

*S-Strong; M-Medium; L-Low


Comparison of S/T/F/CDMA.


TEXT BOOKS

REFERENCE BOOKS
OBJECTIVES

- To impart the knowledge about biomedical electrodes and transducers.
- To familiarize in biomedical recorders.
- To learn the important biomedical instruments.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Identify the various biomedical electrodes. Understand the ECG, EEG and EMG electrodes with its advantages.</th>
<th>K1, K3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2</td>
<td>Designing of basic recoding systems. Study the operations of various blocks of recording system.</td>
<td>K3, K4</td>
</tr>
<tr>
<td>CO3</td>
<td>Understand the concept of blood flow meter. Study the concepts of PCo2.</td>
<td>K4, K5</td>
</tr>
<tr>
<td>CO4</td>
<td>Ability and to understand the concepts of x-ray machine, CT scanner and NMR.</td>
<td>K3, K6</td>
</tr>
<tr>
<td>CO5</td>
<td>Designing of endoscopy, pacemaker and defibrillator block diagrams and its functions.</td>
<td>K4, K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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<tr>
<td>CO5</td>
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</table>

*S-Strong; M-Medium; L-Low

UNIT I: ELECTRODES & TRANSDUCERS
– Respiration sensors

UNIT II: BIOMEDICAL RECORDERS

UNIT III: MEASUREMENT & ANALYSIS TECHNIQUES IN BLOOD
Blood flow meters: Electro magnetic blood flow meter – Blood gas analyzers: blood pH measurement

UNIT IV: MODERN IMAGING SYSTEMS

X-ray machine– CT scanner: basic principle – contrast scale – system components – NMR: principles of NMR imaging – image reconstruction techniques – discrimination based on relaxation rates – basic NMR components – applications, biological effects and advantages of NMR imaging system

UNIT V: ADVANCES IN BIOMEDICAL INSTRUMENTATION


TEXT BOOKS

1. Dr.M.Arumugam, “Biomedical instrumentation”

2. Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, “Biomedical instrumentation “

REFERENCE BOOKS

OBJECTIVES

- To impart the knowledge about voltage regulation.
- To familiarize in MSP.
- To learn the important of UART and supporting circuits.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Understanding and analyzing about the DC motor, battery, voltages and energy.</th>
<th>K2,K3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2</td>
<td>Justification of assembler, debugger and software design. GPIO programming and its applications. Analyze the various interfacing concepts.</td>
<td>K1,K4</td>
</tr>
<tr>
<td>CO3</td>
<td>Design the timers, PWM and duty cycle concepts, interrupts and sensor/black box recorder. Understand the concepts of LCD Interface.</td>
<td>K3,K4</td>
</tr>
<tr>
<td>CO4</td>
<td>Ability and to understand spin motor techniques. Study the Data Acquisition System.</td>
<td>K5,K6</td>
</tr>
<tr>
<td>CO5</td>
<td>Designing the Bluetooth, wireless, communication concepts, wi-fi with its applications.</td>
<td>K3,K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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<td>M</td>
<td>S</td>
<td>M</td>
<td>S</td>
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<tr>
<td>CO3</td>
<td>M</td>
<td>S</td>
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</tr>
<tr>
<td>CO4</td>
<td>S</td>
<td>M</td>
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</tr>
<tr>
<td>CO5</td>
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<td>M</td>
</tr>
</tbody>
</table>

*S-Strong; M-Medium; L-Low

UNIT-I

UNIT-II

UNIT-III
Sys Tick Timer and Interrupt Functions Sys tick timer – PWM – Running heartbeat by
adjusting the duty cycle – Running sine wave output to adjust power - Debugging real time systems: Theory – Interrupts – Sys Tick Interrupts – Running the line sensor/black box recorder - LCD Interface.

