B. Sc. Electronics

Syllabus

AFFILIATED COLLEGES

Program Code: 22M

2020 – 2021 onwards

BHARATHIAR UNIVERSITY

(A State University, Accredited with “A” Grade by NAAC, Ranked 13th among Indian Universities by MHRD-NIRF, World Ranking: Times -801-1000, Shanghai -901-1000, URAP - 982)

Coimbatore - 641 046, Tamil Nadu, India
<table>
<thead>
<tr>
<th><strong>Program Educational Objectives (PEOs)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEO1</strong></td>
<td>Provide graduates with a strong foundation in Electronics domain and to enable them to devise and deliver efficient solutions to challenging problems in Electronics, Communications and allied disciplines.</td>
</tr>
<tr>
<td><strong>PEO2</strong></td>
<td>Impart analytic and thinking skills to develop initiatives and innovative ideas for R&amp;D, Industry and societal requirements.</td>
</tr>
<tr>
<td><strong>PEO3</strong></td>
<td>Provide sound theoretical and practical knowledge of Electronics, managerial and entrepreneurial skills to enable students to contribute to the wellbeing of society with a global outlook.</td>
</tr>
<tr>
<td><strong>PEO4</strong></td>
<td>Inculcate qualities of teamwork as well as social, interpersonal and leadership skills and an ability to adapt to evolving professional environments in the domains of engineering and technology.</td>
</tr>
<tr>
<td><strong>PEO5</strong></td>
<td>Motivate graduates to become good human beings and responsible citizens for the overall welfare of the society.</td>
</tr>
<tr>
<td><strong>PEO6</strong></td>
<td>Develop attitude in lifelong learning, applying and adapting new ideas and technologies as their field evolves.</td>
</tr>
<tr>
<td><strong>PEO7</strong></td>
<td>To prepare graduates who will have knowledge, ability and courage to pursue higher studies and research.</td>
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</table>
# Program Specific Outcomes (PSOs)

After the successful completion of B.Sc. Electronics program, the students are expected to

<table>
<thead>
<tr>
<th>PSO</th>
<th>Description</th>
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<tbody>
<tr>
<td>PSO1</td>
<td>Demonstrate proficiency in use of software and hardware required to practice electronics and communication profession.</td>
</tr>
<tr>
<td>PSO2</td>
<td>Graduates will be able to apply fundamentals of electronics in various domains of analog and digital systems.</td>
</tr>
<tr>
<td>PSO3</td>
<td>Apprehend and analyse specific engineering problems of communication, electronic circuits, computer programming, embedded systems, VLSI design and semiconductor technology by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.</td>
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<tr>
<td>PSO4</td>
<td>Ability to communicate effectively with excellent interpersonal skills and demonstrate the practice of professional ethics for societal benefit.</td>
</tr>
<tr>
<td>PSO5</td>
<td>Graduates will be able to apply fundamentals of electronics in various domains of analog and digital systems.</td>
</tr>
<tr>
<td>PSO6</td>
<td>Use embedded system concepts for developing IoT applications.</td>
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### Program Outcomes (POs)

**On successful completion of the B. Sc. Electronics program**

<table>
<thead>
<tr>
<th>PO</th>
<th>Description</th>
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<tbody>
<tr>
<td>PO1</td>
<td><strong>Engineering knowledge</strong>: Apply the knowledge of mathematics, Science, Engineering fundamentals and an engineering specialization to the solution of complex engineering problems</td>
</tr>
<tr>
<td>PO2</td>
<td><strong>Problem analysis</strong>: Identify, formulate, review research literature and analyse complex engineering problems reaching substantiated conclusion using principles of mathematics and Engineering Sciences</td>
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<tr>
<td>PO3</td>
<td><strong>Design/Development of solutions</strong>: Design solutions for complex Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental conditions.</td>
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<tr>
<td>PO4</td>
<td><strong>Conduct investigation of complex problems</strong>: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.</td>
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<tr>
<td>PO5</td>
<td><strong>Modern tool usage</strong>: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.</td>
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<tr>
<td>PO6</td>
<td><strong>The engineer and society</strong>: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.</td>
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<tr>
<td>PO7</td>
<td><strong>Environment and Sustainability</strong>: Understand the impact of the professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.</td>
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<tr>
<td>PO8</td>
<td><strong>Ethics</strong>: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</td>
</tr>
<tr>
<td>PO9</td>
<td><strong>Individual and team work</strong>: Function effectively as an individual, as a member or leader in diverse teams, and in multidisciplinary settings.</td>
</tr>
<tr>
<td>PO10</td>
<td><strong>Life-Long learning</strong>: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</td>
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### BHARATHIAR UNIVERSITY: COIMBATORE 641 046

**B. Sc. Electronics Curriculum (University Department)**
*(For the students admitted during the academic year 2020 – 21 onwards)*

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<tr>
<th>Course Code</th>
<th>Title of the Course</th>
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| **Total** | 20                        | -      | -       | 115   | 385    | 500   |

### FOURTH SEMESTER

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**Total**: 30 215 535 750

### FIFTH SEMESTER

<p>| 53A | Core Paper IX: 8051 Microcontroller and its Applications | 4 | 6 | - | 25 | 75 | 100 |
| 5EA/5EB/5EC/5ED | Elective I | 4 | 6 | - | 25 | 75 | 100 |
| 5EE/5EF/5EG/5EH | Elective II | 4 | 6 | - | 25 | 75 | 100 |
| -- | Core Practical VI: IC, TV and Medical Electronics Lab | - | - | 3 | - | - | - |
| -- | Core Practical VII: Industrial and Power Electronics Lab | - | - | 3 | - | - | - |
| -- | Core Practical VIII: Microcontroller Lab | - | - | 3 | - | - | - |</p>
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**SIXTH SEMESTER**

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@ No University Examinations. Only Continuous Internal Assessment (CIA)
# No Continuous Internal Assessment (CIA). Only University Examinations.

*For Project report 120 marks and viva-voce 30 marks

**Swatch Bharat Summer internship- extra 2 credits would be given. It is mandatory**
First Semester
**Course code**: 13A  
**BASIC ELECTRONICS**

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**Course Objectives:**

The main objectives of this course are to:
1. To become familiar with fundamentals of electronic components
2. To learn to use common electronic components
3. To design electronic circuits to perform realistic tasks

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Understand the basic electronic components  
2. Understand the basic electronic components
3. Differentiate and demonstrate the voltage and current source.
4. Apply the electronic components in network theorems.
5. Put into practice and use the electronic components

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

<table>
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<th>Unit</th>
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<th>Unit</th>
<th>Electrical Elements And Circuits</th>
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<th>Network Theorems</th>
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<td>Superposition Theorem - Thevenin Theorem-Thevenin Circuit with Two Voltage Sources - Bridge Circuit - Norton’s Theorem - Thevenin to Norton Conversion - Conversion of Voltage and Current Sources - Millman’s Theorem - Star and Delta Conversion-Maximum Power Transfer Theorem - Simple Problems in DC Circuits.</td>
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<tr>
<th>Unit</th>
<th>Contemporary Issues</th>
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*Page 9 of 81*
## Electrical elements, network theorems

| Total Lecture hours | 75 hours |

## Text Book(s)

1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj “Electronic Devices And Circuits”.

## Reference Books


## Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. [https://nptel.ac.in/courses/108/104/108104139/](https://nptel.ac.in/courses/108/104/108104139/)
2. [https://nptel.ac.in/courses/108/101/108101091/](https://nptel.ac.in/courses/108/101/108101091/)
3. [https://www.youtube.com/playlist?list=PLFF553CED56CDE25D](https://www.youtube.com/playlist?list=PLFF553CED56CDE25D)
4. [https://www.youtube.com/watch?v=w8Dq8b1TmSA](https://www.youtube.com/watch?v=w8Dq8b1TmSA)

Course Designed By: K. Manikantan, Assistant Professor, Government Arts College, Ooty. & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

## Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Second Semester
Course code | 23P | BASIC ELECTRONICS LAB | L | T | P | C
---|---|---|---|---|---|---
Core /Elective / Supportive: | Core Practical I | 0 | 0 | 3 | 4
Pre-requisite | Basic Electronics theory | Syllabus | Version | 2020-21

Course Objectives:

The main objectives of this course are to:
1. To understand the fundamental principles of circuit theory
2. To make use of circuit laws and theorems and measuring the circuit parameters.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Apply the concept of basic circuit and theorems
2. Simplify the circuits using series and parallel equivalents and using Thevenin’s and Norton’s equivalent circuits.
3. Design resonance circuits.
4. Use the oscilloscope for the display and measurements of signals.
5. Analyse Various Theorems with different resistance values

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

Basic Electronics Lab | 90 Hours

(Any 16 Experiments)

1. Study of Multimeter – Checking of Components
2. Measurement of Amplitude, Frequency & Phase Difference using CRO
3. Verification of Ohm’s Law
4. Voltage sources in Series, Parallel and Series – Parallel
5. Resistance in Series, Parallel and Series – Parallel
6. Voltage and Current Dividers
7. Verification of Kirchoff’s Law
8. Wheatstone Bridge
9. Verification of Norton’s Theorem
10. Verification of Thevenin’s Theorem
11. Verification of Millman’s Theorem
12. Verification of Superposition Theorem
13. LCR Bridge
14. Series Resonance Circuit
15. Parallel Resonance Circuit
16. Transient Response of RC Circuit
17. Transient Response of RL Circuit
18. Capacitors & Inductors in Series & Parallel
19. Frequency Response of R, L & C
20. Low Pass Filter & High Pass Filter
21. Band pass and Band Rejection Filter
22. Verification of Maximum Power Transfer Theorem
23. Measurement of resistance and capacitance in series and parallel

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1. https://nptel.ac.in/courses/122/106/122106025/
2. https://nptel.ac.in/courses/122/106/122106026/

Course Designed By: K. Manikantan, Assistant Professor, Government Arts College, Ooty. & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Course code: 23Q  
SEMICONDUCTOR DEVICES LAB  
Core/Elective/Supportive: Core Practical II  
Pre-requisite: Higher secondary physics  
Syllabus Version: 2020 - 21

