

# B. Sc. Electronics

## Syllabus

### AFFILIATED COLLEGES

Program Code: 22M

2021 – 2022 onwards



## BHARATHIAR UNIVERSITY

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

Coimbatore - 641 046, Tamil Nadu, India

<b>Program Educational Objectives (PEOs)</b>	
The <b>B. Sc. Electronics</b> program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
<b>PEO1</b>	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.
<b>PEO2</b>	Impart analytic and thinking skills to develop initiatives and innovative ideas for R&D, Industry and societal requirements.
<b>PEO3</b>	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.
<b>PEO4</b>	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.
<b>PEO5</b>	Motivate graduates to become good human beings and responsible citizens for the overall welfare of the society.
<b>PEO6</b>	Develop attitude in lifelong learning, applying and adapting new ideas and technologies as their field evolves.
<b>PEO7</b>	To prepare graduates who will have knowledge, ability and courage to pursue higher studies and research.

<b>Program Specific Outcomes (PSOs)</b>	
After the successful completion of B.Sc. Electronics program, the students are expected to	
<b>PSO1</b>	Demonstrate proficiency in use of software and hardware required to practice electronics and communication profession.
<b>PSO2</b>	Graduates will be able to apply fundamentals of electronics in various domains of analog and digital systems
<b>PSO3</b>	Apprehend and analyse specific engineering problems of communication, electronic circuits, computer programming, embedded systems, VLSI design and semiconductor technology by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.
<b>PSO4</b>	Ability to communicate effectively with excellent interpersonal skills and demonstrate the practice of professional ethics for societal benefit
<b>PSO5</b>	Graduates will be able to apply fundamentals of electronics in various domains of analog and digital systems.
<b>PSO6</b>	Use embedded system concepts for developing IoT applications



<b>Program Outcomes (POs)</b>	
On successful completion of the B. Sc. Electronics program	
<b>PO1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, Science, Engineering fundamentals and an engineering specialization to the solution of complex engineering problems
<b>PO2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature and analyse complex engineering problems reaching substantiated conclusion using principles of mathematics and Engineering sciences
<b>PO3</b>	<b>Design/Development of solutions:</b> 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.
<b>PO4</b>	<b>Conduct investigation of complex problems:</b> 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.
<b>PO5</b>	<b>Modern tool usage:</b> 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
<b>PO6</b>	<b>The engineer and society:</b> 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.
<b>PO7</b>	<b>Environment and Sustainability:</b> Understand the impact of the professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of and need fir sustainable development
<b>PO8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9</b>	<b>Individual and team work:</b> Function effectively as an individual, an as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO10</b>	<b>Life-Long learning:</b> 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.

## BHARATHIAR UNIVERSITY: : COIMBATORE 641 046

**B. Sc. Electronics Curriculum**  
**(University Affiliated Colleges)**

*(For the students admitted during the academic year 2021 – 22 onwards)*

Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			Theory	Practical	CIA	ESE	TOTAL
<b>FIRST SEMESTER</b>							
11T	Language –I	4	6	-	50	50	100
12E	English – I	4	6	-	50	50	100
13A	<b>Core Paper I :</b> Basic Electronics	4	5	-	50	50	100
--	<b>Core Practical I:</b> Basic Electronics Lab	-	-	3	-	-	-
--	<b>Core Practical II :</b> Semiconductor Devices Lab	-	-	3	-	-	-
1AA	<b>AlliedI</b> Mathematics–I	4	5	-	50	50	100
1FA	Environmental Studies #	2	2	-	-	50	50
<b>Total</b>		18	-	-	200	250	450
<b>SECOND SEMESTER</b>							
21T	Language – II	4	6	-	50	50	100
22E	English – II	4	6	-	50	50	100
23A	<b>Core Paper II :</b> Semiconductor Devices	4	5	-	50	50	100
23P	<b>Core Practical I:</b> Basic Electronics Lab	4	-	3	50	50	100
23Q	<b>Core Practical II:</b> Semiconductor Devices Lab	4	-	3	50	50	100
2AA	<b>Allied : II</b> Mathematics–II	4	5	-	50	50	100
2FB	Value Education – Human Rights #	2	2	-	-	50	50
	Swatch Bharat- Summer internship **	-	-	-	-	-	-
<b>Total</b>		26	-	-	300	350	650

THIRD SEMESTER							
33A	<b>Core Paper III :</b> Principles of Communication Systems	4	4	-	50	50	100
33B	<b>Core Paper IV:</b> Digital Principles and Applications	4	4	-	50	50	100
33C	<b>Core Paper V:</b> Electronic Circuits	4	4	-	50	50	100
--	<b>Core Practical III:</b> Electronic Circuits & Communication Lab	-	-	3	-	-	-
--	<b>Core Practical IV:</b> Digital Electronics and Microprocessor Lab	-	-	3	-	-	-
3AD	<b>Allied : III</b> Programming in C	3	4	-	30	45	75
--	<b>Core Practical V:</b> Computer Programming Lab	-	-	3	-	-	-
3ZA	<b>Skill based Subject I :</b> Computer Oriented Office Automation	3	3	-	30	45	75
3FB/ 3FC	Tamil @ / Advanced Tamil#(OR) Non-major elective - I (Yoga for Human excellence # Womens Rights#)	2	2	-	-	50	50
<b>Total</b>		20	-	-	210	290	500
FOURTH SEMESTER							
43A	<b>Core Paper VI :</b> 8085 Microprocessor Interfacing and its Applications	4	4	-	50	50	100
43B	<b>Core Paper VII :</b> IC's and Instrumentation	4	4	-	50	50	100
43C	<b>Core Paper VIII :</b> Biomedical Instrumentation	4	4	-	50	50	100
43P	<b>Core Practical III</b> Electronic Circuits and Communication Lab	4	-	3	50	50	100
43Q	<b>Core Practical IV:</b> Digital Electronics and Microprocessor Lab	4	-	3	50	50	100

4AD	<b>Allied: IV</b> Object Oriented Programming using C++	3	4	-	30	45	75
43R	<b>Core Practical V :</b> Computer Programming Lab	2	-	3	25	25	50
4ZB	<b>Skill based Subject II :</b> PC Hardware and Troubleshooting	3	3	-	30	45	75
4FB/ 4FE	Tamil @ /Advanced Tamil # (OR) Non-major elective -II (General Awareness #)	2	2	-	-	50	50
<b>Total</b>		30			345	405	750
<b>FIFTH SEMESTER</b>							
53A	<b>Core Paper IX : 8051</b> Microcontroller and its Applications	4	6	-	50	50	100
5EA/ 5EB/ 5EC/ 5ED	<b>Elective I</b>	4	6	-	50	50	100
5EE/ 5EF/ 5EG/ 5EH	<b>Elective II</b>	4	6	-	50	50	100
--	<b>Core Practical VI:</b> IC,TV and Medical Electronics Lab	-	-	3	-	-	-
--	<b>Core Practical VII:</b> Industrial and Power Electronics Lab	-	-	3	-	-	-
--	<b>Core Practical VIII :</b> Microcontroller Lab	-	-	3	-	-	-
5ZC	<b>Skill based subject – III</b> Visual Programming	3	3	-	30	45	75
<b>Total</b>		15	-	-	180	195	375
<b>SIXTH SEMESTER</b>							
63A	<b>Core Paper X : Design with</b> PIC Microcontroller	4	5		50	50	100
6EI/ 6EJ/ 6EK/ 6EL	<b>Elective III</b>	4	5		50	50	100

63P	<b>Core PracticalVI:</b> IC,TV and Medical Electronics Lab	4		3	50	50	100
63Q	<b>Core Practical VII:</b> Industrial and Power Electronics Lab	4		3	50	50	100
63R	<b>Core PracticalVIII</b> :MicrocontrollerLab	4		3	50	50	100
67V	<b>PROJECT</b>	6		-	75	75	150
6ZP	<b>Skill based Subject – IV</b> Practical Visual Programming	3		3	30	45	75
67A	Extension Activities @	2	-	2	50	-	50
<b>Total</b>		<b>31</b>			<b>405</b>	<b>370</b>	<b>775</b>
<b>GrandTotal</b>		<b>140</b>					<b>3500</b>