UNIT-IV

UNIT-V

Text Books:
SEMMESTER –III

ELECTIVE-III: INTERNET OF THINGS

OBJECTIVES

- To provide a good understanding of Internet of Things (IoT).
- To provide a overview about the various protocol standards.
- To impart knowledge in the design and development of IoT systems with enablement ensuring security.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Objectives</th>
<th>K1-K2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understanding the IoT Design Methodology, IoT Platforms, IoT Network and Cloud Services and IoT Applications.</td>
<td>K2,K4</td>
</tr>
<tr>
<td>CO3</td>
<td>Design the embedded devices, Embedded Hardware, Connected Sensors and Actuators, study the Controllers, Battery Life Conservation and designing with Energy Efficient Devices, Understand the concepts of SoCs, CC32XX Architecture and CC32XX Launch pad for Rapid Internet timers.</td>
<td>K3,K5</td>
</tr>
<tr>
<td>CO4</td>
<td>Ability and to understand IoT Software Architecture, Operating Systems for IoT Applications and Building Android Applications, The recommendation of Components for IoT Applications, Introduction to Embedded Linux.</td>
<td>K4,K6</td>
</tr>
<tr>
<td>CO5</td>
<td>Evaluation the management of data in the context of the Internet of Things, Specific topics include Data sources in IoT and Data Types in IoT, Study the various applications.</td>
<td>K5,K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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*S-Strong; M-Medium; L-Low

UNIT-I:

UNIT-II


UNIT-III:


UNIT-IV:


UNIT-V:

Management of data in the context of the Internet of Things Specific topics include Data sources in IoT and Data Types in IoT - Data-centric IoT products - Flow of Data - Challenges in managing IoT Data - Data Models and Data acquisition in Sensor Networks - Query Processing and Query Optimization in sensor networks - Sensor Data Cleaning and Storage - Mining Data Streams – Clustering, Classification - Frequent Pattern Mining - Change Detection - Dimensionality Reduction – Forecasting.

TEXT BOOKS


REFERENCES BOOKS


3. Wireless Connectivity Solutions
SEMMESTER - III
ELECTIVE-III: ANDROID DEVELOPMENT TOOLS AND APPLICATIONS

OBJECTIVES

- To provide a good understanding of android.
- To provide a overview about the various embedded devices.
- To impart knowledge in the design and development of audio, video and camera.

Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO1</th>
<th>Understanding and analyzing the concepts of android tools</th>
<th>K2,K3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2</td>
<td>Justification of debugging and its applications. Analyze the various debugging concepts.</td>
<td>K1,K3</td>
</tr>
<tr>
<td>CO3</td>
<td>Ability to differentiate the various tools and its priorities.</td>
<td>K3,K4</td>
</tr>
<tr>
<td>CO4</td>
<td>Understand and develop the skills of audio, video and camera.</td>
<td>K2,K6</td>
</tr>
<tr>
<td>CO5</td>
<td>Designing the real time applications for ticket booking, bank applications and other government related applications.</td>
<td>K4,K6</td>
</tr>
</tbody>
</table>

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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*S-Strong; M-Medium; L-Low

UNIT - I

Introduction to Android


UNIT- II

Developing for Android

UNIT- III

Mobile and Embedded Devices


UNIT- IV

Audio, Video and Camera

Playing Audio and Video – Manipulating Raw Audio – Creating a Sound Pool – Using Audio Effects – Camera for taking Pictures –Recording Video – Adding Media to the Media Store.

UNIT – V

Real time Applications


TEXT BOOKS


REFERENCE BOOKS


OBJECTIVES

- To know fundamentals of Automotive Electronics, fuel injection and ignition systems.
- To provide knowledge about application of electronics in Automobile engineering.
- To impart knowledge about automotive engines.