<table>
<thead>
<tr>
<th>Course Objectives:</th>
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<tr>
<td>The main objectives of this course are to:</td>
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<tr>
<td>1. To understand and experiment the basic parameters of electronic devices.</td>
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<tr>
<td>2. To construct few applications using semiconductor devices.</td>
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<table>
<thead>
<tr>
<th>Expected Course Outcomes:</th>
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<tbody>
<tr>
<td>On the successful completion of the course, student will be able to:</td>
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<tr>
<td>1. Experiment the fundamental operations of the main semiconductor electronic devices.</td>
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<td>2. Design and construct electronic circuits using semiconductor devices.</td>
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<td>3. Understand the transistor characteristics</td>
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<td>4. Understand the characteristics of LDR and solar cell</td>
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<td>5. Apply Various transistor characteristics in applications.</td>
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<td><strong>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 – Create</strong></td>
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<tr>
<th>Unit I</th>
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<tr>
<td>(Any 16 Experiments)</td>
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<tr>
<td>1. Band Gap Energy of Silicon / Germanium Diode</td>
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<td>2. V-I Characteristics of Junction Diode</td>
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<td>3. V-I Characteristics of Zener Diode</td>
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<td>4. Transistor Characteristics of CE Configuration</td>
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<td>5. Transistor Characteristics of CB Configuration</td>
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<td>7. Clipping Circuits</td>
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<td>8. Clamping Circuits</td>
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<td>9. Measurement of Stability Factor of Fixed Bias</td>
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<td>10. Measurement of Stability Factor of Self Bias</td>
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<td>11. V-I Characteristics of JFET</td>
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<td>12. V-I Characteristics of UJT</td>
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<td>13. UJT as Oscillator</td>
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<td>16. Characteristics of Solar Cell</td>
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<td>17. Study of IR (Tx &amp; Rx)</td>
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<td>18. Study of LED and 7 Segment display</td>
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<td>19. Temperature Co-efficient of Junction Diode</td>
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<td>20. Zener as a Voltage regulator</td>
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<td>21. ON / OFF control of relay using Opto –Couplers</td>
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<td>22. Characteristics of SCR</td>
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<td>23. TRIAC Characteristics</td>
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Course Designed By: K. Manikantan, Assistant Professor, Government Arts College, Ooty. & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.
## Mapping with Programme Outcomes

<table>
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<tr>
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*S-Strong; M-Medium; L-Low*
**Course code**: 23A  
**SEMICONDUCTR DEVICES**  
**Core /Elective / Supportive:** Core Paper II:  
**Pre-requisite:** Higher secondary physics  
**Syllabus Version:** 2020-21

### Course Objectives:

The main objectives of this course are to:
1. To enable the students to understand and gain the knowledge on semiconductor devices.
2. To acquaint the students with construction, theory and characteristics of the electronic

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:
1. Explain the structure of the basic electronic devices  
2. Understand the characteristics and operations of special diodes  
3. Understand the characteristics and operations of transistors  
4. Understand the characteristics and operations of FET and UJT  
5. Use the special diodes for various applications

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

### Unit: 1

**PN Junction Diode**  
15 hours


### Unit: 2

**Special Diodes**  
13 hours


### Unit: 3

**BJT**  
15 hours


### Unit: 4

**FET And UJT**  
15 hours

- Introduction to FET - Construction and Operation of N-Channel JFET - Drain Characteristics-Comparison of JFET &BJT - Introduction to MOSFET - Enhancement MOSFET – Depletion MOSFET - FET as a Voltage Variable Resistor(VVR) - Introduction to UJT – Characteristics – UJT as Relaxation Oscillator - Introduction to PUT – SCR – TRIAC –DIAC

### Unit: 5

**Optoelectroic Devices**  
15 hours


### Unit: 6

**Contemporary Issues**  
2 hours

Summary of Transistors and optocoupler devices : Principles and applications

| Total Lecture hours | 75 hours |
### Text Book(s)


### Reference Books


### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. [https://nptel.ac.in/courses/108/108/108108122/](https://nptel.ac.in/courses/108/108/108108122/)

2. [https://nptel.ac.in/courses/108/108/108108112/](https://nptel.ac.in/courses/108/108/108108112/)

3. [https://nptel.ac.in/courses/115/102/115102103/](https://nptel.ac.in/courses/115/102/115102103/)

Course Designed By: K.Manikantan, Assistant Professor, Government Arts College, Ooty.& Dr.N Om Muruga, Assistant Professor, Government Arts College, Ooty.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Third Semester
Course code: 33A

PRINCIPLES OF COMMUNICATION SYSTEMS

Core /Elective / Supportive: Core Paper III

L  T  P  C
4  0  0  4

Pre-requisite: Higher secondary physics

Syllabus Version 2020-21

Course Objectives:

The main objectives of this course are to:
1. To understand the concept of wave propagation and its types.
2. To acquire knowledge on Amplitude and Frequency modulation.
3. To inculcate the principle of radio receivers and its types.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Understand the basic building blocks of communication systems
2. Analyse the performance of amplitude and frequency modulation techniques.
3. Demonstrate the stages of radio receiver.
4. Compare the operation of FM and SSB receivers
5. Understand Various Receiver circuits

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

Unit: 1 Wave Propagation

11 hours


Unit: 2 Antennas

11 hours


Unit: 3 Modulation Techniques

12 hours


Unit: 4 Single Sideband Modulation

12 hours


Unit: 5 Receiver

12 hours


Unit: 6 Contemporary Issues

2 hours
Wave Propagation, Antenna

| Total Lecture hours | 60 hours |

**Text Book(s)**
2. Dennis Roddy and John Coolen, “Electronic Communications” PHI, 4th edition,

**Reference Books**

**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**
1. https://swayam.gov.in/nd1_noc20_ee16/preview
2. https://swayam.gov.in/nd1_noc19_ee47/preview

Course Designed By: K. Manikantan, Assistant Professor, Government Arts College, Ooty, & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low*
Course code: 33B

**DIGITAL PRINCIPLES AND APPLICATIONS**

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<tr>
<th>Course / Elective / Supportive</th>
<th>Core Paper IV</th>
<th>Syllabus Version</th>
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<tr>
<td>Core Paper IV</td>
<td>4</td>
<td>2020-21</td>
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Pre-requisite: Basic Physics

**Core / Elective / Supportive:** Core Paper IV

**L T P C** 4 0 0 4

**Course Objectives:**

The Main Objectives of this course are to:

1. To acquire the basic knowledge of Number system, Digital logic circuits and its application.
2. To outline the formal procedures for the analysis and design of combinational and sequential circuits.
3. To learn the concepts of A/D, D/A conversions and their types.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Understand the basics of Number system and gates
2. Realize the operation of various logic gates and analysing the outputs
3. Analyse and design the combinational logic circuits
4. Analyse and design the Sequential logic circuits
5. Design various synchronous and asynchronous sequential circuits

**Unit: 1**

**Number System And Codes**

- Decimal, Binary, Octal and Hexa Decimal Numbers – Conversion
- Floating Point Representation
- Binary Addition, Subtraction and Multiplication – 1’s and 2’s Compliments
- Binary Coded Decimal (BCD) – Weighted Codes and Non-weighted Codes
- Excess Three – Grey Code
- Hamming Codes – ASCII Codes – EBCDIC Codes – Hollerith Code – Parity Advantages

**Unit: 2**

**Boolean Algebra And Logic Gates**

- Boolean logic operations
- Boolean functions
- Truth Tables
- Basic Laws
- DeMorgans Theorem
- Sum of Products and Products of Sums
- Karnaugh map
- Logic Gates – OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR Gates
- Code Conversion – VHDL Coding for Logic Gates

**Unit: 3**

**Combinational Logic Circuits**

- Multiplexer – Demultiplexer
- Decoders – Encoders – Parity Generators / Checkers
- Magnitude Comparators – VHDL Coding for Combinational Circuits

**Unit: 4**

**Sequential Logic Circuits**

- Flip Flops – RS, Clocked RS, JK, JK Master Slave
- D and T Flip Flops – Shift Registers and its Types
- Ring Counters – Ripple Counters
- Synchronous Counter – Up Down counter – Mod-3, Mod-5 Counters
- Decade Counter – Applications

**Unit: 5**

**D/A And A/D Converters**

- Digital to Analog Converters: Resistive Divider Type – Ladder Type
- Accuracy and Resolution
- Analog to Digital Converters: Counter – Ramp Type – simultaneous Conversion – Dual Slope Type – Successive Approximation Type – Accuracy and Resolution

**Unit: 6**

**Contemporary Issues**

- Analysis of analog and digital circuits
Total Lecture hours | 60 hours

Text Book(s)


Reference Books

1. Floyd and Jain, Digital Fundamentals, Prentice Hall 2010

Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]

2. https://nptel.ac.in/courses/117/106/117106086/Introduction to digital circuits

Course Designed By: R. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

Mapping with Programme Outcomes

<table>
<thead>
<tr>
<th>COs</th>
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*S-Strong; M-Medium; L-Low
Course Code 33C ELECTRONIC CIRCUITS L T P C
Core /Elective / Supportive: Core paper V 4 0 0 4
Pre-Requisite: Basic Physics Syllabus Version 2020-21

Course Objectives:
The Main Objectives of this course are to:
1. To enable the students to understand and gain the knowledge on power supplies, amplifiers and oscillators.
2. To acquaint the students with construction, theory and characteristics of the electronic amplifier circuits and types of multivibrators.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Understand the concepts of rectifiers and regulators K1
2. Study about small signal amplifiers K2
3. Analyse the functions of power amplifiers K3
4. Analyse the performance of negative as well as positive feedback circuits K4
5. Design oscillators and multivibrators K5
K1:Remember; K2:Understand; K3:Apply; K4:Analyze; K5:Evaluate; K6:Create

Unit:1 Rectifiers And Regulators 12 hours

Unit:2 Small Signal Amplifiers 12 hours

Unit:3 Power Amplifiers 12 hours

Unit:4 Feedback Amplifiers 12 hours

Unit:5 Oscillators And Multivibrators 12 hours

Unit:6 Contemporary Issues 2 hours
Amplifiers, Oscillators
Total Lecture hours | 60 hours

Text Book(s)

Reference Books

Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]
1. http://www.ee.iitm.ac.in/~ani/2012/ec5135/lectures.html Lecture Notes
2. https://nptel.ac.in/courses/108/102/108102097/#Introduction to Electronic circuits NPTEL.
3. https://nptel.ac.in/courses/108/102/108102095/Analog Electronic circuits NPTEL.