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

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

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

**\*\* Swatch Bharat Summer internship- extra 2 credits would be given. It is mandatory**

<b>List of Elective papers (Colleges can choose any one of the paper as electives)</b>		
<b>Elective – I</b>	<b>A</b>	PCB Design and Fabrication
	<b>B</b>	Advanced Communication Systems
	<b>C</b>	Internet Of Things
	<b>D</b>	Advanced Computer Architecture
<b>Elective – II</b>	<b>E</b>	Modern Television Engineering
	<b>F</b>	Microwave and Fiber Optic Communication
	<b>G</b>	Automotive Electronics
	<b>H</b>	Satellite Communications
<b>Elective – III</b>	<b>I</b>	Industrial and Power Electronics
	<b>J</b>	Robotics
	<b>K</b>	Programmable Logic Controllers
	<b>L</b>	VLSI Design





# First Semester

Course code	BASIC ELECTRONICS			L	T	P	C
Core /Elective / Supportive:	Core I			5			4
Pre-requisite	Higher secondary physics			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
The main objectives of this course are to:							
<ul style="list-style-type: none"> <li>❖ To become familiar with fundamentals of electronic components</li> <li>❖ To learn to use common electronic components</li> <li>❖ To design electronic circuits to perform realistic tasks</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Understand the basic electronic components						K2
2	Understand the basic electronic components						K2
3	Differentiate and demonstrate the voltage and current source.						K3
4	Apply the electronic components in network theorems.						K3
5	Put into practice and use the electronic components						K4
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 – Create</b>							
<b>Unit:1</b>	<b>RESISTORS &amp; INDUCTORS</b>					<b>15hours</b>	
Types of Resistors: Fixed, Variable - Brief mention of their Construction and Characteristics - Color Coding of Resistors - Connecting Resistors in Series and Parallel Types of Inductors: Fixed, Variable- Self and Mutual Inductance-Faraday's Law and Lenz's Law Of Electromagnetic Induction-Energy Stored In An Inductor-Inductance In Series And Parallel- Testing of Resistance and Inductance using Multimeter.							
<b>Unit:2</b>	<b>CAPACITORS</b>					<b>15hours</b>	
Principles of Capacitance-Parallel Plate Capacitor-Permittivity-Definition of Dielectric Constant - Dielectric Strength-Energy Stored in a Capacitor-Types of Capacitors: Air, Paper, Mica, Teflon, Ceramic, Plastic and Electrolytic: Construction and Application- Connecting Capacitors in Series and Parallel - Factors Governing the Value of Capacitors- Testing of Capacitors Using Millimeters.							
<b>Unit:3</b>	<b>ELECTRICAL ELEMENTS AND CIRCUITS</b>					<b>15hours</b>	
Potential Difference- Electric Current-Electromotive Force - Ohms Law- Kirchoff's Law - Kirchoff's Current Law-Analysis of Resistance in Series Circuits, Parallel Circuits and Series Parallel Circuits-Concept of Voltage Source and Current Source-Voltage Source in Series and Current Source in Parallel-Simple Problems in DC Circuits.							
<b>Unit:4</b>	<b>NETWORK THEOREMS</b>					<b>15 hours</b>	
Superposition Theorem - Thevenin Theorem-Thevenin in Circuit with Two Voltage Sources - Bridge Circuit - Norton's Theorem - Thevenin to Norton Conversion - Conversion of Voltage and Current Sources - Millman's Theorem - Star and Delta Conversion-Maximum Power Transfer Theorem - Simple Problems in DC Circuits.							
<b>Unit:5</b>	<b>AC CIRCUITS</b>					<b>15hours</b>	
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 - Series							

Resonant Circuit – Parallel Resonant Circuit - Q Factor - Passive Filters: Low Pass Filters, High Pass Filters, Band Pass Filters, Band Rejection Filters	
	<b>Total Lecture hours</b>
	<b>75 hours</b>
<b>Text Book(s)</b>	
1	S.Salivahanan, N.Suresh Kumar, A.Vallavaraj “ <b>ELECTRONIC DEVICES AND CIRCUITS</b> ”-
2	B.V.Narayana Rao “ <b>PRINCIPLES OF ELECTRONICS</b> ”, Wiley Eastern Limited, 1992
<b>Reference Books</b>	
1	B.L.Theraja, “ <b>BASIC ELECTRONICS-SOLID STATE DEVICES</b> ”,S.Chand Company
2	BernardGrob “ <b>BASIC ELECTRONICS</b> ”-Tata McGraw-Hill Publishing Company Limited, 9thEdition.
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>	
1	<a href="https://nptel.ac.in/courses/108/104/108104139/">https://nptel.ac.in/courses/108/104/108104139/</a>
2	<a href="https://nptel.ac.in/courses/108/101/108101091/">https://nptel.ac.in/courses/108/101/108101091/</a>
3	<a href="https://www.youtube.com/playlist?list=PLFF553CED56CDE25D">https://www.youtube.com/playlist?list=PLFF553CED56CDE25D</a>
4	<a href="https://www.youtube.com/watch?v=w8Dq8blTmSA">https://www.youtube.com/watch?v=w8Dq8blTmSA</a>
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										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	L	L	L	L	M	S	M
CO2	L	L	L	L	L	M	M	S	M	S
CO3	M	M	S	L	M	S	L	L	M	M
CO4	M	L	L	L	L	S	L	L	M	S
CO5	L	M	S	S	M	L	L	L	M	M

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

Course code	BASIC ELECTRONICS LAB			L	T	P	C	
Core /Elective / Supportive:	Core Practical I					3	4	
Pre-requisite	Basic Electronics theory			Syllabus Version		2021-22		
<b>Course Objectives:</b>								
The main objectives of this course are to:								
<ul style="list-style-type: none"> <li>❖ To understand the fundamental principles of circuit theory</li> <li>❖ To make use of circuit laws and theorems and measuring the circuit parameters.</li> </ul>								
<b>Expected Course Outcomes:</b>								
On the successful completion of the course, student will be able to:								
1	Apply the concept of basic circuit and theorems						K3	
2	Simplify the circuits using series and parallel equivalents and using Thevenin's and Norton's equivalent circuits.						K3	
3	Design resonance circuits.						K4	
4	Use the oscilloscope for the display and measurements of signals.						K2	
5	Analyse Various Theorems with different resistance values						K4	
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 - Create</b>								
			<b>BASIC ELECTRONICS LAB</b>			90 Hours		
(Any 16 Experiments)								
<ol style="list-style-type: none"> <li>1. Study of Multimeter – Checking of Components</li> <li>2. Measurement of Amplitude, Frequency &amp; Phase Difference using CRO</li> <li>3. Verification of Ohm's Law</li> <li>4. Voltage sources in Series, Parallel and Series –Parallel</li> <li>5. Resistance in Series, Parallel and Series –Parallel</li> <li>6. Voltage and Current Dividers</li> <li>7. Verification of Kirchoff's Law</li> <li>8. Wheatstone Bridge</li> <li>9. Verification of Norton's Theorem</li> <li>10. Verification of Thevenin's Theorem</li> <li>11. Verification of Millman's Theorem</li> <li>12. Verification of Superposition Theorem</li> <li>13. LCR Bridge</li> <li>14. Series Resonance Circuit</li> <li>15. Parallel Resonance Circuit</li> <li>16. Transient Response of RC Circuit</li> <li>17. Transient Response of RL Circuit</li> <li>18. Capacitors &amp; Inductors in Series &amp; Parallel</li> <li>19. Frequency Response of R, L &amp; C</li> <li>20. Low Pass Filter &amp; High Pass Filter</li> <li>21. Band pass and Band Rejection Filter</li> <li>22. Verification of Maximum Power Transfer Theorem</li> <li>23. Measurement of resistance and capacitance in series and parallel</li> </ol>								