**Expected Course Outcomes (CO):**

After the completion of the course, the student will be able to:

<table>
<thead>
<tr>
<th>CO</th>
<th>Description</th>
<th>Knowledge Level</th>
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</thead>
<tbody>
<tr>
<td>CO1</td>
<td>Understanding and analyzing the concepts of ignition, stroke, break and steering systems</td>
<td>K2, K3</td>
</tr>
<tr>
<td>CO2</td>
<td>Justification of starting, ignition and fuel consumption concepts</td>
<td>K3, K4</td>
</tr>
<tr>
<td>CO3</td>
<td>Know the applications of fuel injection programming and controls</td>
<td>K3, K6</td>
</tr>
<tr>
<td>CO4</td>
<td>Ability and to understand ABS, seat belt application and anti-lock breaking systems</td>
<td>K4, K6</td>
</tr>
<tr>
<td>CO5</td>
<td>Designing and understanding of Protocols CAN, LIN, Flexray, J1850, and Wi-Fi.</td>
<td>K5, K6</td>
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K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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*S-Strong; M-Medium; L-Low

**UNIT-I**


**UNIT-II**


**UNIT-III**

UNIT-IV

Chassis Electrical System Anti-lock Brakes –Introduction –Requirements of ABS –General
System Description –ABS components –Anti-lock Brake System Control -Traction Control –
Airbags and Belt Tensioners

UNIT-V


TEXT BOOKS


2. Tom Denton, “Automobile Electrical and Electronic Systems”, Elsevier

REFERENCES BOOKS

1. www.flexray.com

2. www.can-cia.org

3. www.interfacebus.com
SEMESTER - IV

ELECTIVE-IV : THIN FILM AND NANO TECHNOLOGY

OBJECTIVES

- To provide knowledge about thin films and preparation techniques.
- To familiarize in nano electronics and nano devices.
- To know the various applications of nano devices.

2. Expected Course Outcomes (CO):
After the completion of the course, the student will be able to:

| CO1 | Understanding and analyzing the concepts of vacuum pumps, gauges and thin film growth. | K2.K3 |
| CO2 | Justification of thin film deposition for physical vacuum deposition, e-beam, MBE, sputtering, laser ablation, chemical-CVD MOCVD and Electrochemical deposition. | K1.K5 |
| CO3 | Design the concepts of thick film, various properties and adhesion properties. | K4,K6 |
| CO4 | Ability and to understand the nano electronics and integrated system concepts. | K3,K5 |
| CO5 | Designing the various nano devices and understand the various applications. | K4,K6 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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UNIT I:
Vacuum science and technology: vacuum pumps, gauges, vacuum seals and notion and electrical feed through UHV materials and technology-thin film growth and nucleation growth modes.

UNIT II:
Thin film deposition techniques: physical vacuum deposition, e-beam, MBE, sputtering, laser ablation, chemical-CVD MOCVD, Electrochemical deposition, plasma assisted techniques.

UNIT III:
Thick film deposition techniques: screen printing, thickness measurements of films talystep, quartz crystal microbalance, optical methods-mechanical properties and adhesion characterization techniques to determine harness.

UNIT IV: NANO ELECTRONICS AND INTEGRATED SYSTEMS
NIT V: NANODEVICES AND APPLICATIONS

TEXT BOOKS
(For Other Major P.G Students In The Second Semester)

**EDC: FOR OTHER DEPT STUDENTS (II-SEMESTER)**

1. BASIC ELECTRONICS

**OBJECTIVES:**

- To understand the principles of passive and active electronic devices
- To Gain the basic concepts of OP-amp and timer circuits.
- To get knowledge in digital principles and logic circuits
- To know the working principles of laboratory instruments.

**Expected Course Outcomes (CO):**

After the completion of the course, the student will be able to:

| CO1 | Understanding the symbol, operations, applications of diode, transistor, zener diode and amplifiers. | K2, K3 |
| CO2 | Justification of inverting, non-inverting, comparator, integrated and differentiator circuits. | K1, K3 |
| CO3 | Design the solar cell, 555 timer, automatic street light and multivibrators. | K3, K5 |
| CO4 | Ability and to understand the digital signals, logic gates and flip-flops. | K5, K6 |
| CO5 | Designing and operations of various digital instruments knowing the concept of various applications. | K4, K5 |

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create**

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**UNIT-I**


UNIT-II

UNIT-III

UNIT-IV


TEXT BOOKS

REFERENCE BOOKS