Course Designed By: R. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Course Code - ELECTRONIC CIRCUITS & COMMUNICATION LAB

Core /Elective / Supportive: Core Practical III
Pre-requisite: Electronic circuits theory and Communication theory
Syllabus Version 2020-21

Course Objectives:
The Main Objectives of this course are to:
- To understand the concept of working of regulated power supplies, rectifiers, amplifiers and oscillators.
- To experiment the modulation and detection techniques.

Expected Course Outcomes:
On the Successful completion of the course, student will be able to:

1. Design power supply and rectifier circuits K6
2. Design Amplifier circuits K6
3. Design different Oscillator circuits K6
4. Design different Modulation circuits K6
5. Study on communication antennas K1

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

Part I | Electronic Circuits | 45 hours
--- | --- | ---
1. DC Regulated Power Supply using Zener Diode
2. Voltage Doubler
3. Feedback Amplifier
4. Emitter Follower
5. Transformer Coupled Amplifier
6. Hartley Oscillator
7. Colpitts Oscillator
8. Phase shift Oscillator
9. Wein Bridge Oscillator
10. RC Coupled Amplifier
11. Half Wave and Full Wave Rectifier
12. Filter Circuits

Part II | Electronic Communication | 45 hours
--- | --- | ---
13. Performance of IF Amplifier
14. AM Modulation and Detection
15. FM Modulation and Detection
16. PAM Modulation
17. PIN Diode Oscillator
18. Alignment of Dish Antenna
19. Alignment of Satellite Receiver
20. PWM Modulation
21. PPM Modulation
22. PCM Modulation
23. GUNN Diode Oscillator

(Any 16 Experiments)

Total Lecture hours 90 hours
Course Designed By: R. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
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<th>DIGITAL ELECTRONICS AND MICROPROCESSOR LAB</th>
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<td>Syllabus Version</td>
<td>2020-21</td>
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### Course Objectives:

**The Main Objectives of this course are to:**

1. To understand the logical operation of various gates and theorems
2. To develop various digital circuits
3. To develop the assembly language programming of Microprocessor and to interface it with various peripheral devices

### Expected Course Outcomes:

On the Successful completion of the course, student will be able to:

1. Analyse the circuit using Boolean laws  
   **K6**
2. Design the Adder and subtractor circuit using logic gate  
   **K6**
3. Gain knowledge of arithmetic Programming of 8085  
   **K6**
4. Knowledge about logic Programming of 8085  
   **K6**
5. Understand the wave form generation  
   **K1**

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

### Part I: Digital Electronics

**45 hours**

1. Verification of Basic Gates and Universal gates
2. Verification of Demorgan’s Theorem
3. Half Adder and Full Adder & Half Subtractor and Full Subtractor
4. Decade Counter & BCD Counter
5. Study of Flip Flops
6. Multiplexer and De-Multiplexers
7. Encoder and Decoder
8. BCD to 7-Segment Display
9. Binary to Grey code and Grey to Binary code
10. Synchronous and Asynchronous Counter
11. Design and Simulation of Logic Gate using VHDL Coding
12. Design and Simulation of Adder Circuits using VHDL Coding

### Part II: 8085 Microprocessor Lab

**45 hours**

1. Addition / Subtraction/ Multiplication / Division of 8 bit data
2. Block Data Transfer and Sum of N 8 bit Numbers
3. To Arrange in Ascending / Descending order
4. UP/DOWN Counter using 7 segment displays
5. Traffic Light Control Interface
6. LED Interface
7. Stepper Motor Interface
8. Solid State Relay Interface
9. Data Transfer using 8255 (PPI)
10. Square Wave Generator using 8255
11. Interfacing ADC / DAC with 8085
   (Any 16 Experiments)
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*S-Strong; M-Medium; L-Low

Total Lecture hours | 90 hours

Course Designed By: R. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

SCAA DATED: 23.09.2020
**Course Code:** 3ZA  
**COMPUTER ORIENTED OFFICE AUTOMATION**

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| Syllabus Version            | 2020-21 |

**Course Objectives:**

The Main Objectives of this course are to:
1. To learn about the computer organization, processor, memory design and peripherals and recent system architecture.
2. To develop skills on using MS word, MS Excel, Power Point and MS Access.

**Expected Course Outcomes:**

On the Successful completion of the course, student will be able to:

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<th>Number</th>
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<tr>
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<td>Recognize and understand Basic of Computer</td>
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<td>Use and Practice of Word Processing</td>
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<td>Use and Practice of MS Access</td>
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K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

**Unit:1 Basics Of Computer**  
7 hours

Introduction: What is a Computer  
- Software and Hardware Components  
- Accessories  
- Operating System  
- Software Applications  
- Computer Network: LAN  
- Internet  
- E-Mail  
- Browsers  
- Clients.

**Unit:2 MS Word**  
9 hours

Setting Page Style  
- Formatting  
- Border & Shading  
- Columns  
- Header & Footer  
- Setting Footnotes  
- Inserting Manual Page Break  
- Column Break and Line Break  
- Creating Sections and Frames  
- Inserting Clip Arts, Pictures, and Other Files  
- Anchoring & Wrapping  
- Setting Document Styles  
- Table of Contents  
- Index  
- Page Numbering, Data And Time, Author, Etc.,  
- Creating Master Documents  
- Web Page

**Unit:3 MS Excel**  
9 hours

Creating Worksheet  
- Entering and Editing Text, Numbers, Formulas  
- Saving  
- Excel Functions  
- Modifying Worksheet  
- Selection  
- Copying and Moving Data  
- Defining Names  
- Inserting and Deleting Rows of Columns  
- Moving Around Worksheet  
- Naming Worksheet  
- Copying and Deleting Worksheet  
- Formatting, Gauging, Heading  
- Displaying Value  
- Changing of Selecting Fonts  
- Protesting Data Using Style So Templates  
- Reprinting Worksheet  
- Creating Charts  
- Managing Date  
- What If Tables Pate Tables Wraps  
- Macros  
- Linking Worksheets.

**Unit:4 MS Power Point**  
9 hours

Creating a Presentation: Setting Presentation Style  
- Adding Text to the Presentation  
- Formatting a Presentation: Adding Style  
- Color, Gradient Fills  
- Arranging Objects  
- Adding Header & Footer  
- Slide Background  
- Slide Layout  
- Adding Graphics to the Presentation: Inserting Pictures, Movies, Tables, Etc. Into the Presentation  
- Drawing Pictures Using Draw  
- Adding Effects to the Presentation: Setting Animation & Transition Effect  
- Adding Audio and Video.

**Unit:5 MS Access**  
9 hours

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<th>Unit:6</th>
<th>Contemporary Issues</th>
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**Text Book(s)**

2. *Microsoft Office Word 2007 Plain & Simple* by Jerry Joyce & Marianne Moon

**Reference Books**

2. *Microsoft Office Power point 2007 Plain & Simple* Nancy Muir

**Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]**


**Course Designed By:** R.Archana, Assistant professor, Nehru Arts and Science College, Coimbatore & Dr.N Om Muruga, Assistant Professor, Government Arts College, Ooty.

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low*
Fourth Semester
Course code | 43A  
---|---
Course Title: 8085 MICROPROCESSOR INTERFACING AND ITS APPLICATIONS | L T P C  
Core /Elective / Supportive: | Core paper VI  
Pre-requisite | Basic of Digital circuits and Programming languages  
Syllabus Version | 2020-21

**Course Objectives:**

The main objectives of this course are to:

1. To enable the students to learn about the Microprocessor Architecture
2. To learn the instruction set of 8085 and to develop the programming skills
3. To know various peripheral devices and to interface them with 8085

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Explain the 8085 microprocessor architecture and its instruction set. (K1)
2. Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor (K2)
3. Interface the 8085 microprocessor with various peripheral devices. (K3)
4. Understand the operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor. (K4)
5. Explain the need for different interfacing devices (K5)

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

---

**Unit:1**
Microprocessor Architecture and its Operation
- Memory Map of 1k Memory Chip
- Memory and Instruction Fetch
- 8085 Micro Processing Unit
- Bus Timing
- De-multiplexing the Bus AD7 – AD0
- Generating Control Signals
- Functional Block Diagram of 8085

12 hours

**Unit:2**
Timings And Instruction Set
- Decoding and Execution of an Instruction – 8085 based Microcomputer
- Timing of the Memory Write Cycle and Read Cycle
- OPCODE Fetch Cycle Timing
- Instruction Classification
- Instruction Format
- Addressing modes
- Data Transfer Operations
- Arithmetic Operations
- Logical Operations
- Branch Operations
- Looping, Counting and Indexing
- Addition, Subtraction of 8 and 16 bit Numbers
- Time Delay Program

12 hours

**Unit:3**
Interfacing Concepts
- Peripherals I/O Instruction – Device Selection and Data Transfer
- Input Interfacing – Interfacing I/P using Decoders
- Interfacing O/P Display: LED Display – 7 Segments LED Display
- Interfacing Memory Bus Contention – Memory Time and Wait States

10 hours

**Unit:4**
Peripherals
- The 8255A Programmable Peripherals Interface: Block Diagram of 8255A, Mode 0 Simple I/P O/P
- BSR Mode
- Programming the 8255A in Mode1, Mode 2 – Bidirectional Data Transfer
- 8259 Programmable Interrupt Controller – Block diagram of 8253 – Direct Memory Access and 8257 DMA Controller
- 8279 Keyboard/Display Interfacing

