B. Sc. Electronics and Communication Systems

Syllabus

AFFILIATED COLLEGES

Program Code: 26B

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>Program Educational Objectives (PEOs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The <strong>B. Sc. ELECTRONICS AND COMMUNICATION SYSTEMS</strong> program describe accomplishments that graduates are expected to attain within five to seven years after graduation</td>
</tr>
</tbody>
</table>

| PEO1 | 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. |
| PEO2 | Impart analytic and thinking skills to develop initiatives and innovative ideas for R&D, Industry and societal requirements. |
| PEO3 | 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. |
| PEO4 | 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. |
| PEO5 | Motivate graduates to become good human beings and responsible citizens for the overall welfare of the society. |
| PEO6 | Develop attitude in lifelong learning, applying and adapting new ideas and technologies as their field evolves. |
| PEO7 | To prepare graduates who will have knowledge, ability and courage to pursue higher studies and research. |
Program Specific Outcomes (PSOs)

<table>
<thead>
<tr>
<th>PSO</th>
<th>Description</th>
</tr>
</thead>
<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 analyses 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>
</tr>
<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>
</tr>
</tbody>
</table>

After the successful completion of B.Sc. ELECTRONICS AND COMMUNICATION SYSTEMS program, the students are expected to
<table>
<thead>
<tr>
<th>Program Outcomes (POs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On successful completion of the B.Sc. ELECTRONICS AND COMMUNICATION SYSTEMS program</strong></td>
</tr>
<tr>
<td><strong>PO1</strong> Engineering knowledge: Apply the knowledge of mathematics, Science, Engineering fundamentals, and an engineering specialization to the solution of complex engineering problems</td>
</tr>
<tr>
<td><strong>PO2</strong> Problem analysis: Identify, formulate, review research literature and analyses complex engineering problems reaching substantiated conclusion using principles of mathematics and Engineering sciences</td>
</tr>
<tr>
<td><strong>PO3</strong> Design/Development of solutions: 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>
</tr>
<tr>
<td><strong>PO4</strong> Conduct investigation of complex problems: 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>
</tr>
<tr>
<td><strong>PO5</strong> Modern tool usage: 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>
</tr>
<tr>
<td><strong>PO6</strong> The engineer and society: 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>
</tr>
<tr>
<td><strong>PO7</strong> Environment and Sustainability: Understand the impact of the professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.</td>
</tr>
<tr>
<td><strong>PO8</strong> Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</td>
</tr>
<tr>
<td><strong>PO9</strong> Individual and team work: Function effectively as an individual, as a member or leader in diverse teams, and in multidisciplinary settings.</td>
</tr>
<tr>
<td><strong>PO10</strong> Life-Long learning: 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>
</tr>
</tbody>
</table>
## BHARATHIAR UNIVERSITY: COIMBATORE 641 046
### B.Sc. Electronics and Communication Systems Curriculum
*(For the students admitted during the academic year 2020 – 21 onwards)*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title of the Course</th>
<th>Credits</th>
<th>Hours</th>
<th>Maximum Marks</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
</tr>
<tr>
<td><strong>FIRST SEMESTER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11T</td>
<td>Language – I</td>
<td>4</td>
<td>6</td>
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<tr>
<td>12E</td>
<td>English – I</td>
<td>4</td>
<td>6</td>
<td>-</td>
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<tr>
<td>13A</td>
<td>Core Paper I: Basic Electronics</td>
<td>4</td>
<td>5</td>
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<tr>
<td></td>
<td>Core Practical I: Basic Electronics</td>
<td></td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Core Practical II: Semiconductor</td>
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<td>-</td>
<td>3</td>
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<tr>
<td></td>
<td>Devices Lab</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>1AA</td>
<td>Allied I Mathematics – I</td>
<td>4</td>
<td>5</td>
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<tr>
<td>1FA</td>
<td>Environmental Studies #</td>
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<td><strong>Total</strong></td>
<td>18</td>
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<p>| <strong>SECOND SEMESTER</strong> |                                      |         |       |              |     |     |       |
| 21T         | Language – II                        | 4       | 6    | -            | 25  | 75  | 100   |
| 22E         | English – II                         | 4       | 6    | -            | 25  | 75  | 100   |
| 23A         | Core Paper II: Semiconductor Devices| 4       | 5    | -            | 25  | 75  | 100   |
| 23P         | Core Practical I: Basic Electronics  | 4       | -    | 3            | 40  | 60  | 100   |
| 23Q         | Core Practical II: Semiconductor     | 4       | -    | 3            | 40  | 60  | 100   |
|             | Devices Lab                          |         | -    | -            | -   | -   | -     |
| 2AA         | Allied II Mathematics – II           | 4       | 5    | -            | 25  | 75  | 100   |
| 2FB         | Value Education – Human Rights #     | 2       | 2    | -            | -   | 50  | 50    |</p>
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<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
<th>Hours</th>
<th>Theory</th>
<th>Practical</th>
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<tr>
<td>Swatch Bharat- Summer internship **</td>
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<td>180</td>
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**THIRD SEMESTER**

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<th>Practical</th>
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<tr>
<td>33A</td>
<td><strong>Core Paper III:</strong> Principles of Communication Systems</td>
<td>4</td>
<td>4</td>
<td>25</td>
<td>75</td>
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<tr>
<td>33B</td>
<td><strong>Core Paper IV:</strong> Digital Principles and Applications</td>
<td>4</td>
<td>4</td>
<td>25</td>
<td>75</td>
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<tr>
<td>33C</td>
<td><strong>Core Paper V:</strong> Electronic Circuits</td>
<td>4</td>
<td>4</td>
<td>25</td>
<td>75</td>
<td>100</td>
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<tr>
<td></td>
<td><strong>Core Practical III:</strong> Digital Electronic lab</td>
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<td><strong>Core Practical IV:</strong> Electronic circuits, Radio, TV and Instrumentation lab</td>
<td>-</td>
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<td>3</td>
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<tr>
<td>3AD</td>
<td><strong>Allied : III</strong> Programming in C</td>
<td>3</td>
<td>4</td>
<td>20</td>
<td>55</td>
<td>75</td>
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<td><strong>Core Practical V:</strong> Computer Programming Lab</td>
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<td>3ZA</td>
<td><strong>Skill based Subject I:</strong> Computer Architecture and organization</td>
<td>3</td>
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<td>20</td>
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<td>3FB/3FC</td>
<td>Tamil @ / Advanced Tamil#(OR) Non-major elective - I (Yoga for Human excellence # Womens Rights#)</td>
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<td><strong>Total</strong></td>
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<td>115</td>
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**FOURTH SEMESTER**

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<th>Hours</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>43A</td>
<td><strong>Core Paper VI:</strong> IC’s and Instrumentation</td>
<td>4</td>
<td>4</td>
<td>25</td>
<td>75</td>
<td>100</td>
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<tr>
<td>43B</td>
<td><strong>Core Paper VII:</strong> Modern Television</td>
<td>4</td>
<td>4</td>
<td>25</td>
<td>75</td>
<td>100</td>
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<tr>
<td></td>
<td>Engineering</td>
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<td>------------------------------------------------------------------------------</td>
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<td></td>
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</tbody>
</table>
| 43C    | **Core Paper III**  
Digital and cellular communication | 4 | 4 | - | 25 | 75 | 100 |
| 43P    | **Core Practical III**  
Digital Electronics Lab | 4 | - | 3 | 40 | 60 | 100 |
| 43Q    | **Core Practical IV**  
Electronic circuits, Radio, TV and Instrumentation lab | 4 | - | 3 | 40 | 60 | 100 |
| 4AD    | **Allied: IV**  
Object Oriented Programming using C++ | 3 | 4 | - | 20 | 55 | 75 |
| 43R    | **Core Practical V**  
Computer Programming Lab | 2 | - | 3 | 20 | 30 | 50 |
| 4ZB    | **Skill based Subject II**  
Visual Programming | 3 | 3 | - | 20 | 55 | 75 |
| 4FB/4FE| Tamil /Advanced Tamil # (OR)  
Non-major elective -II (General Awareness #) | 2 | 2 | - | - | 50 | 50 |
|        | **Total** | 30 | - | - | 215 | 535 | 750 |