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	<a href="https://nptel.ac.in/courses/122/106/122106025/">https://nptel.ac.in/courses/122/106/122106025/</a>
2	<a href="https://nptel.ac.in/courses/122/106/122106026/">https://nptel.ac.in/courses/122/106/122106026/</a>
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										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	L	M	L	L	L	L	M	S	M
CO3	L	M	M	M	L	M	L	S	M	L
CO3	M	L	S	L	L	S	L	L	L	M
CO4	M	M	L	L	L	S	M	L	M	L
CO5	L	M	S	M	M	M	L	L	M	M

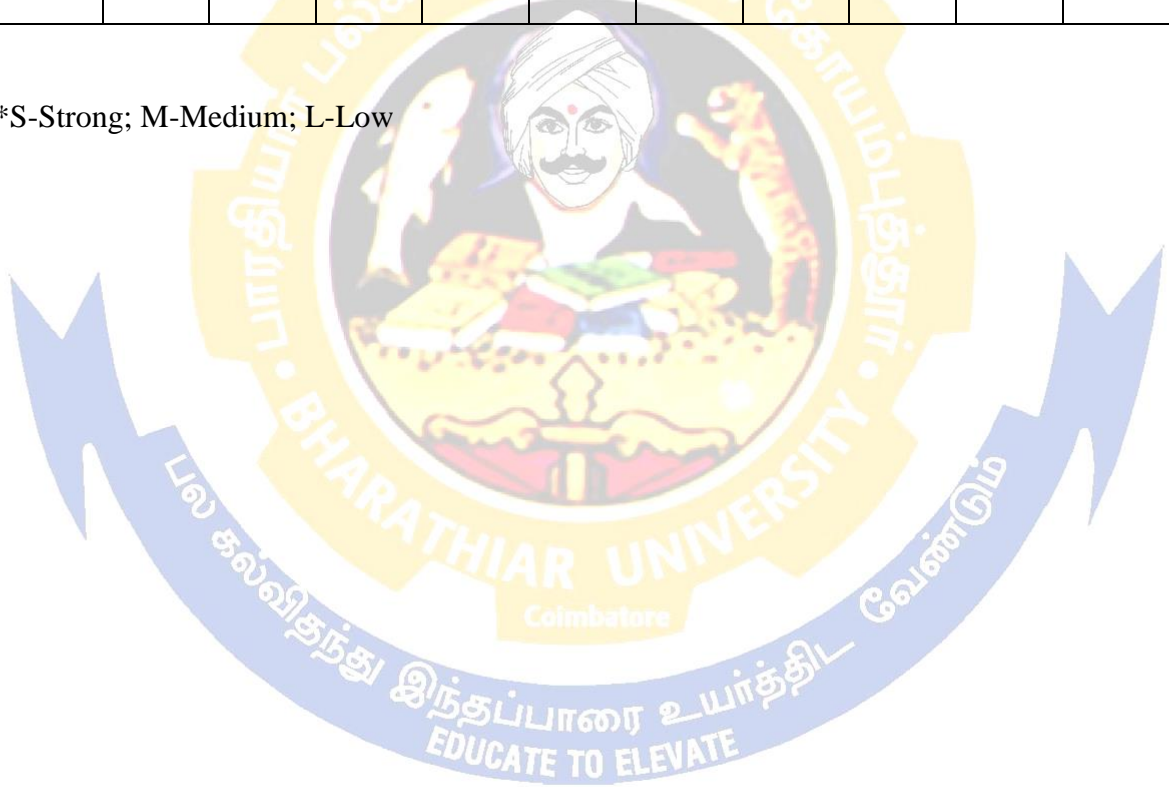
\*S-Strong; M-Medium; L-Low



Course code	SEMICONDUCTOR DEVICES LAB		L	T	P	C
Core /Elective / Supportive:	Core Practical II				3	4
Pre-requisite:	Higher secondary physics		Syllabus Version		2021-22	
<b>Course Objectives:</b>						
The main objectives of this course are to:						
<ul style="list-style-type: none"> <li>❖ To understand and experiment the basic parameters of electronic devices.</li> <li>❖ To construct few applications using semiconductor devices.</li> </ul>						
<b>Expected Course Outcomes:</b>						
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	Apply Various transistor characteristics in applications.					K3
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 - Create</b>						
<b>UNIT I</b>	<b>SEMICONDUCTOR DEVICES LAB</b>				<b>90 Hours</b>	
(Any 16 Experiments)						
<ol style="list-style-type: none"> <li>1. Band Gap Energy of Silicon / Germanium Diode</li> <li>2. V-I Characteristics of Junction Diode</li> <li>3. V-I Characteristics of Zener Diode</li> <li>4. Transistor Characteristics of CE Configuration</li> <li>5. Transistor Characteristics of CB Configuration</li> <li>6. Transistor Characteristics of CC Configuration</li> <li>7. Clipping Circuits</li> <li>8. Clamping Circuits</li> <li>9. Measurement of Stability Factor of Fixed Bias</li> <li>10. Measurement of Stability Factor of Self Bias</li> <li>11. V-I Characteristics of JFET</li> <li>12. V-I Characteristics of UJT</li> <li>13. UJT as Oscillator</li> <li>14. Characteristics of Solar Cell</li> <li>15. Study of IR (Tx &amp; Rx)</li> <li>16. Study of LED and 7 Segment display</li> <li>17. Temperature Co-efficient of Junction Diode</li> <li>18. Zener as a Voltage Regulator</li> <li>19. ON / OFF control of relay using Opto – Couplers</li> <li>20. Characteristics of SCR</li> <li>21. TRIAC Characteristics</li> </ol>						
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										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	L	M	L	L	L	L	M	S	M
CO3	L	M	M	M	L	M	L	S	M	L
CO3	M	L	S	L	L	S	L	L	L	M
CO4	M	M	L	L	L	S	M	L	M	L
CO5	L	M	S	M	M	M	L	L	M	M

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





# Second Semester



Course code	SEMICONDUCTR DEVICES			L	T	P	C
<b>Core /Elective / Supportive:</b>	<b>Core Paper II:</b>			<b>5</b>			<b>4</b>
<b>Pre-requisite</b>	<b>Higher secondary physics</b>			<b>Syllabus Version</b>		<b>2021-22</b>	
<b>Course Objectives:</b>							
The main objectives of this course are to:							
<ul style="list-style-type: none"> <li>❖ To enable the students to understand and gain the knowledge on semiconductor devices.</li> <li>❖ To acquaint the students with construction, theory and characteristics of the electronic</li> </ul>							
<b>Expected Course Outcomes:</b>							
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
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 - Create</b>							
<b>Unit:1</b>	<b>PN JUNCTION DIODE</b>					<b>15hours</b>	
Energy Band Structure and Conduction in Insulator - Semiconductor, Conductor - Intrinsic and Extrinsic Semiconductor – Doping – P Type – N Type Semiconductor - Formation of PN Junction Diode - Forward Bias - Reverse Bias Condition – Characteristics - Clipping and Clamping.							
<b>Unit:2</b>	<b>SPECIAL DIODES</b>					<b>15hours</b>	
Zener Diode - VI Characteristics – Breakdown - Backward Diode – Varactor Diode - Step Recovery Diode - Point Contact Diode - Shcottkey Diode - Tunnel Diode - Gunn Diode - ImpattDiode - PIN Diode - PNP Diode							
<b>Unit:3</b>	<b>BJT</b>					<b>15hours</b>	
Introduction To Bipolar Junction Transistor – Construction - Transistor Biasing - Operation of NPN and PNP Transistor - CB, CE &CC Configuration - Bias Stability - Load Line - Method of Biasing: Fixed Bias - Collector to Base Bias - Voltage Divider Bias – Bias Compensation - Thermal Runaway - HeatSink							
<b>Unit:4</b>	<b>FET AND UJT</b>					<b>15hours</b>	
Introduction to FET - Construction and Operation of N-Channel JFET - Drain Characteristics- Comparison of JFET &BJT - Introduction to MOSFET - Enhancement MOSFET – Depletion MOSFET - FET as a Voltage Variable Resistor(VVR) - Introduction to UJT – Characteristics – UJT as Relaxation Oscillator - Introduction to PUT – SCR – TRIAC -DIAC							
<b>Unit:5</b>	<b>OPTOELECTROIC DEVICES</b>					<b>15hours</b>	
Principles, Operation And Characteristics Of Opto Electronic Devices: LDR – Photo Diode - Photo Transistor – Photo Voltaic Cell – Solar Cell – Photo Emissive Sensors – Vacuum Photo Tube– Gap Filled Photo Tube – Photo Multiplexer – LED – IR Emitter – LCD – Optocouplers							
<b>Total Lecture hours</b>						<b>75 hours</b>	