12 hours

**Unit:5**
Applications
- Applications of Microprocessors - System Requirements
- Overall System Design and Software Design
- Temperature Monitoring System
- Data Acquisition System
- Traffic Light Control System
- Stepper Motor Control
- Digital Clock
- Washing Machine Control

12 hours

**Unit:6**
Contemporary Issues
- An overall survival study on microprocessor and its applications

2 hours
**Total Lecture hours** | **60 hours**
--- | ---

**Text Book(s)**


**Reference Books**

1. Doughlas V. Hall, “Microprocessors and Interfacing, Programming and Hardware”, TMH, 2012

**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

1. [https://nptel.ac.in/courses/108/103/108103157/](https://nptel.ac.in/courses/108/103/108103157/)
2. [https://www.youtube.com/watch?v=t0Z8P_hpbFk&vl=en](https://www.youtube.com/watch?v=t0Z8P_hpbFk&vl=en)
3. [https://www.youtube.com/watch?v=fS7FFOaC_iQ](https://www.youtube.com/watch?v=fS7FFOaC_iQ)

Course Designed By: M. Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore. & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

<table>
<thead>
<tr>
<th>Mapping with Programme Outcomes</th>
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*S-Strong; M-Medium ;L-Low*
Course Objectives:
The Main Objectives of this course are to:
1. To impart the knowledge on IC fabrication, Timer, PLL, and electronic instruments
2. To enable the students to acquire the knowledge of Op-amp., transducers and its applications in electronic circuits and know the technique of measurements using electronic instruments

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Recognize the standards in IC Fabrication Technology. K1
2. Understand the working of Timer and PLL K2
3. Design simple circuits using Op-amp K6
4. Understand the principle of various types of transducers K2
5. Study the construction and working of frequently used equipment’s like CRO, Digital Voltmeter etc. K4

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

Unit:1 IC Fabrication Technology 10 hours

Unit:2 Timer And PLL 12 hours

Unit:3 Operational Amplifier 12 hours

Unit:4 Transducers 12 hours

Unit:5 Electronic Instruments 12 hours

Unit:6 Applications 2 hours
## Integrated Circuit and its applications

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<th>Total Lecture hours</th>
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### Text Book(s)


### Reference Books


### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

2. [https://nptel.ac.in/courses/117/106/117106030/Analog IC Design](https://nptel.ac.in/courses/117/106/117106030/Analog IC Design)

Course Designed By: R. Archana, Assistant professor, Nehru Arts and Science College & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code 43C  BIOMEDICAL INSTRUMENTATION  L  T  P  C
Core /Elective / Supportive:  Core Paper VIII  4  0  0  4
Pre-requisite  Higher secondary biology  Syllabus Version  2020-21

Course Objectives:
The main objectives of this course are to:
1. To present various bio-potentials and working principles of medical instruments
2. To enable the students to learn about bio-potentials and medical instruments

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Understand the Concept of bio-potential  K2
2. Understand the concept of medical instruments  K2
3. Develop the troubleshooting Skills of medical instruments  K3
4. Understand the concepts of signal conditioners & diagnostic equipment  K2
5. Analyse physiological assist devices  K4

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

Unit:1  Basic Physiology  10 hours

Unit:2  Electrodes And Transducers  12 hours

Unit:3  Signal Conditioners & Diagnostic Equipments  12 hours
Instrumentation Amplifiers - Current Amplifiers - Isolation Amplifier - Need for Filters - LowPass, High Pass and Band Pass Active Filters - Notch Filters - Heated Stylus and Ink Pen Recorders. DIAGNOSTIC EQUIPMENTS: Typical Electrocardiogram (ECG) - Electrocardiograph- Bipolar and Unipolar Leads - Einthoven Triangle - Electrical Activities of the Brain - Electroencephalogram (EEG) - Muscle Response - Electromyograph (EMG)

Unit:4  Diagnostic Equipments & Biotelemetry  12 hours

Unit:5  Physiological Assist Devices  12 hours

Unit:6  Contemporary Issues  2 hours
Seminar on biomedical instrumentation with concerned instrument experts
### Text Book(s)

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<tr>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td>Joseph J. Carr and John M. Brown</td>
<td><em>Introduction to Biomedical Equipment Technology</em></td>
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<tr>
<td>2</td>
<td>Leslie Cromwell., Fred J. Webell., Erich A. Pfeffer</td>
<td><em>Bio-medical Instrumentation</em></td>
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### Reference Books

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<th>Title</th>
<th>Publisher</th>
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<tbody>
<tr>
<td>1</td>
<td>Khandpur</td>
<td><em>Handbook on Biomedical Instrumentation</em></td>
<td>Tata McGraw Hill Company, New</td>
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<td>2</td>
<td>Ohn G Webster</td>
<td><em>Medical Instrumentation Application and Design</em></td>
<td>John Wiley &amp; Sons, Singapore, 1999</td>
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<tr>
<td>3</td>
<td>Arumugam M</td>
<td><em>Biomedical Instrumentation</em></td>
<td>Anuradha Agencies Publishers, Chennai, 1992</td>
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### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

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Course Designed By: K. Manikantan, Assistant Professor, Government Arts College, Ooty. & Dr. N. Om Muruga, Assistant Professor, Government Arts College, Ooty.

### Mapping with Programme Outcomes

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<tr>
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*S-Strong; M-Medium; L-Low*
### Course Code: 4ZB
#### PC HARDWARE AND TROUBLESHOOTING

<table>
<thead>
<tr>
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<th>Core /Elective /Supportive:</th>
<th>Pre-requisite:</th>
<th>Syllabus Version</th>
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<td>4ZB</td>
<td>Skill Based Subject II Supportive</td>
<td>Basic Computer Fundamentals</td>
<td>2020-21</td>
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### Course Objectives:

The Main Objectives of this course are to:
1. To enable the students to understand and gain the knowledge on PC Hardware, troubleshooting and driver.
2. To acquaint the students with theory and characteristics of peripherals, buses and ports.

### Expected Course Outcomes:

On the Successful completion of the course, student will be able to:

<table>
<thead>
<tr>
<th>No</th>
<th>Outcomes</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>K4</th>
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<tr>
<td>1</td>
<td>Identify the hardware components of a computer.</td>
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<td>2</td>
<td>Familiarize Peripherals in PC</td>
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<td>3</td>
<td>Familiarize peripherals in the system</td>
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<td>4</td>
<td>Analyse I/o Buses and ports</td>
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<td>5</td>
<td>Analyse Maintenance and Troubleshooting Tools</td>
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K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

### Unit:1 Hardware & Mother Board Organization (9 hours)


### Unit:2 Peripherals (8 hours)


### Unit:3 Drivers (9 hours)


### Unit:4 System Softwares (7 hours)


### Unit:5 Diagnostic Tools & PC Maintenance (9 hours)


### Unit:6 Contemporary Issues (2 hours)

PC and its Maintenance, Diagnosis Tools
<table>
<thead>
<tr>
<th>Text Book(s)</th>
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<table>
<thead>
<tr>
<th>Reference Books</th>
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<tbody>
<tr>
<td>1   Craig Zacker and John Rourke, “PC Hardware: The Complete Reference”, TMH Publication.</td>
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<tr>
<td>2   M Lotia, P Nair and P Lotia, “Modern Computer Hardware Course”, BPB Publication.</td>
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<tr>
<th>Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]</th>
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<td>1   <a href="https://nptel.ac.in/content/storage2/courses/106108101/pdf/Lecture_Notes/Mod%201_LN.pdf">https://nptel.ac.in/content/storage2/courses/106108101/pdf/Lecture_Notes/Mod%201_LN.pdf</a> Operating system lecture notes nptel</td>
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<td>2   <a href="https://nptel.ac.in/courses/106/105/106105163/computer">https://nptel.ac.in/courses/106/105/106105163/computer</a> Architecture and Organization</td>
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Course Designed By: R. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore, & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

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<th>Mapping with Programme Outcomes</th>
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*S-Strong; M-Medium; L-Low
Fifth Semester
### Course Objectives:

**The main objectives of this course are to:**

1. To Study the architecture and addressing modes of 8051
2. To Impart knowledge about assembly language programs of 8051
3. to understand the importance of different peripheral devices and their interfacing to 8051
4. To Impart knowledge of different types of external interfaces including LCD, Keypad, Matrix, Stepper motor and sensors

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Describe architecture and operation of Microcontroller 8051
2. Foster ability to understand the design concept of interfacing Microcontroller with various peripherals
3. Analyse the data transfer and interfacing techniques
4. Foster ability to understand the role of embedded systems in industry
5. Analyze the data transfer through serial and parallel ports.

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

### Syllabus

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<tr>
<td>1</td>
<td>Microcontroller Overview - Introduction to Microcontroller - Comparison of µP &amp; µC - 8051 Microcontroller Block Diagram - 8051 Oscillator and Clock - A, B &amp; Register Banks - Stack - Program Counter &amp; Data Pointer - Flag &amp; PSW - Special Function Registers - Internal Memory - Input / Output Pins &amp; Ports.</td>
<td>16</td>
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<td>2</td>
<td>Addressing Modes, Arithmetic And Logical Instruction - Introduction - Addressing Modes: Direct - Indirect - Register - Indexed - Arithmetic Instructions: Addition, Subtraction, Multiplication, Division, Increment And Decrement - Logic &amp; Compare Instructions: AND, OR, XOR, CPL &amp; Compare – Rotate &amp; Swap Instruction: RR, RL, RRC, RLC - Simple Programs.</td>
<td>18</td>
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<td>3</td>
<td>Data Transfer And Branch Operations - Introduction - Internal Data Move - External Data Move - Code Memory Read Only Data Move - Loop and Jump Instructions – Conditional Jump – Unconditional Jump – Call Instructions: LCALL and ACALL – Push and Pop Instructions – Simple Programs.</td>
<td>18</td>
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<td>Peripherals - Timer and Counter - Timer Registers – TMOD – TCON - Mode 1 and 2 Programming – Counter Programming – Serial: MAX232 – Baud Rate – SBUF Register – SCON Register – Program to Transfer and Receive Data Serially - Interrupts: Enabling &amp; Disabling Interrupt.</td>
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<td>6</td>
<td>Contemporary Issues - Addressing Modes, Interrupts</td>
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Course Designed By: M. Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore, & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

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*S-Strong; M-Medium; L-Low*
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**Course Objectives:**

The Main Objectives of this course are to:
1. To impart the knowledge on IC fabrication, Timer, PLL, Op-amp., transducers and bio-medical electronic instruments and TV troubleshooting.
2. To enable the students to acquire the knowledge of IC fabrication, and its application in electronic circuits and know the measurement techniques using bio-medical electronic instruments.