**FIFTH SEMESTER**

<table>
<thead>
<tr>
<th></th>
<th>Engineering</th>
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</table>
| 53A    | **Core Paper IX**  
8085 microprocessor and 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**  
Microprocessor and microcontroller lab | - | - | 3 | - | - | - |
| -- | Core Practical VII: Industrial and Power Electronics Lab | - | - | 3 | - | - | - |
| -- | Core Practical VIII: Electronics communication lab | - | - | 3 | - | - | - |
| 5ZC | Skill based subject – III Internet and java programming | 3 | 3 | - | 20 | 55 | 75 |
|      | **Total** | 15 | _ | _ | 95 | 280 | 375 |

**SIXTH SEMESTER**

| 63A | Core Paper X: 8051 Microcontroller and embedded systems | 4 | 5 | - | 25 | 75 | 100 |
| 63P | Core Practical VI: Microprocessor and Microcontroller lab | 4 | - | 3 | 40 | 60 | 100 |
| 63Q | Core Practical VII: Industrial and Power Electronics Lab | 4 | - | 3 | 40 | 60 | 100 |
| 63R | Core Practical VIII: Electronics and communication Lab | 4 | - | 3 | 40 | 60 | 100 |
| 67V | PROJECT | 6 | 5 | _ | 150 |
| 6EI/6EJ/6EK/6EL | Elective- III | 4 | 4 | _ | 25 | 75 | 100 |
| 6ZP | Skill based Subject – IV Practical Visual & java Programming | 3 | - | 3 | 30 | 45 | 75 |
| 67A | Extension Activities @ | 2 | - | - | 50 | - | 50 |
|      | **Total** | 31 | _ | _ | 275 | 375 | 775 |
|      | **Grand Total** | 140 | _ | _ | 955 | 2395 | **3500** |

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

* Swatch Bharat Summer internship- extra 2 credits would be given. It is mandatory
*For Project report 120 marks and viva-voce 30 marks
First Semester
Course code          13A         BASIC ELECTRONICS          L T P C  
Core/Elective/Supportive          Core          5 0 0 4  
Pre-requisite          Higher secondary Physics          Syllabus Version 2020-2021  

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-Analyze; K5-Evaluate; K6-Create

<table>
<thead>
<tr>
<th>Unit:1</th>
<th>Resistors &amp; Inductors</th>
<th>11 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of Resistors:</td>
<td>Fixed, Variable - Brief mention of their Construction and Characteristics - Color Coding of Resistors - Connecting Resistors in Series and Parallel</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit:2</th>
<th>Capacitors</th>
<th>11 hours</th>
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</table>

<table>
<thead>
<tr>
<th>Unit:3</th>
<th>Electrical Elements And Circuits</th>
<th>12 hours</th>
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<table>
<thead>
<tr>
<th>Unit:4</th>
<th>Network Theorems</th>
<th>12 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superposition Theorem - Thevenin Theorem-Thevenizing a Circuit with Two Voltage Sources - Bridge Circuit - Norton’s Theorem - Thevenin 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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</table>

<table>
<thead>
<tr>
<th>Unit:5</th>
<th>AC Circuits</th>
<th>12 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Sinusoidal Wave - RMS Value - Average Value - AC Circuits with Resistance-Circuits with XL Alone-Circuits with XC Alone-Series Reactance and Resistance- Parallel Reactance and Resistance - Series Parallel Reactance and Resistance - Real Power -</td>
<td></td>
<td></td>
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</tbody>
</table>
Unit:6
Contemporary Issue
Group discussion on the overall study of Capacitors, resistors and Inductors

Total Lecture hours 60 hours

Text Book(s)

Reference Books

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1. https://nptel.ac.in/courses/108/104/108104139/
2. https://nptel.ac.in/courses/108/101/108101091/
4. https://www.youtube.com/watch?v=w8Dq8blTmSA

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>
<thead>
<tr>
<th>Co</th>
<th>PO1</th>
<th>PO2</th>
<th>PO3</th>
<th>PO4</th>
<th>PO5</th>
<th>PO6</th>
<th>PO7</th>
<th>PO8</th>
<th>PO9</th>
<th>PO10</th>
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<tbody>
<tr>
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<td>S</td>
<td>M</td>
<td>L</td>
<td>L</td>
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<td>M</td>
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<td>CO2</td>
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<td>L</td>
<td>L</td>
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<td>M</td>
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<td>M</td>
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<td>L</td>
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<td>CO4</td>
<td>M</td>
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<td>L</td>
<td>L</td>
<td>S</td>
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<td>S</td>
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<td>L</td>
<td>L</td>
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<td>M</td>
<td>L</td>
<td>L</td>
<td>S</td>
<td>M</td>
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*S-Strong; M-Medium; L-Low
Second Semester
<table>
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<tr>
<th>Course code</th>
<th>23A</th>
<th>SEMICONDUCTR DEVICES</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
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<tbody>
<tr>
<td>Core/Elective/Supportive</td>
<td>Core</td>
<td>5</td>
<td>0</td>
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<td>Pre-requisite</td>
<td>Higher secondary physics</td>
<td>Syllabus Version</td>
<td>2020-2021</td>
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</table>

**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 devices.

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

1. Explain the structure of the basic electronic devices K1
2. Understand the characteristics and operations of special diodes K2
3. Understand the characteristics and operations of transistors K2
4. Understand the characteristics and operations of FET and UJT K2
5. Use the special diodes for various applications K3

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

<table>
<thead>
<tr>
<th>Unit:1</th>
<th>PN Junction Diode</th>
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<table>
<thead>
<tr>
<th>Unit:2</th>
<th>Special Diodes</th>
<th>12 hours</th>
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<table>
<thead>
<tr>
<th>Unit:3</th>
<th>BJT</th>
<th>12 hours</th>
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<table>
<thead>
<tr>
<th>Unit:4</th>
<th>FET and UJT</th>
<th>12 hours</th>
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<tbody>
<tr>
<td></td>
<td>Introduction to FET - Construction and Operation of N-Channel JFET - Drain Characteristics-Comparison of JFET &amp;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</td>
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<table>
<thead>
<tr>
<th>Unit:5</th>
<th>Optoelectronic Devices</th>
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<table>
<thead>
<tr>
<th>Unit:6</th>
<th>Contemporary Issues</th>
<th>2 hours</th>
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<tbody>
<tr>
<td></td>
<td>Diodes, transistors</td>
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</tr>
</tbody>
</table>

**Total Lecture hours** 60 hours
Text Book(s)

Reference Books

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1 https://nptel.ac.in/courses/108/108/108108122/
2 https://nptel.ac.in/courses/108/108/108108112/
3 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

<table>
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<tr>
<th>COs</th>
<th>PO1</th>
<th>PO2</th>
<th>PO3</th>
<th>PO4</th>
<th>PO5</th>
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<tbody>
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*S-Strong; M-Medium; L-Low
Course code | 23P | BASIC ELECTRONICS LAB | L | T | P | C  
--- | --- | --- | --- | --- | --- | ---  
Core/Elective/Supportive | Core practical - I | 0 | 0 | 3 | 4 |  
Pre-requisite | Higher secondary physics |  |  |  |  | Syllabus Version 2020-2021  
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. Understand the basic principles of ohms and kirchoff’s laws  
3. Simplify the circuits using series and parallel equivalents and using Thevenin’s and Norton’s equivalent circuits.  
4. Design resonance circuits.  
5. Use the oscilloscope for the display and measurements of signals.  
K1-Remember; K2- Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create  
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 Kirchhoff’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

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

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/]

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*S-Strong; M-Medium; L-Low
Course code: 23Q

SEMICONDUCTOR DEVICES LAB

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Course Objectives:
The main objectives of this course are to:

1. To understand and experiment the basic parameters of electronic devices.
2. To construct few applications using semiconductor devices.