Text Book(s)	
1	S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, “ELECTRONICS DEVICES AND CIRCUITS”, Tata McGraw Hill Publishing Company Limited, New Delhi, 8th edition.
2	B. L. Theraja, “BASIC ELECTRONICS – SOLID STATE DEVICES”, S.Chand&Company Ltd. 2000
Reference Books	
1	S.L. Kakani,K. C. BhanDai-A TEXTBOOK OF ELECTRONICS
2	Bernard Grob “BASIC ELECTRONICS”-Tata McGraw-Hill Publishing Company Limited,
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	<a href="https://nptel.ac.in/courses/108/108/108108122/">https://nptel.ac.in/courses/108/108/108108122/</a>
2	<a href="https://nptel.ac.in/courses/108/108/108108112/">https://nptel.ac.in/courses/108/108/108108112/</a>
3	<a href="https://nptel.ac.in/courses/115/102/115102103/">https://nptel.ac.in/courses/115/102/115102103/</a>
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										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	L	M	L	M	M	M	S	M
CO2	L	L	L	L	L	M	M	M	L	L
CO3	L	M	L	L	S	M	L	L	M	M
CO4	L	M	M	L	L	S	M	L	M	S
CO5	M	L	L	M	L	M	M	L	M	M

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



# Third Semester

Course code	PRINCIPLES OF COMMUNICATION SYSTEMS			L	T	P	C
Core /Elective / Supportive:	Core Paper III			4			4
Pre-requisite:	Higher secondary physics			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
The main objectives of this course are to:							
<ul style="list-style-type: none"> <li>❖ To understand the concept of wave propagation and its types.</li> <li>❖ To acquire knowledge on Amplitude and Frequency modulation.</li> <li>❖ To inculcate the principle of radio receivers and its types.</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Understand the basic building blocks of communication systems						K2
2	Analyse 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	Understand Various Receiver circuits						K2
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 – Create</b>							
<b>Unit:1</b>	<b>WAVE PROPAGATION</b>					<b>12hours</b>	
EM Waves – Free Space Propagation – Surface Wave Propagation – Sky Wave Propagation – Space Wave Propagation – Tropospheric Scatter Propagation – Structure Of Atmosphere – Virtual Height – MUF – LUF – Skip Distance – OWF – Ionosphere Abnormalities- Duct Propagation							
<b>Unit:2</b>	<b>ANTENNAS</b>					<b>12hours</b>	
Electromagnetic Radiations – Elementary Doublet – Current And Voltage Distribution – Resonant Antennas, Radiation Patterns and Length Calculations – Non Resonant Antennas – Antenna Gain and Effective Radiated Power – Antenna Resistance – Bandwidth, Beam Width and Polarization – Grounded and Ungrounded Antennas – Effects Of Height – Feed Point – Couplers – Impedance Matching – Dipole Arrays - Yagi Uda Antenna – Parabolic Antenna – Horn and Lens Antenna – Helical Antenna							
<b>Unit:3</b>	<b>MODULATION TECHNIQUES</b>					<b>12hours</b>	
Introduction to Communication Systems – Information – Transmitter – Channel – Noise – Receiver –Need for Modulation Band Width Requirement – Amplitude Modulation: AM Theory – Frequency Spectrum of AM Wave – Representation of AM – Power Relations In AM Wave – AM Transmitter Block Diagram – Frequency Modulation – System Description – Mathematical Representation – Frequency Spectrum – Generation of FM – Direct and Indirect Methods.							
<b>Unit:4</b>	<b>SINGLE SIDEBAND MODULATION</b>					<b>12hours</b>	
Introduction – Principles – Balanced Modulator – SSB Generation: Filter Method, Phase Shift Method and Third Method – SSB Reception: Pilot Carrier SSB and Independent Side Band – Vestigial Sideband Transmission – Introduction to PAM, PWM AndPPM							

<b>Unit:5</b>	<b>RECEIVER</b>	<b>12hours</b>
Introduction – Super Heterodyne Receiver – Choice of IF and Oscillator Frequencies – Image Rejection – Adjacent Channel Selectivity – Spurious Response - Tracking – AGC – Double Conversion Receiver		
<b>Total Lecture hours</b>		<b>60 hours</b>
<b>Text Book(s)</b>		
1	Kennedy and Davis “ <b>Electronic Communication Systems</b> ” Tata McGraw Hill, 8th edition,	
2	Dennis Roddy and John Coolen, “ <b>Electronic Communications</b> ” PHI, 4th edition,	
<b>Reference Books</b>		
1	K.D. Prasad and Satyaprakahan“ <b>Antenna Wave Propagation</b> ” 3rd edition.	
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>		
1	<a href="https://swayam.gov.in/nd1_noc20_ee16/preview">https://swayam.gov.in/nd1_noc20_ee16/preview</a>	
2	<a href="https://swayam.gov.in/nd1_noc19_ee47/preview">https://swayam.gov.in/nd1_noc19_ee47/preview</a>	
Course Designed By: K.Manikantan, Assistant Professor, Government Arts College, Ooty.& Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.		

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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

Course code	DIGITAL PRINCIPLES AND APPLICATIONS			L	T	P	C
Core /Elective / Supportive:	Core Paper IV			4			4
Pre-requisite:	Basic Physics			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
The main objectives of this course are to:							
<ul style="list-style-type: none"> <li>❖ To acquire the basic knowledge of Number system, Digital logic circuits and its application</li> <li>❖ To outline the formal procedures for the analysis and design of combinational and sequential circuits</li> <li>❖ To learn the concepts of A/D, D/A conversions and their types</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Understand the basics of Number system and gates						K2
2	Realize the operation of various logic gates and analysing the outputs						K1
3	Analyse and design the combinational logic circuits						K4
4	Analyse and design the Sequential logic circuits						K4
5	Design various synchronous and asynchronous sequential circuits						K6
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 – Create</b>							
<b>Unit:1</b>	<b>NUMBER SYSTEM AND CODES</b>					<b>12hours</b>	
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 – Error Detection Codes – Hamming Codes – ASCII Codes – EBCDIC Codes – Hollerith Code – Parity Advantages.							
<b>Unit:2</b>	<b>BOOLEAN ALGEBRA AND LOGIC GATES</b>					<b>12hours</b>	
Boolean logic operations – Boolean functions – Truth Tables – Basic Laws – DeMorgans Theorem – Sum of Products and Products of Sums – Karnaugh map – Logic Gates – OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR Gates – Code Conversion – VHDL Coding for Logic Gates							
<b>Unit:3</b>	<b>COMBINATIONAL LOGIC CIRCUITS</b>					<b>12hours</b>	
Half Adder – Full Adder – Half Sub tractor – Full Sub tractor – Parallel Binary Adder – 4 bit Binary Adder / Subtractor – BCD adder – Multiplexer – Demultiplexer – Decoders – Encoders – Parity Generators / Checkers – Magnitude Comparators – VHDL Coding for Combinational Circuits							
<b>Unit:4</b>	<b>SEQUENTIAL LOGIC CIRCUITS</b>					<b>12hours</b>	
Flip Flops – RS, Clocked RS, JK, JK Master Slave, D and T Flip Flops – Shift Registers and its Types – Ring Counters – Ripple Counters – Synchronous Counter – Up Down counter – Mod-3, Mod-5 Counters – Decade Counter – Applications							