**Expected Course Outcomes:**

On the Successful completion of the course, student will be able to:

1. Design the circuits with ICS
2. Design and Analyse circuits with IC 555 and IC 741
3. Gain knowledge about bio-medical electronic instruments
4. Study on pacemaker and ECG
5. Understand Trouble shooting of TV Sections

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

### Part I

#### IC Lab

- 1. Astable Multivibrator using 555
- 2. Monostable Multivibrator using 555
- 3. Inverting and Non Inverting Amplifier
- 4. Adder and Subtractor using IC741
- 5. Instrumentation Amplifier
- 6. Voltage to Current Converter and Current to Voltage Converter
- 7. Wein Bridge Oscillator using IC741
- 8. Square Wave and Triangular Generator
- 9. Schmitt Trigger using IC741

**30 hours**

### Part II

#### TV Lab

- 1. Video IF Section of TV Receiver
- 2. Sync Separator
- 3. Horizontal Section Faults
- 4. Vertical Section Faults
- 5. Tuner Section Faults
- 6. Video Section Faults

**30 hours**

### Part III

#### Medical Electronics Lab

- 1. Pulse Rate Monitor
- 2. Temperature Monitor using AD590
- 3. ECG Measurement
- 4. Notch Filter
- 5. Pacemaker

(Any 16 Experiments)

**30 hours**

**Total Lecture hours** | 90 hours

Course Designed By: R. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.
## Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code: INDUSTRIAL AND POWER ELECTRONICS
Core/Elective/ Supportive: Core – Practical - VII
Pre-requisite: Basic knowledge of Electronic Circuits or permission of instructor
Syllabus Version: 2020-21

Course Objectives:
The main objectives of this course are to:
1. To make the students to design triggering circuits of SCR.
2. To understand the characteristics of power electronic devices.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Design triggering circuits of SCR
2. Understand the characteristics of power electronic devices.
3. Design power Inverter Circuits
4. Design Various Applications of SCR
5. Design Cyclo Converter Circuits

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

Unit I: Industrial And Power Electronics (Any 16 Experiments)
90 Hours

1. Triggering of SCR by R, C and Diac.
2. Design of snubber circuit.
3. Fan regulator using Triac.
4. Thyristor chopper.
5. TRIAC Flasher.
7. Speed control of DC motor using SCR.
8. Automatic street light controller
9. Burglar Alarm
10. Sequencer Circuit.
11. Power Inverter
12. Switching Regulators
13. Automatic Battery Charger
14. Firealarm
15. ON / OFF relay control using opto – coupler
16. Servo stabilizer
17. Layout and Art Work preparation for PCB
18. Etching Drilling and Component mounting of PCB  
21. Phase Control Circuit  
22. Cycloconverter  
23. Thyristor protection circuit

Course Designed By: M. Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.& Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

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*S-Strong; M-Medium; L-Low
Course code - 8051 MICROCONTROLLER LAB
Core/Elective/Supportive: Core –Practical – VIII
Pre-requisite: Digital Electronics 8085 Microprocessor
Syllabus Version 2020-2021

Course Objectives:
The main objectives of this course are to:
1. To introduce the assembly language programming of Microcontroller
2. To develop the student’s Assembly language programming skills and gives practical training of interfacing the peripheral devices with the Microcontroller

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Apply the fundamentals of assembly level programming of microcontroller K3
2. Design and develop program for real time interface K6
3. Understand the array arrangement in memory cells K2
4. Analyze the wave form generation K4
5. Understand the basic principles in the LED and LCD K2

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

8051/ PIC Programming
(Any 16 Experiments)

1. Addition / Subtraction of 8 / 16 bit Data
2. Multiplication / division 8 bit Data
3. Block Data Transfer
4. Smallest / Largest of N Numbers
5. To Arrange in Ascending / Descending Order
6. Sum of N 8 bit Numbers
7. 1’s and 2’s Compliment of an Array (8 / 16bit)
8. UP/DOWN Counter using 7 Segment Display
9. Traffic Light Control Interface
10. Wave Form Generation
11. ADC Interface
12. DAC Interface
13. Stepper Motor Interface
14. Solid State Relay Interface
15. DC Motor Interface
16. Temperature Controller
17. Rolling and Blinking of a Message
18. LCD Interface
19. Frequency Counter
20. Water Level Indicator

Course Designed By: M. Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.
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<td>Pre-requisite</td>
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<td>Syllabus Version</td>
<td>2020-21</td>
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**Course Objectives:**

The main objectives of this course are to:
1. To design and develop Windows-based applications using Visual Basic
2. To Emphasis on the fundamentals of design, development, implementation and documentation
3. To Gain knowledge about to write visual C++programming

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:
1. Explore Visual Basic’s K1
2. Implement syntax rules in Visual Basic programs K2
3. Explain variables and data types used in program development K3
4. Write and apply visual C++ principles and programming techniques K4
5. Write and apply procedures, sub-procedures, and functions to data transfer K5

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

**Unit:1 Visual Basic Overview 7 hours**

**Unit:2 Visual Basic Objects 9 hours**

**Unit:3 Building The User Interface 9 hours**

**Unit:4 Database And Applications 9 hours**
Database Connectivity – Min Database Applications – Embedding Controls in View creating user defined DLL’s – Dialog Based Applications – Dynamic Data Transfer Function – Data Base Management with ODBC – Communicating with other applications – Object Linking and Embedding.

**Unit:5 Design And Development 9 hours**

**Unit:6 Contemporary Issue 2 hours**
SDK Tools, GUI Designs

| Total Lecture hours | 45 hours |

**Text Book(s)**
2 Marion Cottingham, "Visual Basic", Peachpit Press, 1999
3 Kate Gregory, "Using Visual C++", Prentice Hall of India Pvt. Ltd

Reference Books
2 Richard C. Leinecker and Tom Archer, “Visual C++ 6 Programming Bible”, Wiley India Pvt Ltd.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1 https://www.youtube.com/watch?v=5nahqfJTXQs
2 https://www.youtube.com/watch?v=1oGpl6qNKnQ
3 https://www.youtube.com/watch?v=gcFHyVYdeFU

Course Designed By: M. Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
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<th>Course Code</th>
<th>PCB DESIGN AND FABRICATION</th>
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<td>Pre-requisite</td>
<td>Basic knowledge of circuits familiar with the functions and performance of various components and have a good logical thinking ability.</td>
<td>Syllabus Version</td>
<td>2020-2021</td>
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Course Objectives:

The main objectives of this course are to:
1. To inculcate the knowledge of PCB design
2. To impart knowledge on various methods of laying out a PCB
3. To learn how to etch and solder
4. To develop various techniques used for PCB design and fabrication

Expected Course Outcomes:

On the Successful completion of the course, student will be able to:

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<tr>
<td>1</td>
<td>Classify the boards and layers</td>
<td>K1 Remember</td>
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<td>2</td>
<td>Design layout and make use of the photo printing and etching techniques</td>
<td>K2 Understand</td>
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<td>Understand the design rules and automation techniques</td>
<td>K3 Apply</td>
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<td>4</td>
<td>Understand basic concepts of transmission line, crosstalk and thermal issues</td>
<td>K4 Analyze</td>
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<td>5</td>
<td>Design (schematic and layout) PCB for analog circuits, digital circuits and mixed circuits</td>
<td>K5 Evaluate</td>
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K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Unit:1

Types Of PCB

Single sided board – double sided – Multilayer boards – Plated through holes technology – Benefits of Surface Mount Technology (SMT) – Limitation of SMT – Surface mount components: Resistors, Capacitor, Inductor, Diode and IC’s

Unit:2

Layout And Artwork


Unit:3

Laminates And Photo Printing


Unit:4

Etching And Soldering


Unit:5

Design Rules And Automation

Reflection – Crosstalk – Ground and Supply Line Noise – Electromagnetic Interference from Pulse Type EM Fields and Automation – Automated Artwork Drafting – CAD

Unit:6

Contemporary Issues

Page 51 of 81
### Hands on training on PCB design and fabrication

<table>
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<th>Total Lecture hours</th>
<th>90 hours</th>
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### Text Book(s)

2. RS Khandpur, “Printed Circuit Board” by Tata McGraw Hill Education Pvt Ltd., New Delhi

### Reference Books


### Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]

1. [https://www.wikihow.com/Create-Printed-Circuit-Boards](https://www.wikihow.com/Create-Printed-Circuit-Boards)
3. [https://reprap.org/wiki/MakePCBInstructions#Making_PCBs_yourself](https://reprap.org/wiki/MakePCBInstructions#Making_PCBs_yourself)
4. [https://www.youtube.com/watch?v=mv7Y0A9YeUc](https://www.youtube.com/watch?v=mv7Y0A9YeUc)
5. [https://www.youtube.com/watch?v=imQTCW1yWkg](https://www.youtube.com/watch?v=imQTCW1yWkg)

Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty,
C.N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code | 5EB | ADVANCED COMMUNICATION SYSTEMS |  |  |  |  |  
---|---|---|---|---|---|---|---
Core/ Elective/ Supportive: | Elective I B | L | T | P | C |  |  
Pre-requisite | Principles of Communication Systems | Syllabus Version 2020-21 |  |  |  |  |  

**Course Objectives:**

The main objectives of this course are to:

1. To analyze various data communication systems
2. To make the students understand the basic concept in the field of pulse communications and cellular communication systems
3. To know basis of satellite communication and expose the learners to the basics of signal propagation through optical fibres