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

1. Experiment the fundamental operations of the main semiconductor electronic devices. (K3)
2. Design and construct electronic circuits using semiconductor devices. (K3)
3. Understand the transistor characteristics. (K2)
4. Understand the characteristics of LDR and solar cell. (K2)
5. Analyse the characteristics of diodes and transistors. (K4)

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

1. Band Gap Energy of Silicon / Germanium Diode
2. V-I Characteristics of Junction Diode
3. V-I Characteristics of Zener Diode
4. Transistor Characteristics of CE Configuration
5. Transistor Characteristics of CB Configuration
6. Transistor Characteristics of CC Configuration
7. Clipping Circuits
8. Clamping Circuits
9. Measurement of Stability Factor of Fixed Bias
10. Measurement of Stability Factor of Self Bias
11. V-I Characteristics of JFET
12. V-I Characteristics of UJT
13. UJT as Oscillator
14. FET as Voltage Variable Resistor(VVR)
15. Characteristics of LDR
16. Characteristics of Solar Cell
17. Study of IR (Tx & Rx)
18. Study of LED and 7 Segment display
19. Temperature Co-efficient of Junction Diode
20. Zener as a Voltage regulator
21. ON / OFF control of relay using Opto –Couplers
22. Characteristics of SCR
23. TRIAC Characteristics

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Third Semester
Course code | 33A  
---|---
PRINCIPLES OF COMMUNICATION SYSTEMS | **L** | **T** | **P** | **C**
Core/Elective/Supportive | Core | 4 | 0 | 0 | 4
Pre-requisite | Higher secondary physics | Syllabus Version | 2020-2021

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 **K2**
2. Analyze the performance of amplitude and frequency modulation techniques. **K4**
3. Demonstrate the stages of radio receiver. **K3**
4. Compare the operation of FM and SSB receivers **K4**
5. Analyze the performance of receiver. **K4**

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

### Unit: 1 Wave Propagation 9 hours

### Unit: 2 Antennas 9 hours

### Unit: 3 Modulation Techniques 10 hours

### Unit: 4 Single Sideband Modulation 9 hours

### Unit: 5 Receiver 9 hours

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**Text Book(s)**

**Reference Books**

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

Course Designed By: K.Manikant, 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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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. Remember;  
3. Apply;  
4. Analyze;  
5. Evaluate;  
6. Create

Unit:1  
Number System And Codes  
10 hours

- 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

Unit:2  
Boolean Algebra And Logic Gates  
12 hours

- Boolean logic operations – Boolean functions – Truth Tables – Basic Laws – De Morgans Theorem

Unit:3  
Combinational Logic Circuits  
12 hours


Unit:4  
Sequential Logic Circuits  
12 hours


Unit:5  
D/A and A/D Converters  
12 hours

- 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  
2 hours
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
3. https://www.youtube.com/watch?v=CL3ups78jrs/Introduction to digital 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 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:

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

#### Unit: 1 Rectifiers And Regulators (10 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)

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- Webinar program on electronic circuits [NPTEL](https://nptel.ac.in/courses/108/102/108102097/#Introduction to Electronic circuits NPTEL)
- Webinar program on electronic circuits [NPTEL](https://nptel.ac.in/courses/108/102/108102095/) [Analog Electronic circuits NPTEL]

**Text Book(s)**
2. B.L. Theraja, *-BASIC ELECTRONICS*, Chand Company Ltd, 2000

**Reference Books**

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

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: 3ZA  
COMPUTER ARCHITECTURE AND ORGANIZATION  

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Course Objectives:

The Main Objectives of this course are to:
1. To enable the students to learn the newest computer technology and trends.
2. To learn subject presents the Modern computer organization, Processor and memory design, Peripherals and recent system architecture.

Expected Course Outcomes:

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

1. Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os.  
   K3
2. Analyze the performance of commercially available computers.  
   K6
3. Distinguish the organization of various parts of a system memory hierarchy.  
   K6
4. Understand the design of the various functional units and components of computers.  
   K1
5. Identify the elements of modern instructions sets and their impact on processor design.  
   K5

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

Unit:1  
Modern Computer Organization  
9 hours

Unit:2  
Processor Design And Data Path  
9 hours

Unit:3  
Memory Design And Management  
9 hours

Unit:4  
Computer Peripherals  
8 hours

Unit:5  
Advanced System Architecture  
8 hours

Unit:6

CONTEMPORARY ISSUES

2 hours

Interaction programme on computer architecture

Total Lecture hours 45 hours

Text Book(s)


Reference Books


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

1 https://nptel.ac.in/courses/106/102/106102062/Introductionto computer architecture,Nptel

2 https://nptel.ac.in/courses/106/103/106103068/ComputerArchitecture andOrganization

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
Fourth Semester
Course Code: 43A  IC’S AND INSTRUMENTATION  

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Pre-Requisite: Basic Electronics  
Syllabus Version: 2020-2021

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
   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

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Total Lecture hours  60 hours

**Text Book(s)**

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<td>D. Roy Choudhury and Shahil B Jain</td>
<td>Linear Integrated Circuits</td>
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<td>New Age International Publishers</td>
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<td>Khanna Publishers</td>
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<td>J.B. Gupta</td>
<td>A Course In Electronic and Electrical Measurements And Instrumentation</td>
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<td>S.K. Kataria &amp; Sons</td>
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<td>2</td>
<td>A.K. Sawhney</td>
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<td>Dhanpath Rai &amp; Co (P) Ltd</td>
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**Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.**]

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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: 43B
### MODERN TELEVISION ENGINEERING

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### 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:

|  | Acquire knowledge on television standards | K1 |
|  | Study on Transmitter and receiver standards | K2 |
|  | Understand the Picture tube of color TV | K2 |
|  | Knowledge on performance of Color TV and other modern devices | K3 |
|  | Familiarize Advanced TV Systems | K4 |

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

### Unit: 1 Fundamentals Of Television (12 hours)

- Aspect ratio
- Image continuity
- Number of scanning lines
- Interlaced scanning
- Picture resolution
- Camera tubes
- Image Orthicon
- Videocon
- Plumb icon
- Monochrome picture tubes
- Composite video signal
- Video signal dimension
- Horizontal sync. Composition
- Vertical sync. Details function of vertical pulse train
- Scanning sequence details
- VSB transmission
- Sound signal transmission
- Standard channel bandwidth

### Unit: 2 Monochrome Television Transmitter And Receiver (12 hours)

- TV transmitter
- TV signal Propagation
- Interference
- TV Transmission Antennas
- Monochrome TV receiver
- RF tuner
- UHF, VHF tuner
- Digital tuning techniques
- AFT
- IF subsystems
- AGC
- Noise cancellation
- Video and Sound inter-carrier detection
- Vision IF subsystem
- DC re-insertion
- Video amplifier circuits
- Sync operation
- Line deflection circuits
- EHT generation
- Receiver antennas

### Unit: 3 Essentials Of Colour Television (10 hours)

- Three colour theory
- Luminance, Hue and saturation
- Colour television cameras
- Values of luminance and colour difference signals
- Colour television display tubes
- Delta-guns
- Precision-in-lineand Trinitroncolours
- picture tubes
- Purit y and convergence
- Purity and static and Dynamic convergence adjustments
- Pincushion-correction techniques
- Automatic degaussing circuit

### Unit: 4 Colour Television Systems (12 hours)

- 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 (12 hours)
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- 3DTV- EDTV.

**Unit: 6**

Contemporary Issues | 2 hours
---|---
Preparing analysis report on television and its future developments

**Total Lecture hours: 60 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=EAybxdgS2T4TV Transmission](https://www.youtube.com/watch?reload=9&v=EAybxdgS2T4TV Transmission)

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 | DIGITAL AND CELLULAR COMMUNICATIONS | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/Supportive | Core | 4 | 0 | 0 | 4 |
Pre-Requisite: | Basic Electronics | Syllabus Version | 2020-2021 |

Course Objectives:

The Main Objectives of this course are to:
1. To enhance the knowledge in communication with digital and cellular systems
2. To learn the digital and cellular technology

Expected Course Outcomes:

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

1. Know the concepts of data transmission systems
2. Analyze the Model of Communication system
3. Familiarize Digital carrier Modulation Schemes
4. Understand pulse modulation and quantization techniques
5. Analyze the cellular system design and technical challenges.