<b>Unit:5</b>	<b>D/A AND A/D CONVERTERS</b>	<b>12 hours</b>
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.		
	<b>Total Lecture hours</b>	<b>60 hours</b>
<b>Text Book(s)</b>		
1	Malvino & Leech, “ <b>DigitalPrinciplesandApplications</b> ”, Tata McGrawHill Edition V, 2002.	
2	M.Morris Mano ,” <b>Digital Logic and Computer Design</b> ”, PHI 2005.	
<b>Reference Books</b>		
1	Floyd and Jain, <b>Digital Fundamentals</b> , Prentice Hall2010	
2	M. Morris Mano Charles Kime, <b>Digital Logic and Computer Design Fundamentals</b> , Pearson Education Limited, 2014	
<b>Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]</b>		
1	<a href="https://soaneemrana.org/onewebmedia/DIGITAL%20PRINCIPLES%20AND%20APPLICATION%20BY%20LEACH%20&amp;%20MALVINO.pdf">https://soaneemrana.org/onewebmedia/DIGITAL%20PRINCIPLES%20AND%20APPLICATION%20BY%20LEACH%20&amp;%20MALVINO.pdf</a> E book, Malvino & Leech, – <b>DIGITALPRINCIPLESANDAPPLICATIONS</b> , TataMcGrawHillEdition XI,2011	
2	<a href="https://nptel.ac.in/courses/117/106/117106086/">https://nptel.ac.in/courses/117/106/117106086/</a> Introduction to digital circuits	
Course Designed By: R.Archana, Assistant professor, Nehru Arts and Science College,Coimbatore&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.		

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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

Course Code	ELECTRONIC CIRCUITS			L	T	P	C
Core /Elective / Supportive:	Core paper V			4			4
Pre-Requisite:	Basic Physics			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
<b>The Main Objectives of this course are to:</b>							
<ul style="list-style-type: none"> <li>❖ To enable the students to understand and gain the knowledge on power supplies, amplifiers and oscillators.</li> <li>❖ To acquaint the students with construction, theory and characteristics of the electronic amplifier circuits and types of multivibrators.</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	understand the concepts of Rectifiers and regulators					K2	
2	Study about Small signal amplifiers					K1	
3	analyse the functions of power amplifiers					K4	
4	analyse the performance of negative as well as positive feedback circuits					K4	
5	design oscillators and Multivibrators					K6	
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>							
<b>Unit:1</b>	<b>RECTIFIERS AND REGULATORS</b>					<b>12 hours</b>	
Half wave, Full waves and bridge Rectifiers – Calculation of RMS Value – Average Value – Ripple Factor – Efficiency – Transformer Utility Factor – Peak Inverse Voltage – Inductor Filter – Capacitor Filter – LC Filter – Pi Filter - Voltage Doubler – Voltage Regulator – Zener Diode Shunt Regulator – Transistor Shunt and Series Regulator – Overload Protection – Construction of DC Power Supply.							
<b>Unit:2</b>	<b>SMALL SIGNAL AMPLIFIERS</b>					<b>12 hours</b>	
CE, CB, CC amplifiers – Calculation of I/P Resistance, O/P Resistance – Current Gain - Voltage Gain – Power Gain – Single Stage Transistor Amplifier – DC and AC load line – RC Coupled Amplifier – Gain Frequency Response – Bandwidth – Transformer Coupled Amplifier – Impedance Matching – FET Amplifier.							
<b>Unit:3</b>	<b>POWER AMPLIFIERS</b>					<b>12 hours</b>	
Operation and Graphical Representation of Class A, Class B, Class C and Class AB Amplifiers – Maximum Collector Efficiency of Class A Power Amplifier – Collector Dissipation Curve – Harmonic Distortion – Class B Push Pull Amplifier – Crossover Distortion – Complementary Symmetry Push Pull Amplifier.							
<b>Unit:4</b>	<b>FEEDBACK AMPLIFIERS</b>					<b>12 hours</b>	
Basic concepts of feedback – Positive Feedback – Negative Feedback – Effects of Negative Feedback on Gain, Bandwidth and Distortion – Noise – Voltage Series Feedback - Voltage Shunt Feedback – Current Series Feedback – Current Shunt Feedback.							



<b>Unit:5</b>	<b>OSCILLATORS AND MULTIVIBRATORS</b>	<b>12 hours</b>
Barkhausen Criterion – Hartley Oscillator – Colpitts Oscillator – Phase Shift Oscillator – Wein Bridge Oscillators – Peizo Electric Crystal and its Effects – Crystal Oscillator - Astable Multivibrator – Monostable multivibrator – Bistable Multivibrator – Schmitt Trigger		
	<b>Total Lecture hours</b>	<b>60 hours</b>
<b>Text Book(s)</b>		
1	S.K. Sahdev, ” <b>Electronic Principles</b> ”, Dhanpat Rai & Co (P) Ltd, 2nd Edition, 1998	
2	B.L.Theraja, “ <b>Basic Electronics</b> ”, Chand Company Ltd, 2000.	
<b>Reference Books</b>		
1	V.K.Metha, Rohit Metha, “ <b>Principles of Electronics</b> ” S Chand, 2006 .	
2	B.Sasikala, C.Poornachandra, ” <b>Electronic Devices and Circuits</b> ”, Scitech 2003.	
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]</b>		
1	<a href="http://www.ee.iitm.ac.in/~ani/2012/ec5135/lectures.html">http://www.ee.iitm.ac.in/~ani/2012/ec5135/lectures.html</a> Lecture Notes	
2	<a href="https://nptel.ac.in/courses/108/102/108102097/#">https://nptel.ac.in/courses/108/102/108102097/#</a> Introduction to Electronic circuits NPTEL.	
3	<a href="https://nptel.ac.in/courses/108/102/108102095/">https://nptel.ac.in/courses/108/102/108102095/</a> Analog Electronic circuits NPTEL.	
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.		

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

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

<b>Course Code</b>		<b>ELECTRONIC CIRCUITS &amp; COMMUNICATION LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Core /Elective / Supportive:</b>	<b>Core Practical III</b>				<b>3</b>	<b>4</b>
<b>Pre-Requisite:</b>	<b>Electronic circuits theory and Communication theory</b>		<b>Syllabus Version</b>		<b>2021-22</b>	
<b>Course Objectives:</b>						
<b>The Main Objectives of this course are to:</b>						
<ul style="list-style-type: none"> <li>❖ To understand the concept of working of regulated power supplies,rectifiers, amplifiers andoscillators.</li> <li>❖ To experiment the modulation and detectiontechniques.</li> </ul>						
<b>Expected Course Outcomes:</b>						
On the Successful completion of the course, student will be able to:						
1	Design power supply and rectifier circuits					K6
2	Design Amplifiercircuits					K6
3	Design different Oscillator circuits					K6
4	Design different Modulation circuits					K6
5	Study on communication antennas					K1
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>						
<b>Part I</b>	<b>ELECTRONIC CIRCUITS</b>					<b>45 hours</b>
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 CoupledAmplifier 11. Half Wave and Full Wave Rectifier 12. FilterCircuits						
<b>Part II</b>	<b>ELECTRONIC COMMUNICATION</b>					<b>45 hours</b>
13. Performance of IF Amplifier 14. AM Modulation and Detection 15. FM Modulation and Detection 16. PAM Modulation						

17. PIN DiodeOscillator 18. Alignment of DishAntenna 19. Alignment of SatelliteReceiver 20. PWMModulation 21. PPMModulation 22. PCMModulation 23. GUNN DiodeOscillator (Any 16 Experiments)	
<b>Total Lecture hours</b>	
<b>90 hours</b>	
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										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