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Explain the different types of Pulse communication systems  
2. Analyse the performance of modulation techniques  
3. Demonstrate the Satellite and cellular communication system  
4. Analyse the performance of cellular communication systems  
5. Study the principle of optical fibre structure and its various applications

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

### Unit: 1
**Data Communication**  
18 hours

### Unit: 2
**Pulse Communication**  
16 hours

### Unit: 3
**Satellite Communication**  
18 hours
- **Inside Satellite:** Transponder – Antenna System – Power Package and Station Keeping – Forms of Modulation – Free Path Space Losses – Ground Station – Aligning the Satellite Dish

### Unit: 4
**Cellular Communication System**  
18 hours
- Introduction Cellular Mobile System – Basic Cellular System – Operational Cellular System – Maximum number of Calls per Cell – Maximum Number of Frequency Channel - Concept of Frequency Channel Cell Splitting – Permanent Splitting – Real Time Splitting – Frequency Management – Channel Assignment

### Unit: 5
**Optical Communication**  
18 hours
- Introduction to Optical Fibers – Optical Fiber Structure – Numerical aperture – Propagation of Light Rays through it – Applications of Optical Fiber (Video link, Satellite link, Computer link, Communicating Antenna Television link)

### Unit: 6
**Contemporary Issues**  
2 hours
- RS232 Cable, Optical fibre
<table>
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<tr>
<th>Total Lecture hours</th>
<th>90 hours</th>
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</table>

**Text Book(s)**


**Reference Books**

1. *Data communications and networking* (sie) By behrouz a. Forouzan (author)


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

1. [https://nptel.ac.in/courses/108/101/108101113/](https://nptel.ac.in/courses/108/101/108101113/)

2. [https://nptel.ac.in/courses/117/105/117105143/](https://nptel.ac.in/courses/117/105/117105143/)

3. [https://nptel.ac.in/courses/106/106/106106167/](https://nptel.ac.in/courses/106/106/106106167/)

Course Designed By: P.Manikantan, Assistant Professor, Government Arts College, Ooty.& Dr.N Om Muruga, Assistant Professor, Government Arts College, Ooty, C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low*
### Course Objectives:

The Main Objectives of this course are to:

1. To enable the students to learn about IoT and also to understand the concept of embedded devices and Interfacing sensors.

### Expected Course Outcomes:

On the Successful completion of the course, student will be able to:

<table>
<thead>
<tr>
<th></th>
<th>Study the concept of basic IoT</th>
<th>K1</th>
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<tbody>
<tr>
<td>2</td>
<td>Familiarize the principle of connected devices</td>
<td>K2</td>
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<tr>
<td>3</td>
<td>Gain knowledge about embedded devices</td>
<td>K3</td>
</tr>
<tr>
<td>4</td>
<td>Analyze different sensor Interface technology</td>
<td>K4</td>
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<td>5</td>
<td>Analyze the IoT applications</td>
<td>K4</td>
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</table>

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

### Syllabus

<table>
<thead>
<tr>
<th>Unit</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>1</td>
<td>IOT Fundamentals</td>
<td>16 hours</td>
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<tr>
<td>2</td>
<td>Design Principles For Connected Devices</td>
<td>18 hours</td>
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<tr>
<td>3</td>
<td>Programming Fundamentals With C Using Arduino IDE</td>
<td>18 hours</td>
</tr>
<tr>
<td>4</td>
<td>Sensors And Actuators</td>
<td>18 hours</td>
</tr>
<tr>
<td>5</td>
<td>Sending Sensor Data Over Internet</td>
<td>18 hours</td>
</tr>
<tr>
<td>6</td>
<td>Contemporary Issues</td>
<td>2 hours</td>
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</table>

**Total Lecture hours:** 90 Hours

### Text Book(s)


### Reference Books

## Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]

1. [https://nptel.ac.in/courses/106/105/106105166/Introduction to IoT Part I – Lecture 1](https://nptel.ac.in/courses/106/105/106105166/Introduction to IoT Part I – Lecture 1)
2. [https://ocw.cs.pub.ro/courses/iot/courses/02Electronics for Internet of Things – Lecture II](https://ocw.cs.pub.ro/courses/iot/courses/02)
3. [https://nptel.ac.in/courses/106105166/](https://nptel.ac.in/courses/106105166/) Introduction to Arduino – I – Lecture 22

**Course Designed By:**
R. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty,
C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

### Mapping with Programme Outcomes

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<tr>
<th>COs</th>
<th>PO1</th>
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*S-Strong; M-Medium; L-Low*
Course Code: 5ED  
ADVANCED COMPUTER ARCHITECTURE

Core/Elective/Supportive: ELECTIVE I-D  
Pre-requisite: Basic Computer Architecture  
Syllabus version: 2020-21

Course Objectives:
The objectives of this course are:
1. To provide knowledge on fundamentals of Advanced Computer design.
2. To understand the concept of instruction level parallelism, pipelining and memory hierarchy associated with it.
3. To enhance the knowledge on advanced processors.

Expected Course Outcomes:
On successful completion of the course, student will be able to:
1. Gain the knowledge on advanced computer design principles.  
2. Able to analyze the parallel computer model with instruction level parallelism.  
3. Gain the knowledge on pipelining.  
4. Understand the memory hierarchy in developing an advanced computer.  
5. Apply the multiprocessor concepts in advanced processors.

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

Unit: 1  
Principles Of Computer Design  
16 Hours

Unit: 2  
Instruction Level Parallelism  
18 Hours

Unit: 3  
Pipelining  
18 Hours
Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.

Unit: 4  
Memory Hierarchy  
18 Hours
Introduction- the Fundamentals of Caches-Reducing Cache Misses and Miss Penalty - Reducing Hit Time-Main Memory-Virtual Memory-Issues in Memory Hierarchy design.

Unit: 5  
Principles Of Advanced Processor  
18 Hours
Advanced processor technology, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors

Unit: 6  
Contemporary Issues  
2 hours
Bus architecture, RISC Scalar Processor

Total Lecture Hours: 90 Hours

Text Books

Reference Books

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1. https://nptel.ac.in/courses/106/103/106103206/
2. https://www.youtube.com/watch?v=v7iefsovo9M
3. https://www.youtube.com/watch?v=L9X7XXfHYdU&list=PLxCzCOw7aiHMonh3G6QNKq53C6oNXGrX

Course Designed by:
Dr. S. Vijayakumar, Associate Professor in ECE, Sreenivasa Institute of Technology and Management Studies, Autonomous, Chittoor.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty,
C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

Mapping with Program Outcomes

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*S-Strong; M-Medium; L-Low
Course Code: 5EE
Course Title: MODERN TELEVISION ENGINEERING
L T P C
Core/Elective/Supportive: Elective II –E
Pre-Requisite: Basic Electronics
Syllabus Version: 2020-21

Course Objectives:
The Main Objectives of this course are to:
1. To design of the subject is to impart the knowledge on Television standards, receiver section, and sync separator color television with advanced techniques.
2. To acquire the knowledge about color television and its recent developments

Expected Course Outcomes:
On the Successful completion of the course, student will be able to:
1. Acquire knowledge on television standards
2. Study on Transmitter and receiver standards
3. Understand the Picture tube of color TV
4. Knowledge on performance of Color TV and other modern devices
5. Familiarize Advanced TV Systems

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

Unit: 1
Fundamentals Of Television

Unit: 2
Monochrome Television Transmitter And Receiver

Unit: 3
Essentials Of Colour Television

Unit: 4
Colour Television Systems
NTSC colour TV systems - SECAM system - PAL colour TV systems - Cancellation of phase errors - Chromo signal amplifier - separation of U and V signals - colour burst separation-Burst phase Discriminator - ACC amplifier - Reference Oscillator - Ident and colour killer circuits - U and V demodulators - Sound in TV.

Unit: 5
Advanced Television Systems
Satellite TV technology - Geo Stationary Satellites - Domestic Broadcast System – Cable TV - Cable Signal Sources - Cable Signal Processing, Distribution & Scrambling- Video Recording - Video Home Formats - DVD Players - Digital television - Transmission and reception – Projection television - Flat panel display TV receivers - LCD and Plasma screen receivers -3D TV-EDT.
### Unit 6: Contemporary Issues

| TV transmission, 3D TV |

| Total Lecture hours | 90 hours |

### Text Book(s)


### Reference Books


### Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]

1. [https://nptel.ac.in/courses/117/102/117102059/Introduction to communication](https://nptel.ac.in/courses/117/102/117102059/Introduction to communication)

2. [https://www.youtube.com/watch?reload=9&v=EAybxdgS2T4 TV Transmission](https://www.youtube.com/watch?reload=9&v=EAybxdgS2T4 TV Transmission)

### Course Designed By:

R.A. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore.

Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.

C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course Code: 5EF

MICROWAVE AND FIBER OPTIC COMMUNICATION

L T P C
6 0 0 4

Core/Elective/ Supportive: Elective II-F

Pre-requisite: Basic Electronics and Principles of Communication systems

Course Objectives:
The Main Objectives of this course are to:
1. To inculcate the principle of microwave theory and working of wave guides
2. To know the operation and applications of fibre optic communication
3. To impart knowledge on the working principle of microwave amplifiers and oscillators

Expected Course Outcomes:
On the Successful completion of the course, student will be able to:
1. Understand various parameters of waveguide and use of component as per applications. K1
2. Analyse and find applications and limitations of microwave Semiconductor devices. K4
3. Discriminate different Radars, find applications and use of its supporting systems K5
4. Understand The structures of Fiber Optics and types K2
5. Apply Fiber optics in Sensors Application and in Network Design K3

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

Unit: 1 Introduction To Microwaves 16 Hours

Unit: 2 Microwave Amplifiers And Oscillators 18 Hours
Microwave Tubes; -Two Cavity Klystron – Multi cavity Klystron – Reflex Klystron – Traveling Wave Tube (TWT) – Backward Wave Oscillator (BWO) – Magnetron – Applications.