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

Unit:1 Data Transmission 10 hours

Unit:2 Communication System 12 hours

Unit:3 Digital Carrier Modulation Schemes 12 hours

Unit:4 Pulse Modulation And Quantization 12 hours

Unit:5 Digital Cellular Systems 12 hours
Transmission and Modulation—CDMA—Terminology of CDMA Systems—Call Processing—Hand Over Procedures

**Unit: 6**

Contemporary Issues | 2 hours
---|---
Seminar on cellular technology

**Text Book(s)**


**Reference Books**


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

| 1 | [https://nptel.ac.in/courses/106/106/106106167/Wireless and Cellular Communication](https://nptel.ac.in/courses/106/106/106106167/Wireless and Cellular Communication) |
| 2 | [https://nptel.ac.in/courses/117/117/117105077/Digital Communication](https://nptel.ac.in/courses/117/117/117105077/Digital Communication) |

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: 43P
TITLE OF THE COURSE: Digital Electronics Lab
Core/Elective/Supportive: Digital Electronics Lab
Pre-Requisite: Digital Electronics

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

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

1. Understand the logical operation of various gates & theorems
2. Analyze the circuit using Boolean laws
3. Design the Adder and subtractor circuit using logic gates
4. Design and analyze Combinational and Sequential circuits
5. Acquire knowledge about VHDL code for design and simulate of digital logic circuits

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

Digital Electronics Lab

(ANY 16 EXPERIMENTS)

1. Verification of Basic Gates and Universal Gates
2. Verification of Demorgan’s Theorem
3. 2-bit Comparator using Gates
4. Half Adder and Full Adder
5. Half Subtractor and Full Subtractor
6. 4-bit Binary Adder
7. Multiplexer and Demultiplexers
8. Encoder and Decoder
9. BCD to 7-Segment Display
10. Study of Flip flops
11. Binary to Grey and Grey to Binary Conversion
12. Shift Registers and Ring Counter
13. Analog to Digital Converter
14. Digital to Analog Converter
15. Op-Amp: Adder and Subtractor
16. Op-Amp: Integrator and Differentiator
17. Current to Voltage and Voltage to Current Converter
18. Realize Basic gates from universal gates

Syllabus Version: 2020-2021

Page 37 of 88
19. Synchronous and Asynchronous Counter
20. Magnitude Comparator.
22. Design and Simulation of adder using VHDL Coding.
23. Design and Simulation of Subtractor Circuit using VHDL Coding

<table>
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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**: 43Q  
**ELECTRONIC CIRCUITS, RADIO, TV AND INSTRUMENTATION LAB**

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**Course Objectives:**

The Main Objectives of this course are to:

1. To understand the concept of working of regulated power supplies, rectifiers, amplifiers and oscillators.
2. 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  
2. Design Amplifier circuits  
3. Design different Oscillator circuits  
4. Design different Modulation circuits  
5. Design circuits with Transducers

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**  
**Radio, TV And Instrumentation**  
45 hours

13. First IF Amplifier  
14. AM Modulation and Detection  
15. FM Modulation and Detection  
16. Second IF amplifier  
17. Audio amplifier using TBA 810  
18. Alignment of colour TV using video pattern generator.
19. Sync separator  
20. Vertical selection and horizontal selection fault of TV receiver  
22. EHT generation  
23. Temperature measurement using thermistor.  
24. Displacement measurement using LVDT.  
25. Weighing machine using load cell  
26. Instrumentation amplifier.  
27. Characteristics of photo voltaic cell (solar cell)  

(Any 16 Experiments)  

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

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*S-Strong; M-Medium; L-Low*
Course code: 4ZB  VISUAL PROGRAMMING

Core/Elective/Supportive: Skill Based Subject - II

Pre-requisite: Basic computer skills and familiarity with Microsoft Windows.

Course Objectives:
The main objectives of this course are to:
1. To provide fundamental skills in utilizing the tools of a visual environment.
2. To implement SDI and MDI applications while using forms, dialogs, and other types of GUI components.
3. To apply visual programming concept in software development by designing projects with menus and submenus.
4. To use visual programming environment to create simple visual applications.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Gain the Knowledge of different elements of a visual programming language as building blocks to develop correct, coherent programs.
2. Ability to implement the event driven programming using Visual Basic 6.0 forms and Controls.
3. Ability to create menu to make the application more interactive.
4. Gain the Knowledge about how to use existing Common Dialog Controls like File Dialog box, Color Dialog box, etc. to enhance the functionality.
5. Testing and debug Visual Basic programs.

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

Unit: 1  Visual Basic Overview  6 hours

Unit: 2  Visual Basic Objects  7 hours

Unit: 3  Building The User Interface  7 hours

Unit: 4  Database With Visual Basic  7 hours
Communicating with Other Window Applications – Database Development with Visual Basic (DAO, RDO) – Building Active Controls – OLE

Unit: 5  Debugging And Applications  7 hours
VC++ Fundamentals – Using Visual Studio’s IDE – Menus – Writing, Compiling and Debugging Simple Programs – Building a Basic Application – Types – Overview of MFC
### Unit: 6

Contemporary Issues  
2 hours  

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### Text Book(s)


### Reference Books


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

1. [https://www.youtube.com/watch?v=5nahqfJTQXs](https://www.youtube.com/watch?v=5nahqfJTQXs)
2. [https://www.youtube.com/watch?v=1oGpl6qNKoQ](https://www.youtube.com/watch?v=1oGpl6qNKoQ)
3. [https://www.youtube.com/watch?v=gcFHvYydeFU](https://www.youtube.com/watch?v=gcFHvYydeFU)

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

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Fifth Semester
Course code | 53A | **8085 MICROPROCESSOR AND APPLICATIONS**
---|---|---
Core/Elective/Supportive | Core | L | T | P | C
Pre-requisite | Requires the basic of Digital circuits and Programming languages | Syllabus Version | 2020-2021

**Course Objectives:**
The main objectives of this course are to:
1. To enable the students to learn the Microprocessor Architecture.
2. To learn the instruction set of 8085 and to develop 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

**Unit:1**
**Introduction To 8085**
*PinDiagram–Architecture–DemultiplexingtheBus–GenerationofControlSignals–Fetching, Decoding and Execution of Instruction – Instruction Timing and Operation Status.* 14 hours

**Unit:2**
**Instruction Set And Addressing Modes**
*Instruction Set – Addressing Modes – Instruction Format – Simple Program – Memory Read Machine Cycle– Memory Write Machine Cycle* 15 hours

**Unit:3**
**Interfacing Concepts**
*Peripheral I/O Instructions – Device Selection and Data Transfer – Input Interfacing – Practical Input Interfacing Using Decoders – Interfacing O/P Devices: LED and 7 Segment Display – Interfacing Memory – Memory Time and Unit States* 14 hours

**Unit:4**
**Parallel And Serial Interface**
*Introduction to Programmable Peripheral Interface 8255 – Pin Diagram – Architecture – Modes of Operation: I/O and BSR – Architecture and Operation of 8251 (USART)*
**Interrupt And Timer Logic**

**Unit:5**
**Applications**
<table>
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<th>Unit:6</th>
<th>Contemporary Issues</th>
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<td>Seminar on microprocessor and its applications</td>
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**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, Assistant Professor, KSG College of Arts and Science & 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 | 5ZC | INTERNET AND JAVA PROGRAMMING | L | T | P | C
--- | --- | --- | --- | --- | --- | ---
Core/Elective/Supportive | Skill Based Subject - III | 3 | 0 | 0 | 3
Pre-requisite | This course requires that the students are familiar with programming language such as C/C++ and data structures, algorithms | Syllabus Version | 2020-2021

Course Objectives:
The main objectives of this course are to:
1. To design of the subject is to provide knowledge about internet, Java data types, classes and files.
2. To learn the internet concept and Java programming systems.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Gain knowledge about the concepts of Internet and able to program the applications using Java.
2. Design, create, build, and debug Java applications and applets
3. Implement object oriented programming concepts in Java.
4. Demonstrate use of Multithreading in Java application.
5. Enhance logical reasoning and programming skills.