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

Course Code	DIGITAL ELECTRONICS AND MICROPROCESSOR LAB	L	T	P	C
Core /Elective / Supportive:	Core Practical IV			3	4
Pre-Requisite:	Digital Electronics and Microprocessor theory	Syllabus Version		2021-22	
<b>Course Objectives:</b>					
<p><b>The Main Objectives of this course are to:</b></p> <ul style="list-style-type: none"> <li>❖ To understand the logical operation of various gates and theorems</li> <li>❖ To develop various digital circuits</li> <li>❖ To develop the assembly language programming of Microprocessor and to interface it with various peripheral devices</li> </ul>					
<b>Expected Course Outcomes:</b>					
On the Successful completion of the course, student will be able to:					
1	Analyse the circuit using Boolean laws				K6
2	Design the Adder and subtractor circuit using logic gate				K6
3	Gain knowledge of arithmetic Programming of 8085				K6
4	Knowledge about logic Programming of 8085				K6
5	Understand the wave form generation				K1
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>					
<b>Part I</b>	<b>DIGITAL ELECTRONICS</b>				<b>45 hours</b>
<ol style="list-style-type: none"> <li>1. Verification of Basic Gates and Universal gates</li> <li>2. Verification of Demorgan's Theorem</li> <li>3. Half Adder and Full Adder &amp; Half Subtractor and Full Subtractor</li> <li>4. Decade Counter &amp; BCD Counter</li> <li>5. Study of Flip Flops</li> <li>6. Multiplexer and DeMultiplexers</li> <li>7. Encoder and Decoder</li> <li>8. BCD to 7-Segment Display</li> <li>9. Binary to Grey code and Grey to Binary code</li> <li>10. Synchronous and Asynchronous Counter</li> <li>11. Design and Simulation of Logic Gate using VHDL Coding</li> <li>12. Design and Simulation of Adder Circuits using VHDL Coding</li> </ol>					
<b>Part II</b>	<b>8085 MICROPROCESSOR LAB</b>				<b>45 hours</b>
<ol style="list-style-type: none"> <li>1. Addition / Subtraction/ Multiplication / Division of 8 bit data</li> <li>2. Block Data Transfer and Sum of N 8 bit Numbers</li> <li>3. To Arrange in Ascending / Descending order</li> </ol>					

4. UP/DOWN Counter using 7 segmentdisplays 5. Traffic Light ControlInterface 6. LED Interface 7. Stepper Motor Interface 8. Solid State RelayInterface 9. Data Transfer using 8255 (PPI) 10.Square Wave Generator using 8255 11.Interfacing ADC / DAC with8085 (Any 16 Experiments)	
<b>Total Lecture hours</b>	
<b>90 hours</b>	
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College, Coimbatore&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

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

Course Code	COMPUTER ORIENTED OFFICE AUTOMATION	L	T	P	C
Core /Elective / Supportive:	Skill Based Subject I	3			3
Pre-Requisite:	Computer Fundamentals	Syllabus Version		2021-22	
<b>Course Objectives:</b>					
<b>The Main Objectives of this course are to:</b>					
<ul style="list-style-type: none"> <li>❖ To learn about the computer organization, processor ,memory design and peripherals and recent systemarchitecture.</li> <li>❖ To develop a skills on using MS word, MS Excel, Power Point and MSAccess</li> </ul>					
<b>Expected Course Outcomes:</b>					
On the Successful completion of the course, student will be able to:					
1	Recognize and understand Basic of Computer				K2
2	Use and Practice of Word Processing				K3
3	Use and Practice of MS Excel				K3
4	Knowledge to Make Small Presentation				K6
5	Use and Practice of MS Access				K3
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>					
<b>Unit:1</b>	<b>BASICS OF COMPUTER</b>				<b>9 hours</b>
Introduction: What is a Computer - Software and Hardware Components – Hardware Accessories - Operating System Software - Software Applications - Computer Network: LAN - Internet - E-Mail – Browsers- E-Mail – Clients.					
<b>Unit:2</b>	<b>MS WORD</b>				<b>9 hours</b>
Setting Page Style - Formatting - Border & Shading – Columns - Header & Foot- Setting Footnotes - Inserting Manual Page Break - Column Break and Line Break - CreatingSectionsandFramesInserting-ClipArts,Pictures,andOtherFiles-Anchoring & Wrapping Setting Document Styles - Table of Contents - Index - Page Numbering, Data And Time, Author, Etc., - Creating Master Documents -Web Page					
<b>Unit:3</b>	<b>MS EXCEL</b>				<b>9 hours</b>
Creating Worksheet - Entering and Editing Text, Numbers, Formulas - Saving – Excel Functions Modifying Worksheet Range Selection Copying and Moving Data - Defining Names - Inserting and Deleting Rows of Columns - Moving Around Worksheet Naming Worksheet, Copying Inserting and Deleting Worksheet - Formatting, Gauging, Heading Displaying Value - Changing of Selecting Fonts - Protesting Data Using Style So Templates - Reprinting Worksheet Creating Charts - Managing Date - What If Tables Pate Tables Wraps – Macros - Linking Worksheets.					
<b>Unit:4</b>	<b>MS POWER POINT</b>				<b>9 hours</b>
Creating a Presentation: Setting Presentation Style - Adding Text to the Presentation - Formatting a Presentation: Adding Style - Color, Gradient Fills - Arranging Objects – Adding Header & Footer - Slide Background - Slide Layout - Adding Graphics to the Presentation: Inserting Pictures, Movies, Tables, Etc. Into the Presentation - Drawing Pictures Using Draw - Adding Effects to the Presentation: Setting Animation & Transition Effect - Adding Audio and Video.					

<b>Unit:5</b>	<b>MS ACCESS</b>	<b>9 hours</b>
Introduction: Database Concepts - Tables - Queries - Forms – Reports. Opening & Saving Database Files: Creating Table Design - Indexing - Entering Data – Importing Data - Creating Queries: SQL Statements - Setting Relationship - Using Wizards - Creating Forms: GUI - Form Creating & Printing Report.		
<b>Total Lecture hours</b>		<b>45 hours</b>
<b>Text Book(s)</b>		
1	<b>Step by Step 2007 Microsoft Office System (W/CD)</b> by Curtis Frye, Joyce Cox, Steve Lambert	
2	<b>Microsoft Office Word 2007 Plain &amp; Simple</b> by Jerry Joyce & Marianne Moon	
<b>Reference Books</b>		
1	<b>The Unofficial Guide to Microsoft Office Excel 2007</b> Julia Kelly & Curt Simmons	
2	<b>Microsoft Office Power point 2007 Plain &amp; Simple</b> Nancy Muir	
<b>Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]</b>		
1	<a href="https://www.msuniv.ac.in/images/e-content/6.Computer%20Fundamentals%20and%20Office%20Automation.pdf">https://www.msuniv.ac.in/images/e-content/6.Computer%20Fundamentals%20and%20Office%20Automation.pdf</a>	
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College, Coimbatore&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.		