Unit: 3 Microwave Devices & Radar 18 Hours

Unit: 4 Optical Fiber Communication 18 Hours

Unit: 5 Fiber Optics Sensors And Applications 18 Hours

Unit: 6 Contemporary Issues 2 hours
Fibre Optics, Fibre Optic Sensor, Applications Of Fibre Optics

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<tr>
<th>Text Book(s)</th>
<th>Total Lecture hours</th>
<th>90 Hours</th>
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<tr>
<td>1. <a href="https://nptel.ac.in/courses/108/103/108103141/Introduction">https://nptel.ac.in/courses/108/103/108103141/Introduction</a> to microwave Engineering</td>
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<td>2. <a href="https://www.classcentral.com/course/swayam-microwave-engineering-14199Microwave">https://www.classcentral.com/course/swayam-microwave-engineering-14199Microwave</a> engineering swayam course</td>
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</table>

Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College, Coimbatore.& Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.

| Mapping with Programme Outcomes COs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 P10 |
|-----------------------------------|---------------|----------|
| CO1                               | S             | S        | M       | M       | M       | M       | S       | M       | M       | S       |
| CO2                               | S             | M        | M       | M       | M       | M       | S       | L       | L       | L       |
| CO3                               | S             | M        | S       | M       | M       | L       | L       | L       | M       | M       |
| CO4                               | S             | S        | M       | S       | S       | S       | L       | L       | M       | M       |
| CO5                               | S             | S        | S       | S       | M       | L       | M       | M       | S       | M       |

*S-Strong; M-Medium; L-Low
Course code: 5EG
Core/Elective/ Supportive: Elective-II –G

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<tr>
<th>Pre-requisite</th>
<th>Basic Electronics</th>
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<tr>
<th>Course Objectives:</th>
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<tbody>
<tr>
<td>The main objectives of this course are to:</td>
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<tr>
<td>1. To understand the concepts of Automotive Electronics and its evolution and Trends automotive systems &amp; subsystems overview.</td>
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<tr>
<td>2. To understand sensors and sensor monitoring mechanisms aligned to automotive Systems, different signal conditioning techniques, interfacing techniques and actuator</td>
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<tr>
<td>3. To understand, design and model various automotive control systems using Model based development technique.</td>
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<th>Expected Course Outcomes:</th>
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<tr>
<td>On the successful completion of the course, student will be able to:</td>
</tr>
<tr>
<td>1. Obtain an overview of automotive components and subsystems. K2</td>
</tr>
<tr>
<td>2. Interface automotive sensors and actuators with microcontrollers K4</td>
</tr>
<tr>
<td>3. Understand the design cycles, communication protocols and safety systems employed in today’s automotive industry. K2</td>
</tr>
<tr>
<td>4. Understand the engine management systems K2</td>
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<tr>
<td>5. Analyse Engine Management System K4</td>
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| K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 – Create |

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<tr>
<th>Unit:1</th>
<th>Introduction</th>
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<th>Unit:3</th>
<th>Instrumentation Systems</th>
<th>18 hours</th>
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<tr>
<td>Introduction to Instrumentation Systems, Various Sensors Used for Different Parameters, Sensing Driver Instrumentation Systems, Vehicle Condition Monitoring Trip Computer, Different Types of Visual Display</td>
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<th>Unit:4</th>
<th>Electronic Control Of Braking And Traction</th>
<th>18 hours</th>
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<td>Introduction and Description Control Elements and Control Methodology, Electronic Control of Automatic Transmission: Introduction and Description Control Of Gear Shift and Torque Converter Lockup, Electric Power Steering, Electronic Clutch</td>
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<th>Unit:5</th>
<th>Engine Management Systems</th>
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### Unit: 6
**Contemporary Issues**
2 hours
Communication: Advantages and Applications, DTH (Direct To Home)

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<tr>
<th>Text Book(s)</th>
<th>Total Lecture hours</th>
<th>90 hours</th>
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<tr>
<td>1 [TOM DENTON, <em>Automobile Electrical and Electronic Systems</em>, Edward Arnold pb., 1995]</td>
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#### Reference Books
1 DON KNOWLES, *Automotive Electronic and Computer controlled Ignition Systems*, Don

#### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1 [https://nptel.ac.in/courses/107/103/107103084/](https://nptel.ac.in/courses/107/103/107103084/)
2 [https://nptel.ac.in/courses/107/106/107106088/](https://nptel.ac.in/courses/107/106/107106088/)
3 [https://www.youtube.com/watch?v=vJ4EfyGXehg](https://www.youtube.com/watch?v=vJ4EfyGXehg)
4 [https://www.youtube.com/watch?v=BG4N2dBgJrQ](https://www.youtube.com/watch?v=BG4N2dBgJrQ)

Course Designed By:
K. Manikantan, Assistant professor, Government Arts College, Ooty.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.
C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

#### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course Code | 5EH | SATELLITE COMMUNICATIONS | L | T | P | C
--- | --- | --- | --- | --- | --- | ---
Core/Elective/Supportive: | ELECTIVE-II-H | 6 | 0 | 0 | 4 |
Pre-requisite: | PRINCIPLES OF COMMUNICATION | Syllabus version | 2020-21

Course Objectives:
The objectives of this course are:
1. To provide knowledge on fundamentals of Advanced Computer design.
2. To understand the concept of instruction level parallelism, pipelining and memory hierarchy associated with it.
3. To enhance the knowledge on advanced processors.

Expected Course Outcomes:
On successful completion of the course, student will be able to:
1. Gain the knowledge on advanced computer design principles. K1
2. Able to analyze the parallel computer model with instruction level parallelism. K4
3. Gain the knowledge on pipelining. K2
4. Understand the memory hierarchy in developing an advanced computer. K2
5. Apply the multiprocessor concepts in advanced processors. K3

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

Unit: 1 | Satellite Systems – Overview | 18 Hours
Introduction- Basic concepts of Satellite communications- Frequency allocations for satellite systems. Advantages and applications of satellite communications over other communications

Unit: 2 | Orbital Aspects Of Satellite Systems | 18 Hours

Unit: 3 | The Space Segment | 16 Hours

Unit: 4 | Satellite Link Design | 18 Hours
Basic transmission theory- system noise temperature and G/T ratio- Design of down links- up link design- design of satellite link for specified C/N.

Unit: 5 | Applications Of Satellite Systems | 18 Hours
INTELSAT Series- INSAT- VSAT- GSM- GPS- INMARSAT-Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH)- Digital audio broadcast (DAB)- World space services- Business TV(BTV)- GRAMSAT.

Unit: 6 | Contemporary Issues | 2 hours
Satellites and its communication

Total Lecture Hours | 90 Hours

Text Books
## Reference Books


## Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. [https://nptel.ac.in/courses/117/105/117105131/](https://nptel.ac.in/courses/117/105/117105131/)
2. [https://www.youtube.com/watch?v=hXa3bTcIGPU](https://www.youtube.com/watch?v=hXa3bTcIGPU)
3. [https://www.youtube.com/watch?v=BvjlBpP4zU8](https://www.youtube.com/watch?v=BvjlBpP4zU8)

## Course Designed by:

Dr. S. Vijayakumar, Associate Professor in ECE, Sreenivasa Institute of Technology and Management Studies, Autonomous, Chittoor.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty,
C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

## Mapping with Program Outcomes

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*S-Strong; M-Medium; L-Low*
Sixth Semester
Course code: 63A
Core/Elective/Supportive: DESIGN WITH PIC MICROCONTROLLER
Core paper X

Pre-requisite: Students having knowledge of electronics fundamentals coupled with some programming experience are the ideal participants for this course.

Course Objectives:
The main objectives of this course are to:
1. To Study the architecture and addressing modes of PIC Microcontroller
2. To know various peripheral devices and to interface them with PIC Microcontroller

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Understand the evolution in microcontroller technology K1
2. Describe Harvard architecture model and programming techniques K2
3. Describe the operation and need for interrupts and timers K3
4. List out various operators in modelling the design units K4
5. Apply the concept for I/O port expansion K5

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

Unit:1 CPU Architecture And Instruction Set 15 hours

Unit:2 Loop Time Subroutine, Timer 2 And Interrupts 13 hours
Timer 2 Use – Interrupt Logic – Timer 2 Scalar Initialization – Interrupt Service - Interrupt Service Routine – Loop Time Subroutine

Unit:3 External Interrupts And Timers 15 hours
RB0/INT External Interrupt Input – Timer 0 – Compare Mode – Capture Mode – Timer1/CCP Programmable Period Scalar – Timer1 External Event Counter – Timer1 and Sleep Mode – Pulse Width Modulated Outputs – Port B Change Interrupts

Unit:4 I/O Port Expansion 15 hours
Synchronous Serial Port Module – Serial Peripheral Interface – Output Port Expansion – Input Port Expansion – LCD Display

Unit:5 I2C Bus For Peripheral Chip Access 15 hours

Unit:6 Contemporary Issues 2 hours
Workshop on PIC microcontroller

Total Lecture hours 75 hours

Text Book(s)
1 John B. Peatman, “Design with PIC Microcontrollers”, Pearson Education Publishing

Reference Books
1 Muhammad Ali Mazidi, Rolin D. McKinlay, and Danny Causey, “The PIC Microcontroller...
and Embedded systems – Using Assembly and C for PIC18,” Prentice Hall, 2007

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1. https://www.youtube.com/watch?v=nLiBssKCN2w
2. https://www.youtube.com/watch?v=VEAYB1A9SiA
3. https://www.youtube.com/watch?v=aSsnLyKtIAU

Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.&
Dr.N Om Muruga, Assistant Professor, Government Arts College, Ooty.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
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<td>Pre-requisite</td>
<td>Basic computer skills and familiarity with Microsoft Windows.</td>
<td>Syllabus Version</td>
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**Course Objectives:**

**The main objectives of this course are to:**

1. Learn to design and develop Windows-based business applications using Visual Basic
2. Emphasis on the fundamentals of structured design, development, implementation, and documentation

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Implement syntax rules in Visual Basic programs
2. Explain variables and data types used in program development
3. Write visual C++ principles and programming techniques
4. Design Application Editor and Control
5. Design VB application Link

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

"Visual Programming (Any 8 Experiments)"

1. Building Simple Applications using Basic Tools
2. Working with Intrinsic Control and Active X controls
3. Create an Application with Multiple Forms and Dialogs
4. Write a VB Program to Design an e-mail Registration Form
5. Create an Application with Menu Editor
6. Create an Application with DAO Controls
7. Create an Application using Common Dialogs
8. Write a program for Drag and Drop Events
9. Create a Database for library management using ADD Controls
10. Creating an Application using Active X control
11. Create a Scientific Calculator in VB
12. Develop a VB application to either link or Embed MS Word Document to an OLE Control
13. Display Student Information using Grid Control
14. Create an Application using RDO Controls
15. Develop an Application to perform the following operation in the Employee Table using DAO
   i) Add a new Record.
   ii) Delete a Record.
   iii) Modify a Record.