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

Unit:1  Introduction To Internet  7 hours
Internet – Introduction- Understanding Internet- Internet Addressing - Hardware Requirements to Connect to the Internet.

Unit:2  Basics Of JAVA  7 hours
Data Types, Arrays, Operators, Flow Control – Branching, Looping

Unit:3  Inheritance And Interfaces  7 hours
Classes – New Operator, Dot Operator, Method Declaration and Calling, Constructors, This in Constructors, Inheritance, Super, Method Overriding Final, Finalize, Static, Package and Import Statement, Interface and Implements

Unit:4  Exception Handling And Multithreading  7 hours
Exception Handling – Exception Types, Uncaught and Calling, Nested Try Statements, Java Thread Model, and Thread, Runnable, Thread Priorities, Synchronization, Deadlock

Unit:5  Managing I/O Operation And Applet  6 hours

Unit:6  Contemporary Issues  2 hours
Webinar on programming using java, seminar on internet and its uses

Total Lecture hours | 36 hours
Text Book(s)

Reference Books

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1 https://www.youtube.com/watch?v=pWusFlk747Y
2 https://www.youtube.com/watch?v=M9G_VeQgy7I
3 https://www.youtube.com/watch?v=3u1fu6f8Hto

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

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Sixth Semester
Course code | 63A | 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS | L | T | P | C
--- | --- | --- | --- | --- | --- | ---
Core/Elective/Supportive | Core | 5 | 0 | 0 | 4 |
Pre-requisite | Digital Electronics; 8085 Microprocessor | Syllabus Version | 2020-2021 |

Course Objectives:
The main objectives of this course are to:
1. Study the architecture and addressing modes of 8051.
2. Impart knowledge about assembly language programs of 8051.
3. Helps to understand the importance of different peripheral devices & their interfacing to 8051.
4. Impart knowledge of different types of external interfaces including LEDs, LCD,
5. Keypad Matrix, Switches & Seven segment display.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Describe architecture and operation of Microcontroller 8051. K1
2. Foster ability to understand the design concept of Microcontroller. K2
3. Design various applications using its peripherals. K3
4. Analyze the data transfer through serial and parallel ports. K4
5. Learn basic hardware of various microcontrollers. K5

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

Unit:1 | Overview And Instruction Set | 14 hours

Unit:2 | Assembly Programming And Addressing Modes | 14 hours
Introduction to 8051 Assembly Programming – The Program Counter and ROM – DataTypes and Directives – Flag Bits and PSW Register – Register Bank and Stack – Loop and Jump Instructions – I/O Port Programming – Addressing Modes.

Unit:3 | Arithmetic And Logical Operations In AIP And C | 14 hours

Unit:4 | 8051 Interrupts And Peripherals | 14 hours

Unit:5 | Real World Applications | 14 hours
Interfacing LCD to the 8051 – Interfacing ADC – Interfacing Sensors to 8051 – Interfacing Stepper Motor – 8051 Interfacing to the Keyboard – Interfacing DAC to the 8051
### Unit:6 Contemporary Issues 2 hours
An overall discussion on embedded systems and microcontrollers

| Total Lecture hours | 72 hours |

### Text Book(s)

### Reference Books

### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1. https://www.youtube.com/watch?v=84YUQu8tE4w
2. https://www.youtube.com/watch?v=GPz_mR7Flas
3. https://www.youtube.com/watch?v=uFhDGagZzs

Course Designed By: M.Baskaran, Assistant Professor, KSG College of Arts and Science & 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>Syllabus Version</td>
<td>2020-2021</td>
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## Course Objectives:

The main objectives of this course are to:

1. To introduces the assembly language programming of Microprocessor and Microcontroller.
2. It develops the student’s Assembly language programming skills and gives practical training of interfacing the peripheral devices with the Microprocessor and Microcontroller.

## Expected Course Outcomes:

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

1. Learn assembly language programming of Microprocessor and Microcontroller with interfacing the peripheral devices.  
2. Learn assembly language programme of microcontroller  
3. Understand the basic concepts of interfacing and peripheral devices  
4. Apply the knowledge gained into a practical exposure  
5. Analyze the concepts of microprocessor and microcontroller

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

### (ANY 16 EXPERIMENTS)

**8085 MICROPROCESSOR LAB**

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 (8bit)  
8. UP/DOWN Counter using 7 Segment Displays  
9. Traffic Light Control Interface  
10. Data Transfer using 8255 (PPI)  
11. Square wave generator using 8255  
12. ADC Interface  
13. DAC Interface  
14. Stepper Motor interface

**8051 MICROCONTROLLER LAB**

15. Arithmetic and Logical Programs  
16. Key Interface  
17. LED Interface  
18. Solid State Relay Interface  
19. Square Wave Generation
20. ADC Interface
21. DAC Interface
22. Stepper Motor Interface
23. LCD Interface

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

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*S-Strong; M-Medium; L-Low
Course code | 63Q | INDUSTRIAL AND POWER ELECTRONICS | L | T | P | C
--- | --- | --- | --- | --- | --- | ---
Core/Elective/Supportive | Core –Practical- VII | 0 | 0 | 3 | 4 | 
Pre-requisite | Basic knowledge of Electronic Circuits or permission of instructor | Syllabus Version | 2020-2021 |

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 and study of DIAC and TRIAC circuits
4. Understand the basic knowledge of PCB
5. Analyse the parameters of various components of electronic circuits

K1 - Remember; K2 - Understand; K3 - Apply;

(ANY 16 EXPERIMENTS)

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 Fire alarm
14. ON / OFF relay control using opto – coupler
15. Servo stabilizer
16. Layout and Art Work preparation for PCB
17. etching Drilling and Component mounting of PCB
20. Phase Control Circuit
21. Cyclo converter
22. Thyristor protection circuit
Course Designed By: M.Baskaran, Assistant Professor , KSG College of Arts and Science &
Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.

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*S-Strong; M-Medium; L-Low
Course code: 63R
Electronic Communication Lab

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<td>Basic knowledge of Electronic Communication</td>
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<td>Syllabus Version</td>
<td>2020-2021</td>
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Course Objectives:
The main objectives of this course are to:
1. To Understand the concept of Digital Communication
2. To experiment the Modulation and Detection techniques
3. To study about wireless communication technologies.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Understand the concept of Digital Communication and wireless communication technologies. K2
2. Obtain experiment knowledge about the Modulation and Detection techniques K3
3. Understand the practical components involved in PAM K2
4. Apply the principles into practical experience K3
5. Analyse the practical exposure over the PAM and PWM, PCM K4

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

(ANY 16 EXPERIMENTS)
1. Pulse Amplitude Modulation (PAM) and Detection
2. Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM)
3. Generation and Detection of PCM
4. Generation of delta and Adaptive delta modulation
5. Amplitude Shift Keying
6. Frequency Shift Keying
7. Phase Shift Keying
8. QPSK
9. DPSK
10. Study of TDM/FDM
11. Full duplex communication model
12. Alignment of satellite receiver
13. Study of GPS Handset
14. Study of GSM Module
15. PIN Diode Characteristics
16. Laser Diode Characteristics
17. Fiber Optics TX and Rx
18. Signal Sampling and Reconstruction
19. GUNN diode Oscillator
20. Reflex Klystron Characteristics using microwave bench
22. Radiation pattern of Dipole & Yagi Uda antennas
23. Radiation pattern Loop & array antennas

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

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*S-Strong; M-Medium; L-Low
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<th>Course code</th>
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<th>VISUAL AND JAVA PROGRAMMING LAB</th>
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<td>Pre-requisite</td>
<td>Basic computer skills and familiarity with Microsoft Windows. students are familiar with programming language such as C/C++ and data structures, algorithms</td>
<td>Syllabus Version</td>
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**Course Objectives:**

The main objectives of this course are to:

1. To design and develop Windows-based business applications using Visual Basic
2. Emphasis on the fundamentals of structured design, development, implementation, and documentation.
3. Gain knowledge about basic Java language syntax and semantics to write Java programs

**Expected Course Outcomes:**

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

1. Develop Windows-based business applications using Visual Basic
2. Understand the fundamentals of structured design, development, implementation, and documentation.
3. Gain knowledge about basic Java language syntax and semantics to write Java Programs
4. Create own programme on visual programming
5. Create own programming on java programming

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create
Visual Programming (any 8 experiments)

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.
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.