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

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



# Fourth Semester



Course code	8085 MICROPROCESSOR INTERFACING AND ITS APPLICATIONS	L	T	P	C
Core /Elective / Supportive:	Core paper VI	4			4
Pre-requisite	Basic of Digital circuits and Programming languages	Syllabus Version		2021-22	
<b>Course Objectives:</b>					
The main objectives of this course are to:					
<ul style="list-style-type: none"> <li>❖ To enable the students to learn about the MicroprocessorArchitecture</li> <li>❖ To learn the instruction set of 8085 and to develop the programmingskills</li> <li>❖ To know various peripheral devices and to interface them with8085</li> </ul>					
<b>Expected Course Outcomes:</b>					
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
6	Program the microprocessor for various applications.				K6
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create</b>					
<b>Unit:1</b>	<b>MICROPROCESSOR ARCHITECTURE</b>	<b>12hours</b>			
Microprocessor Architecture and its Operation – Memory Map of 1k Memory Chip – Memory and Instruction Fetch – 8085 Micro Processing Unit – Bus Timing – De-multiplexing the Bus AD7 – AD0 – Generating Control Signals – Functional Block Diagram of 8085.					
<b>Unit:2</b>	<b>TIMINGS AND INSTRUCTION SET</b>	<b>12hours</b>			
Decoding and Execution of an Instruction – 8085 based Microcomputer – Timing of the Memory Write Cycle and Read Cycle – Opcode Fetch Cycle Timing – Instruction Classification – Instruction Format – Addressing modes - Data Transfer Operations – Arithmetic Operations – Logical Operations – Branch Operations – Looping, Counting and Indexing – Addition, Subtraction of 8 and 16 bit Numbers – Time DelayProgram.					
<b>Unit:3</b>	<b>INTERFACING CONCEPTS</b>	<b>12hours</b>			
Peripherals I/O Instruction – Device Selection and Data Transfer – Input Interfacing – Interfacing I/P using Decoders – Interfacing O/P Display: LED Display – 7 Segments LED Display –Interfacing Memory Bus Contention - Memory Time and Wait States.					
<b>Unit:4</b>	<b>PERIPHERALS</b>	<b>12hours</b>			
The 8255A Programmable Peripherals Interface: Block Diagram of 8255A, Mode 0 Simple I/P O/P BSR Mode, Programming the 8255A in Mode1, Mode 2 – Bidirectional Data Transfer – 8259 Programmable Interrupt Controller – Block diagram of 8253 – Direct Memory Access and 8257 DMA Controller – 8279 Keyboard/Display Interfacing.					
<b>Unit:5</b>	<b>APPLICATIONS</b>	<b>12hours</b>			
Applications of Microprocessors - System Requirements - Overall System Design and Software Design - Temperature Monitoring System - Data Acquisition System - Traffic Light Control System - Stepper Motor Control - Digital Clock - Washing MachineControl.					
<b>Total Lecture hours</b>					<b>60hours</b>

<b>Text Book(s)</b>	
1	Ramesh S Goanker," <b>Microprocessor Architecture Programming and Application with 8085/8080A</b> ", IInd Edition, New Age International (P) Ltd
2	Aditya. P. Mathur, " <b>Introduction to Microprocessors</b> ", IIIrd Edition
3	S.Malarvizhi," <b>Microprocessor and Its Application</b> ", IInd Edition, Anuradha Agencies Publications, March 2006
<b>Reference Books</b>	
1	DoughlasV.Hall, " <b>Microprocessors and Interfacing, Programming and Hardware</b> ", TMH,2012
2	M. Rafi Quazzaman, " <b>Microprocessors Theory and Applications: Intel and Motorola</b> ", Prentice Hall of India, Pvt. Ltd., New Delhi, 2003.
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>	
1	<a href="https://nptel.ac.in/courses/108/103/108103157/">https://nptel.ac.in/courses/108/103/108103157/</a>
2	<a href="https://www.youtube.com/watch?v=t0Z8P_hpbFk&amp;vI=en">https://www.youtube.com/watch?v=t0Z8P_hpbFk&amp;vI=en</a>
3	<a href="https://www.youtube.com/watch?v=fS7FFOaC_iQ">https://www.youtube.com/watch?v=fS7FFOaC_iQ</a>
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science,Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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

Course Code	IC'S AND INSTRUMENTATION Core paper VII	L 4	T	P	C 4
Core /Elective / Supportive:					
Pre-Requisite:	Basic Electronics	Syllabus Version		2021-22	
Course Objectives:					
<b>The Main Objectives of this course are to:</b>					
❖ To impart the knowledge on IC fabrication, Timer, PLL, and electronic instruments					
❖ 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					
<b>Expected Course Outcomes:</b>					
On the Successful completion of the course, student will be able to:					
1	Recognize the standards in IC Fabrication Technology.				K1
2	Understand the working of Timer and PLL				K2
3	Design simple circuits using Op-amp.				K6
4	Understand the principle of various types of transducers				K2
	Study the construction and working of frequently used equipment's like CRO,				
5	Digital Voltmeter etc.				K4
<b>K1: Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>					
<b>Unit:1</b>	<b>IC FABRICATION TECHNOLOGY</b>				<b>12</b>
					<b>hours</b>
Fundamentals of Monolithic IC Technology – Basic Planar Process – Wafer Preparation – Epitaxial Growth – Oxidation – Photolithography – Diffusion of Impurities – Isolation Techniques – Metallization – Monolithic Transistors – Integrated Resistors – Integrated Capacitors - Integrated Inductors - Thin and Thick Film Technology.					
<b>Unit:2</b>	<b>TIMER AND PLL</b>				<b>12</b>
					<b>hours</b>
Functional Block Diagram of 555 timer – Monostable Operation – Applications: – Linear Ramp Generator – Pulse Width Modulator – Astable Operation – Applications: Schmitt Trigger – FSK Generator - Phase Locked Loop: Functional Block Diagram – Phase Detector / Comparator – Voltage Controlled Oscillator – Low Pass Filter – Applications: Frequency Multiplier / Division – AM Detection					
<b>Unit:3</b>	<b>OPERATIONAL AMPLIFIER</b>				<b>12</b>
					<b>hours</b>
Ideal Characteristics - Inverting and Non-inverting Amplifier – Op-amp Parameters – Summing Amplifier – Difference Amplifier – Integrator – Differentiator – Instrumentation Amplifier – Voltage to Current Converter – Current to Voltage Converter – Precision half Wave Rectifiers – Precision Full Wave Rectifiers.					
<b>Unit:4</b>	<b>TRANSDUCERS</b>				<b>12</b>
					<b>hours</b>
Introduction – Electrical Transducer – Basic requirements of Transducer – Classification of Transducers – Selection of Transducers – Resistive Transducers – Potentiometers – Thermistors – Thermocouple – LVDT – RVDT – Piezoelectric Transducers – Hall Effect Transducers – Photoelectric Transducers – Digital Displacement					

Transducers.	
<b>Unit:5</b>	<b>ELECTRONIC INSTRUMENTS</b>
<b>12 hours</b>	
Q Meters- CRO: Block Diagram – Cathode Ray Tube – Measurement of Frequency – Measurement of Voltage and Current – Digital Oscilloscope – Digital voltmeter: Ramp Type DVM – Dual Slope Integrating Type DVM – Digital Multimeter – Humidity Measurement – Measurement of PH.	
<b>Total Lecture hours</b>	
<b>60 hours</b>	
<b>Text Book(s)</b>	
1	D.Roy Choudhury and Shahil B Jain,” <b>Linear Integrated Circuits</b> ”, Second Edition New Age International Publishers, 2004
2	K.R.Botkar, “ <b>Integrated Circuits</b> ”, 10th Edition Khanna Publishers , 2006
<b>Reference Books</b>	
1	J.B.GUPTA,” <b>A Course In Electronic and Electrical Measurements and Instrumentation</b> ”, 12th Edition, S.K Kataria & Sons.
2	A.K. Sawhney,” <b>ELECTRICAL &amp; ELECTRONIC MEASUREMENTS AND INSTRUMENTATION:</b> , Dhanpath Rai & Co (P) Ltd, 2004.
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]</b>	
1	<a href="https://nptel.ac.in/courses/108/108/108108111/">https://nptel.ac.in/courses/108/108/108108111/</a> Integrated circuits,opamps and their applications
2	<a href="https://nptel.ac.in/courses/117/106/117106030/">https://nptel.ac.in/courses/117/106/117106030/</a> Analog IC Design
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College.& Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