Course Designed By: M. Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.
### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Course code | 6EI | INDUSTRIAL AND POWER ELECTRONICS | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ Supportive | Elective-III –I | 5 | 0 | 0 | 4 |
Pre-requisite | Basic knowledge of Electronic Circuits or permission of instructor | Syllabus Version | 2020-21 |

Course Objectives:
The main objectives of this course are to:
1. To presents the principles and applications of industrial and power electronics
2. To enable the students to learn and design industrial and power electronic circuits
3. To develop the circuits designing skills related to the power electronics and understood the concept of industrial electronics

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Developed the Circuit designing skills power electronics. Understood the concept industrial electronics system design. K1
2. Acquire knowledge about fundamental concepts and techniques used in power electronics. K2
3. Ability to analyze various single phase and three phase power converter circuits and understand their applications. K3
4. Foster ability to identify basic requirements for power electronics based design application. K4
5. To develop skills to build, and troubleshoot power electronics circuits. K5

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

Unit:1 | Thyristors | 15 hours
---|---|---

Unit:2 | Turn ON/OFF Mechanisms | 15 hours
---|---|---

Unit:3 | Controlled Rectifiers & Inverters | 15 hours
---|---|---

Unit:4 | Cyclo Converters And Choppers | 15 hours
---|---|---
Introduction – Single Phase Centre Tapped Step-Up Cyclo Converter – Single Phase Centre Tapped Step- Down Cyclo Converter – Three Phase to Single Phase Cyclo converter—Three Phase To Three Phase Cyclo Converters—Step-up and Step-down Choppers

Unit:5 | Applications | 15 hours
---|---|---
### Unit: 6

Contemporary Issues

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<td><strong>Total Lecture hours</strong></td>
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| 75 hours |

### Text Book(s)


### Reference Books


### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. https://www.youtube.com/watch?v=1Auay7ja2oY
2. https://www.youtube.com/watch?v=0qnLQVFaqY1
3. https://www.youtube.com/watch?v=naxnRkOfh2Q

### Course Designed By:

- M. Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.
- Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty.
- C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
The Main Objectives of this course are to:
1. To familiarize the students with the applications of Robots
2. To know about the sensors, actuators used in Robots designing

Expected Course Outcomes:
On the Successful completion of the course, student will be able to:
1. Describe the working concept and types of Robots
2. Apply the knowledge of types of sensors and actuators
3. Programming Languages for Robot design models
4. Understand the concept of Mobile Robotic Locomotion
5. Study the various applications of Robots

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

Unit:1 Fundamentals Of Robots

Unit:2 Robot End Effectors

Unit:3 Sensors In Robots

Unit:4 Mobile Robotics Locomotion
Introduction Key Uses for Locomotion - Leg Mobile Robots - Leg Configuration and Assembly - Consideration for Dynamics - Types of Legged Robot Locomotion - One Leg; Two Legs Biped - Four Legs (Quadruped) - Six Legs (Hexapod) - Concept of Wheeled Mobile Robots.

Unit:5 Robotic Applications

Unit:6 Contemporary Issues
Seminar on Robotics and its applications

Total Lecture hours 75 hours
Text Book(s)


Reference Books


Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]

1. https://nptel.ac.in/courses/112/105/112105249/Introduction to Robots


Course Designed By:

R. Archana, Assistant professor, Nehru Arts and Science College, Coimbatore, & Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty, C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
**Course code** | **6EK** | **PROGRAMMABLE LOGIC CONTROL** | **L** | **T** | **P** | **C**
---|---|---|---|---|---|---
**Core/Elective/ Supportive:** | Elective III – K | 5 | 0 | 0 | 4 | 2020-21
**Pre-requisite** | Digital Electronics and computer Architecture and Organization | Syllabus Version | 2020-21

### Course Objectives:

The main objectives of this course are to:

1. To provide knowledge levels needed for PLC programming and operating input and output modules.
2. To train the students to create ladder diagrams from process control description and understand various types of PLC registers.
3. Apply PLC Timers and Counters for the control of industrial processes, PLC functions and Data Handling Functions.

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Gain knowledge on Programmable Logic Controllers and will understand different type Devices to which PLC input and output modules
2. Gain knowledge about various types of PLC registers, ladder diagrams from process control descriptions
3. Develop a coil and contact control system and analog PLC operations
4. Apply time delay on PLC operations
5. Able to use different types PLC functions, data handling functions and its various

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

**Unit:1** | Programmable Logic | 13 hours
---|---|---
Programmable Logic – Introduction - Programmable Logic Structures - Programmable Logic Arrays (PLAS), Programmable Array Logic (Pals), Programmable Gate Arrays (PGAS), Field Programmable Gate Arrays(FPGAS) - Sequential Network Design With Programmable Logic Devices (PLDs) -Design of Sequential Networks Using ROMs and Flash -Traffic Light Controller Using PAL

**Unit:2** | Programmable Logic Controllers | 15 hours
---|---|---
Programmable Logic Controllers (PLCS) - Introduction Parts Of PLC - Principles of Operation-PLC Sizes - PLC Hardware Components - I/O Section - Analog I/O Section - Analog I/O Modules, Digital I/O Modules CPU - Processor Memory Module - Programming Devices -Diagnostics of PLCS with Computers

**Unit:3** | Basics Of PLC Programming | 15 hours
---|---|---

**Unit:4** | PLC Instructions | 15 hours
---|---|---
Timer Instructions ON DELAY Timer and OFF DELAY Timer - Counter Instructions - Up/Down Counters -Timer and Counter Applications - Program Control Instructions - Data Manipulating Instructions - Math Instructions

**Unit:5** | Applications Of PLC | 15 hours
### Applications of PLC - Simple Materials Handling Applications - Automatic Control of Warehouse Door - Automatic Lubricating Oil Supplier Conveyor Belt - Motor Control Automatic Car Washing Machine - Bottle Label Detection - Process Control Application

<table>
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<tr>
<th>Unit:6</th>
<th>Contemporary Issues</th>
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<tr>
<td>3. Siemens “PLC Handbook”.</td>
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### Reference Books


### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. [https://unitronicsplc.com/what-is-plc-programmable-logic-controller/](https://unitronicsplc.com/what-is-plc-programmable-logic-controller/)

### Course Designed By:

P.Manikantan, Assistant Professor, Government Arts College, Ooty.&
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty,
C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
**Course Code**: 6EL  
**VLSI DESIGN**

<table>
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<tr>
<th>Core/Elective/Supportive:</th>
<th>ELECTIVE – III-L</th>
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<td>Pre-requisite:</td>
<td>Digital Principles and Applications</td>
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**Course Objectives:**

**The objectives of this course are:**

1. To provide knowledge on Fabrication Process of NMOS, PMOS, CMOS, and BICMOS, Super integration concepts.
2. To develop the skill to analyze the electrical properties of MOS transistor, design stick diagrams and layout diagrams for MOS transistors, contacts and wires.
3. To investigate the effect of floor planning, placement, routing and power delay estimation in physical design of digital circuits and memory design.
4. To apply the concept of Combinational and Sequential Circuit Testing.

**Expected Course Outcomes:**

On successful completion of the course, student will be able to:

1. Gain the knowledge on fabrication principles.  
2. Able to analyze the electrical properties of MOS transistors.  
3. Apply the appropriate layout design rule to create a VLSI layout for a design.  
4. Understand the physical design steps and gain the knowledge on types of VLSI design styles.  
5. Gain the knowledge, analyze and apply test principles to evaluate the VLSI designs.

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

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<thead>
<tr>
<th>Unit: 1</th>
<th>VLSI Technology</th>
<th>15 Hours</th>
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<th>Unit: 2</th>
<th>Electrical Properties Of MOS Devices</th>
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<tr>
<td>Drain to source current (I_{ds}) versus Drain to source voltage (V_{ds}) relationships – MOS transistor threshold voltage (V_t) – MOS transistor trans-conductance g_m and output conductance g_{ds} – figure of merit (\omega_0) – pass transistor- pull – up to pull – down ratio.</td>
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<th>Unit: 3</th>
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<th>VLSI Physical Design And Styles</th>
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<th>Testing Of VLSI Circuits</th>
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<th>Unit: 6</th>
<th>Contemporary Issues</th>
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<tr>
<td>Full Custom, Semi Custom, CMOS Fabrication</td>
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| Total Lecture Hours | 75 Hours |
Text Books


Reference Books


Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. https://nptel.ac.in/courses/117/101/117101058/
2. https://www.youtube.com/watch?v=9SnR3M3CIm4
3. https://www.youtube.com/watch?v=Y8FvvzcocT4

Course Designed by:
Dr. S. Vijayakumar, Associate Professor in ECE, Sreenivasa Institute of Technology and Management Studies, Autonomous, Chittoor.
Dr. N Om Muruga, Assistant Professor, Government Arts College, Ooty,
C. N Omprakash Anand, Assistant Professor, Government Arts College, Ooty.

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*S-Strong; M-Medium; L-Low
Annexure
Bharathiar University : Coimbatore 641046

Department of Electronics

Mission

- To develop appropriate facilities for promoting research activities
- To inculcate leadership qualities among students for self and societal growth
- To nurture students on emerging technologies for serving industry needs through industry-institute interface
- To enrich teaching-learning process by transforming young minds to be resourceful engineers