JAVA Programming (Any 8 Experiments)

1. Program to print the following triangle of numbers 1 12 1231234
2. Defining a class with the following attributes: 1. xname 2. Date of Birth 3. Date on which leg injection has to be given (sixty days from date of birth) 4. Date on which polio drops is to be given (45 days from Date of birth). Write a constructor to construct the baby object. The constructor must find out the leg and polio drops dates from the date of birth. In the main program define a baby and display its details.

3. Program to create and display a message on the window

4. Program to draw several shapes in the created window.

5. Program to create an applet and draw gridlines.

6. Java program to create a frame with two buttons called father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother similar details of mother appear.

7. Java program to create a frame with four text fields for name, age and qualification and a text field of multiple lines for address.

8. Program to draw circle, ellipse, square and rectangle at the mouse click position.

9. Java program to create four text fields for the name, street, city and pin code with suitable labels. Also add a button called my details, when you click the button your name, street, city and pin code must appear in the text fields.

10. Java program to demonstrate the multiple selection list boxes.

11. Program to create a canvas which displays a clock with hour hand and a minute hand depending upon an int variable minutes. Write another program with a frame, which displays the clock canvas. It must also have three buttons, tick, reset and close. When we click reset, the clock must reset to 12 hrs. When we click close, the frame closes.

12. Java program to create a menu bar and pull down menus.

13. Java program to create a window when we press M or m the window displays Good Morning, aor the window displays Good Afternoon, or the window displays Good Evening. N or n the window displays Good Night.

14. Java program to move different shapes (Circle, Ellipse, Square, and Rectangle) according to the arrow key pressed.

15. Program to handle the divide by zero exception.

16. Program to explain the multithreading with the use of multiplication tables. Three threads must be defined and each one must create one multiplication table; they are 5 tables, 7 tables and 13 table.

17. Program to illustrate thread priority. Create three threads and assign three different priorities.

---

Course Designed By: M. Baskaran, Assistant Professor, KSG College of Arts and Science & Dr. N. Om Muruga, Assistant Professor, Government Arts College, Ooty.
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*S-Strong; M-Medium; L-Low*
Elective Course
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### Pre-requests

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## Course Objectives:

The Main Objectives of this course are to:

1. To prepare the student to be an entry-level industrial standard ASIC or FPGA designer.
2. To understand the issues and tools related to ASIC/FPGA design and implementation and basics of System on Chip and Platform based design.

### Expected Course Outcomes:

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

1. Know the concepts of data transmission systems
2. Analyze the Model of Communication system
3. Familiarize Digital carrier Modulation Schemes
4. Understand pulse modulation and quantization techniques
5. Analyze the cellular system design and technical challenges

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

#### Unit:1 Introduction To ASICS 16 hours

**Types of ASICS:**
- Full-Custom ASIC
- Standard Cell-Based ASIC
- Gate Array Based ASIC
- Channeled Gate Array
- Structured Gate Array
- Programmable Logic Devices
- FPGA

**Design Flow – Case Study**

#### Unit:2 CMOS Logic 18 hours

**CMOS Transistors**
- Design Rules

**Combinational Logic Cells:**
- Pushing Bubbles
- Drive Strength
- Transmission Gates
- EX-OR Cell

**Sequential Logic Cells:**
- FF

**Data Path Logic Cells:**
- Data Path Elements

#### Unit:3 ASIC Design 18 Hours

**Programmable ASICS:**
- Antifuse
- Static RAM–EPROM and EEPROM Technology
- Programmable ASIC Logic Cells:
  - Actel ACT
  - Xilinx LCA
  - Altera FLEX Architectures
- Programmable ASIC I/O Cells:
  - DC Output
  - DC Input

**Programmable ASIC Design Software:**
- Logic Synthesis
- FPGA Synthesis

#### Unit:4 VHDL 18 hours

**Introduction to VHDL**
- Behavioral, Data Flow and Structural Model
- Operators
- Data Objects
- Data Types
- Design Examples

#### Unit:5 VERILOG 18 hours

**Introduction - Language Elements**
- Gate-Level modeling
- Data Flow
- Behavioral
- Structural Modeling
- Modeling Examples

#### Unit:6 Contemporary Issues 2 hours

**Seminar on ASIC design, CMOS logic, Demo programme on VHDL, Verilog**

**Total Lecture hours:** 90 hours
### Text Book(s)

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<td>1</td>
<td>Michael John Sebastian Smith</td>
<td>“Application Specific Integrated Circuits”</td>
<td>Addition-Wesley</td>
<td>2nd reprint</td>
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<td>Bhasker. J.</td>
<td>&quot;VHDL Primer&quot;</td>
<td>BS Publications</td>
<td>2001</td>
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<td>Bhasker.J.</td>
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<td>Charles J.Roth</td>
<td>“Digital System Design Using VHDL”</td>
<td>PWS Publishing (Thomson learning)</td>
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### Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]

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### Course Designed By:

- R. Archana, Assistant professor, Nehru Arts and Science College
- 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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Pre-request: Basic Electronics

Syllabus Version 2020-2021

Course Objectives:

The Main Objectives of this course are to:
1. To design fully equipped with concepts, methodologies and applications of Remote Sensing Technology.
2. To Define and describe remote sensing and explain its applications, history, electromagnetic spectrum and interactions with various types of media.

Expected Course Outcomes:

On the Successful completion of the course, student will be able to:
1. Know the concepts of data transmission systems
2. Analyze the Model of Communication system
3. Familiarize Digital carrier Modulation Schemes
4. Understand pulse modulation and quantization techniques
5. Analyze the cellular system design and technical challenges.

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

Unit:1  
**Principles Of Remote Sensing**  
16 hours


Unit:2  
**Platforms And Sensors**  
18 hours


Unit:3  
**Image Characteristics And Interpretation**  
18 hours


Unit:4  
**Digital Image Processing**  
18 hours

Image Transformations - Subtraction – Rationing - NDVI and PCA - Thematic Classification and Clustering to Include Unsupervised and Supervised Classification Based on Minimum Distance and Maximum Likelihood Classification - Accuracy Assessment of Classification - Concepts of Hyper spectral Image Analysis.

Unit:5  
**ANCILLARY DATA SOURCES AND INTEGRATION**  
18 hours

### Unit:6  
**Contemporary Issues**  
2 hours

Group discussion on Digital Image Processing, Image interpretation

<table>
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<tr>
<th>Text Book(s)</th>
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<tbody>
<tr>
<td>1 Lillesand, T.M. and Kiefer, R.W., <em>REMOTE Sensing And Image Interpretation</em>.</td>
<td></td>
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<tr>
<td>2 Curran, Paul J., <em>Principles Of Remote Sensing</em></td>
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<td>3 Campbell, J.B., <em>Introduction Of Remote Sensing</em></td>
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<th>Reference Books</th>
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<tr>
<td>1 Sabins,F.F., <em>Remote Sensing: Principles And Interpretations</em></td>
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<td>2 Reddy, M. Anji, <em>Remote Sensing And Geographic Information System</em></td>
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<tr>
<th>Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]</th>
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Course Designed By:
R.Archana, Assistant professor , Nehru Arts and Science College,&
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 5EC
MOBILE COMPUTING

Core/Elective/Supportive
Elective I - C

Pre-Requisite:
Basic Electronics

Syllabus Version 2020-2021

Course Objectives:
The Main Objectives of this course are to:
1. To Learn the context of wireless network systems such as 2G/3G/4G mobile telephony, Data networks, and other wireless networks and infrastructure.
2. To emphasize the interface between mobile computing devices and programming those devices

Expected Course Outcomes:
On the Successful completion of the course, student will be able to:
1. Mobile environments and communications systems. K1
2. Hardware devices and interacting with these devices. K6
3. Mobile operating systems available. K6
4. Programming applications on a mobile system. K2
5. Data and knowledge management K4

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

Unit:1 Introduction 16 hours

Unit:2 Wireless Networks 18 hours

Unit:3 Mobile Network Layer 18 hours

Unit:4 Mobile Transport Layer 18 hours
Traditional TCP- Indirect TCP- Snooping TCP- Mobile TCP - Fast Retransmit/ Fast Recovery- Transmission/Timeout Freezing – Selective Retransmission- Transaction Oriented TCP

Unit:5 WAP 18 hours

Unit:6 Contemporary Issues 2 hours
Workshop on wireless networks, mobile network

Total Lecture hours 90 hours
Text Book(s)


Reference Books


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

1. https://nptel.ac.in/courses/106/106/106106147/Mobile Computing

Course Designed By:
R. Archana, Assistant professor, Nehru Arts and Science College.
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
# Course Objectives:

The main objectives of this course are to:

1. To present the principles and applications of industrial and power electronics.
2. To enable the students to learn and design industrial & power electronic circuits.

## 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.
2. Acquire knowledge about fundamental concepts and techniques used in power electronics.
3. Ability to analyze various single phase and three phase power converter circuits and understand their applications.
4. Foster ability to identify basic requirements for power electronic based design application.
5. To develop skills to build, and troubleshoot power electronics circuits.

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

## Units

### Unit: 1  Introduction

| 14 hours |
|---|---|---|---|---|

### Unit: 2  Welding And Heating

| 14 hours |
|---|---|---|---|---|

### Unit: 3  Waves And Measurement

| 14 hours |
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### Unit: 4  Application In Industrial Systems

| 14 hours |
|---|---|---|---|---|
| Thermistor Control Of Quench Oil Temperature – Proportional Mode Pressure Control System – Strip Tension Controller – Automatic Weighing System – Control Of Relative Humidity In A Textile Moistening Process – Warehouse Humidity Controller |
Unit:5  Industrial Robotic Systems  14 hours
Parts of Robotic Systems – Classifications of Robotic Systems – Robotic System Configurations
Water Level Indicator – Firing Angle Control of Thyristor

Unit:6  Contemporary Issues  2 hours
Seminar on Robotics and its applications

Total Lecture hours  72 hours

Text Book(s)
1 Harish C Rai, “Industrial and Power Electronics” 10th edition, Umesh publications 2002

Reference Books
2 M.H. Rashid, “Power Electronics Circuits,Devices & Applications ,Pearson Education.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1 https://www.youtube.com/watch?v=1Auay7ja2oY
2 https://www.youtube.com/watch?v=ognlQVFaqYI
3 https://www.youtube.com/watch?v=naxnRkOfh2Q

Course Designed By:
M.Baskara,B.K.Ganesh, Assistant Professor , KSG College of Arts and Science &
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: 5EE
ROBOTICS AND AUTOMATION

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<th>Core/Elective/Supportive</th>
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<td>Pre-requisite:</td>
<td>Basic Electronics</td>
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Syllabus Version: 2020-2021

Course Objectives:

The Main Objectives of this course are to:
1. To learn the concepts of Robots.
2. To know about the sensors, actuators used in Robots designing.
3. To familiarize the students with the applications of Robots.

Expected Course Outcomes:

On the Successful completion of the course, student will be able to:
1. Study the fundamentals of robots and components
2. Illustrate sensors and vision systems.
3. Apply programming techniques in Automation.
4. Familiarize programmable Logic Controllers.
5. Analyze Computer Numerical Control

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

Unit:1 Classification Of Robotic Systems 10 hours


Unit:2 Sensors And Vision Systems 9 hours


Unit:3 Robot Programming & Automation 10 hours

### Unit: 4 Programmable Logic Controllers (PLC) 9 hours
Basics of PLC - Architecture of PLC – Advantages - Types of PLC - Types of Programming- Simple Process Control Program's Using Relay Ladder Logic. Introduction to PLC Networking - Introduction to HMI - DCs and SCADA Systems

### Unit: 5 Computer Numerical Control (CNC) 9 hours
Block Diagram of ACNC Control System – Advantages - Power Supply – CPU - CNC and PLC Interfacing - Control Loops - Feedback Devices in CNC Machine - Analog and Digital CNC Systems - Introduction to FMS

### Unit: 6 Contemporary issues 2 hours
Workshop on Robotic automation

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

### Reference Books

### Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]
1. HTTPS://NPTEL.AC.IN/COURSES/112/101/112101098/ROBOTICS

### Course Designed By:
R. Archana, Assistant professor, Nehru Arts and Science College & 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 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 types of 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. Analyze the PLC components

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

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<tr>
<th>Unit:1</th>
<th>Introduction To PLC</th>
<th>9 hours</th>
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<tr>
<td>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</td>
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<th>Unit:2</th>
<th>Hardware And Software Components</th>
<th>9 hours</th>
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<td>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</td>
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<th>Unit:3</th>
<th>Instructions And Relays</th>
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<th>Unit:4</th>
<th>Counter And Timer</th>
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<td>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</td>
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<td>Unit:5</td>
<td>Applications</td>
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<th>Unit:6</th>
<th>Contemporary Issues</th>
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<tr>
<td>Workshop on PLC and its applications</td>
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**Total Lecture hours**: 48 hours

**Text Book(s)**
3. Siemens *“PLC Handbook”*.

**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:**
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: 5EG
Core/Elective/Supportive: Elective II – G

Pre-requisite: Concepts of Automotive Electronics
Syllabus Version: 2020-2021

Course Objectives:

The main objectives of this course are to:
1. To understand the concepts of Automotive Electronics and its evolution and Trends automotive systems & subsystems overview.
2. To understand sensors and sensor monitoring mechanisms aligned to automotive Systems, different signal conditioning techniques, interfacing techniques and actuator
3. To understand, design and model various automotive control systems using Model based development technique.

Expected Course Outcomes:

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

1. Obtain an overview of automotive components and subsystems.
2. Interface automotive sensors and actuators with microcontrollers
3. Understand the design cycles, communication protocols and safety systems employed in today’s automotive industry.
4. Understand the engine management systems
5. Apply the knowledge of electronic instrument systems

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

Unit: 1
Introduction
9 hours

Unit: 2
Ignition Systems
10 hours

Unit: 3
Instrumentation Systems
10 hours
Introduction to Instrumentation Systems, Various Sensors Used for Different Parameters, Sensing Driver Instrumentation Systems, Vehicle Condition Monitoring Trip Computer, Different Types of Visual Display

Unit: 4
Electronic Control Of Braking And Traction
9 hours
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

Unit: 5
Engine Management Systems
10 hours

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<th>Unit: 6</th>
<th>Contemporary Issues</th>
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<td>An interactive session on ignition system, engine management systems</td>
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| Total Lecture hours | 48 hours |

Text Book(s)

1. TOM DENTON, *Automobile Electrical and Electronic Systems*, Edward Arnold pb., 1995

Reference Books


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

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*S-Strong; M-Medium; L-Low*
Course Code  | 5EH  
---|---
Core/Elective/Supportive: | SATELLITE COMMUNICATIONS

| Pre-requisite: | Syllabus version |
---|---
| PRINCIPLES OF COMMUNICATION | 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**  
9 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**  
9 Hours  

Unit: 3  
**The Space Segment**  
10 Hours  

Unit: 4  
**Satellite Link Design**  
9 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**  
9 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  
Seminar on satellite communication, satellite systems

Text Books

willey, 2006.


### 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.

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*S-Strong; M-Medium; L-Low*
Course Code: 6EI

INTERNET OF THINGS

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<td>Basic Electronics</td>
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Pre-Requisite: Basic Electronics

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:

1. Study the concept of basic IoT (K1)
2. Familiarize the principle of connected devices (K2)
3. Gain knowledge about embedded devices (K3)
4. Analyze different sensor Interface technology (K4)
5. Analyze the IoT applications (K4)

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

Unit: 1 IOT Fundamentals 16 hours


Unit: 2 Design Principles For Connected Devices 18 hours

Introduction-IoT/M2m systems - Communication Technologies - Data management, data consolidation and Device management - Ease of Designing and Affordability.

Unit: 3 Programming Fundamentals With C Using Arduino IDE 18 hours


Unit: 4 Sensors And Actuators 18 hours

Analog and Digital Sensors – Interfacing temperature sensor, ultrasound sensor and infrared (IR) sensor with Arduino – Interfacing LED and Buzzer with Arduino.

Unit: 5 Sending Sensor Data Over Internet 18 hours

Introduction to ESP8266 NODEMCU WiFi Module – Programming NODEMCU using Arduino IDE – Using WiFi and NODEMCU to transmit data from temperature sensor to Open Source IoT cloud platform .

Unit: 6 Contemporary Issues 2 hours

Workshop on IoT and its applications
## Total Lecture hours

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<th>Total Lecture hours</th>
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## Reference Books

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

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<td>1. <a href="https://nptel.ac.in/courses/106/105/106105166/">https://nptel.ac.in/courses/106/105/106105166/</a> Introduction to IoT Part I – Lecture 1</td>
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<td>2. <a href="https://ocw.cs.pub.ro/courses/iot/courses/02Electronics">https://ocw.cs.pub.ro/courses/iot/courses/02Electronics</a> for Internet of Things – Lecture II</td>
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<td>3. <a href="https://nptel.ac.in/courses/106105166/">https://nptel.ac.in/courses/106105166/</a> Introduction to Arduino ~ I – Lecture 22</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.

## Mapping with Programme Outcomes

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**Course Objectives:**

The main objectives of this course are to:

1. To provide basic concepts in virtual instruments
2. To know about the programming methods in software used in virtual instrumentation
3. To familiarize the students with the applications of virtual instrumentation

**Expected Course Outcomes:**

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

1. Understand the basics concepts and programming in virtual instrumentation
2. Apply virtual instrumentation tool set for a given problem
3. Apply virtual instrumentation concept for a given applications
4. Understand the LabVIEW concepts
5. Learn the programming structure

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

**Unit:1**

**Introduction**

9 hours

General Functional Description of a digital instrument - Block Diagram of a Virtual Instrument - Physical quantities and Analog Interfaces - Hardware and Software - User Interfaces - Advantages of Virtual Instruments Over Conventional Instruments - Architecture of a Virtual Instrument and its Relation to the Operating System

**Unit:2**

**Software Overview**

9 hours

Lab VIEW - Graphical User interfaces - Controls and Indicators - ‘G’ programming – Labels and Text - Shape, Size and Color - Owned and Free Labels - Data Type, Format, Precision and Representation - Data Types - Data flow programming - Editing - Debugging and Running a Virtual Instrument - Graphical Programming Palettes and Tools - Front Panel Objects - Functions and Libraries

**Unit:3**

**Programming Structure**

10 hours


**Unit:4**

**Hardware Aspects**

9 hours

Installing hardware, Installing Drivers - Configuring the Hardware - Addressing the hardware in LabVIEW - Digital and Analog I/O function - Data Acquisition - Buffered I/O - Real time

**Unit:5**

**LABVIEW Applications**

9 hours

Data logging (DAQ) – OPC - Hardware in loop - Data base system - user interface for the control applications

**Unit:6**

**Contemporary Issues**

2 hours
Analysis over the software and hardware on virtual instrumentation

<table>
<thead>
<tr>
<th>Text Book(s)</th>
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<tr>
<td>2 Labview: Basics I &amp; II Manual, National Instruments, 2005</td>
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<table>
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<th>Reference Books</th>
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<tr>
<td>1 Lisa K Wells, &quot;Labview for Everyone&quot;, Prentice Hall of India, New Delhi, 1996</td>
</tr>
<tr>
<td>2 Barry Paron, &quot;Sensor, Transducers and Labview&quot;, Prentice Hall, New Delhi, 2000</td>
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</table>

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

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

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## 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
2. Understand the concept of medical instruments
3. Develop the troubleshooting Skills of medical instruments
4. Understand the concepts of signal conditioners & diagnostic equipments
5. Apply the knowledge gained on transducers and electrodes

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

### Unit:1 Basic Physiology 9 hours

### Unit:2 Electrodes And Transducers 9 hours

### Unit:3 Signal Conditioners & Diagnostic Equipments 9 hours
Instrumentation Amplifiers - Current Amplifiers - Isolation Amplifier - Need for Filters - Low Pass, 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 10 hours

### Unit:5 Physiological Assist Devices 9 hours
### Unit:6  
Contemporary Issues

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#### Text Book(s)

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<th>Publisher/Year</th>
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<tr>
<td>2</td>
<td>Leslie Cromwell, Fred J. Webell, Erich A. Pfeffer</td>
<td><em>Bio-medical Instrumentation and Measurements</em></td>
<td>Prentice Hall of India, New Delhi, 1990</td>
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<tr>
<td>1</td>
<td>Khandpur</td>
<td><em>Handbook on Biomedical Instrumentation</em></td>
<td>Tata McGraw Hill Company, New Delhi, 1989</td>
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<td>2</td>
<td>Ohn G Webster, Ed.</td>
<td><em>Medical Instrumentation Application and Design</em></td>
<td>John Wiley &amp; Sons, Singapore, 1999</td>
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<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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*S-Strong; M-Medium; L-Low*
Course Code: 6EL
Core/Elective/Supportive: Elective – III-L
Pre-requisite: Digital Principles and Applications

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

Unit: 1
VLSI Technology
9 hours

Unit: 2
Electrical Properties Of MOS Devices
9 hours
Drain to source current (I<sub>ds</sub>) versus Drain to source voltage (V<sub>ds</sub>) relationships – MOS transistor threshold voltage (V<sub>T</sub>) – MOS transistor trans-conductance g<sub>m</sub> and output conductance g<sub>ds</sub> – figure of merit (ω<sub>0</sub>) – pass transistor- pull – up to pull – down ratio.

Unit: 3
Design Processes
10 hours

Unit: 4
VLSI Physical Design And Styles
9 hours
PHYSICAL DESIGN:
VLSI DESIGN STYLES:

Unit: 5
Testing Of VLSI Circuits
9 Hours
Test Principles-BIST-Test Bench- Combinational Circuit Testing, Sequential Circuit Testing, Test
Bench Techniques.

<table>
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<th>Contemporary Issues</th>
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Text Books


Reference Books


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

1. [https://nptel.ac.in/courses/117/101/117101058/](https://nptel.ac.in/courses/117/101/117101058/)
2. [https://www.youtube.com/watch?v=9SnR3M3Clm4](https://www.youtube.com/watch?v=9SnR3M3Clm4)
3. [https://www.youtube.com/watch?v=Y8FvzocT4](https://www.youtube.com/watch?v=Y8FvzocT4)

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.

Mapping with Program Outcomes

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*S-Strong; M-Medium; L-Low*
Bharathiar University: Coimbatore 641046
Department of Electronics and Communication Systems

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

List of Elective papers (Colleges can choose any one of the paper as electives)

<table>
<thead>
<tr>
<th>Elective – I</th>
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<tbody>
<tr>
<td>A</td>
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<td>B</td>
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<td>C</td>
<td>Mobile Computing</td>
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