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

Course code	BIOMEDICAL INSTRUMENTATION		L	T	P	C
Core /Elective / Supportive:	Core Paper VIII		4			4
Pre-requisite	Higher secondary biology		Syllabus Version		2021-22	
<b>Course Objectives:</b>						
The main objectives of this course are to:						
<ul style="list-style-type: none"> <li>❖ To presents various bio-potentials and working principles of medicalinstruments</li> <li>❖ To enable the students to learn about bio-potentials and medicalinstruments</li> </ul>						
<b>Expected Course Outcomes:</b>						
On the successful completion of the course, student will be able to:						
1	Understand the Concept of bio-potential					K2
2	Understand the concept of medical instruments					K2
3	Develop the troubleshooting Skills of medical instruments					K3
4	Understand the concepts of signal conditioners & diagnostic equipment					K2
5	Analyse physiological assist devices					K4
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 – Create</b>						
<b>Unit:1</b>						
<b>BASIC PHYSIOLOGY</b>					<b>12hours</b>	
Cells and their Structures - Transport of Ions through Cell Membrane - Resting and Excited State Transmembrane Potential - Action Potential - Propagation of Bioelectric Potential - Nervous System - Physiology of Muscles - Heart and Blood Circulation						
<b>Unit:2</b>						
<b>ELECTRODES AND TRANSDUCERS</b>					<b>12 hours</b>	
Basic Electrode Theory - Micro Electrodes - Skin Surface Electrodes - Needle Electrodes - Equivalent Circuit - Electrode Materials - Chemical Electrodes - Reference Electrodes - The pH Electrode - Blood Gas Electrode - Active Transducers and Passive Transducers - Strain Gauges – Thermistor						
<b>Unit:3</b>						
<b>SIGNAL CONDITIONERS &amp; DIAGNOSTIC EQUIPMENTS</b>					<b>12hours</b>	
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)						
<b>Unit:4</b>						
<b>DIAGNOSTIC EQUIPMENTS &amp; BIOTELEMETRY</b>					<b>12hours</b>	
X-ray Imaging - Radio Fluoroscopy - Image Intensifiers - Angiography - Endoscopy – Diathermy. BIOTELEMETRY AND PATIENT SAFETY: Need for Biotelemetry - Elements of Telemetry System - Radio Telemetry System - Physiological Signals used in Telemetry - TDM and FDM - ImplantableUnits						

<b>Unit:5</b>	<b>PHYSIOLOGICAL ASSIST DEVICES</b>	<b>12hours</b>
Need for Pacemakers - Pacemaker Parameters and Circuits - Different Modes of Operation - DC Defibrillator - Artificial Heart Valves - Heart Lung Machines - Artificial Lung Machines - Artificial Kidney Machine - Nerve and Muscle Stimulator. COMPUTER APPLICATIONS: Data Acquisition Systems - Analysis of ECG signals - Computerized Axial Tomography (CAT) Scanner - Ultrasonic Scanner - Magnetic Resonance Imaging -Computer Based Patient Monitoring System		
<b>Total Lecture hours</b>		<b>60hours</b>
<b>Text Book(s)</b>		
1	Joseph J. Carr and John M. Brown, “ <b>Introduction to Biomedical Equipment Technology</b> ”,	
2	Leslie Cromwell., FredJ. Webell., Erich A. Pfeffer.,“ <b>Bio-medical Instrumentation</b>	
<b>Reference Books</b>		
1	Khandpur, “ <b>Handbook on Biomedical Instrumentation</b> ”, Tata McGraw Hill Company, New	
2	Ohn G Webster, Ed., “ <b>Medical Instrumentation Application and Design</b> ”, Third Edition, John Wiley & Sons, Singapore, 1999	
3	Arumugam.M,“ <b>BiomedicalInstrumentation</b> ”,AnuradhaAgenciesPublishers,Chennai,1992	
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>		
1	<a href="https://www.youtube.com/watch?v=i2mZylgP1Fk">https://www.youtube.com/watch?v=i2mZylgP1Fk</a>	
2	<a href="https://www.youtube.com/watch?v=4ldv98F7Zng">https://www.youtube.com/watch?v=4ldv98F7Zng</a>	
3	<a href="https://nptel.ac.in/courses/108/105/108105101/">https://nptel.ac.in/courses/108/105/108105101/</a>	
4	<a href="https://nptel.ac.in/courses/108/105/108105091/">https://nptel.ac.in/courses/108/105/108105091/</a>	
Course Designed By: K.Manikantan, Assistant Professor, Government Arts College, Ooty.& Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.		

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	L	M	M	M	L	L	M	S	M
CO2	L	M	M	L	L	M	L	S	L	S
CO3	M	L	S	L	M	L	L	M	M	L
CO4	L	L	S	M	S	S	L	S	M	L
CO5	L	L	S	S	M	L	S	L	M	S

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

Course Code	PC HARDWARE AND TROUBLESHOOTING	L	T	P	C
Core /Elective / Supportive:	Skill Based Subject II	3			3
Pre-Requisite:	Basic Computer Fundamentals	Syllabus Version		2021-22	
<b>Course Objectives:</b>					
<b>The Main Objectives of this course are to:</b>					
<ul style="list-style-type: none"> <li>❖ To enable the students to understand and gain the knowledge on PC Hardware, troubleshooting and driver.</li> <li>❖ To acquaint the students with theory and characteristics of peripherals, buses and ports.</li> </ul>					
<b>Expected Course Outcomes:</b>					
On the Successful completion of the course, student will be able to:					
1	Identify the hardware components of a computer.				K1
2	Familiarize Peripherals in PC				K2
3	Familiarize peripherals in the system				K6
4	analyse I/o Buses and ports				K2
5	analyse Maintenance and Troubleshooting Tools				K4
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>					
<b>Unit:1</b>	<b>HARDWARE &amp; MOTHER BOARD ORGANIZATION</b>				<b>9 hours</b>
Introduction to Computer Organization – Input /Output Devices - Specifications –CPU - Memory Devices - Types Of Memory - Study of Motherboard RAM - ROM – CMOS – Post-Bus(Address,Data,System)-Connections of Various Devices: Display Adapter- Ports - Serial – Parallel – USB - Modem - Importance Of CPU Cooling - Motherboard Troubleshooting.					
<b>Unit:2</b>	<b>PERIPHERALS</b>				<b>9 hours</b>
Key Board: Switches - Keyboard organization - Key board type - Wireless Keyboard Trouble shooting. Mouse: Mouse type - Scroll & Optical Mouse - Function Connecting Mouse - Trouble shooting Mouse - Printers: Working of LED –DMP - Ink Jet - Laser Printer - line printer - Multi Functional Printer and its Trouble shooting. Scanners- Working method and its trouble shooting –Plotters.					
<b>Unit:3</b>	<b>DRIVERS</b>				<b>9 hours</b>
HDD Types – SCSI - Magnetic Recording - Formatting ( Track, Sector) Cluster - Defragmentation - Bad Sector - Common Problem and Its Trouble Shooting - External Drives - Optical Drives - CD and DVD Drives - Rom And Writer - Combo Drives - Mass Storage Devices -USB Devices:- Hub - Pen Drives.					
<b>Unit:4</b>	<b>SYSTEM SOFTWARES</b>				<b>9 hours</b>
System Software - Application Software - Driver Software Installation - Windows and other S/W - Anti Virus - BOOT PROCESS : Setting of CMOS Setup.					
<b>Unit:5</b>	<b>DIAGNOSTIC TOOLS &amp; PC MAINTENANCE</b>				<b>9 hours</b>
Virus and its types - Effect of Virus for Computer System - Scanning and Antivirus remover tools - Antivirus Utilities for Diagnostic - Safety and Preventive Maintenance Tools - Data Recovery - Electrical Power Issues - Troubleshooting PC Hardware:- O/S Troubleshooting issues in computer System					
<b>Total Lecture hours</b>					<b>45 hours</b>

<b>Text Book(s)</b>	
1	Muller ,” <b>Upgrading &amp; Repairing PCs</b> ”, Prentice Hall ,10th Edition, 2000.
2	Mark Minasi ,” <b>Complete PC Upgrade &amp; Maintenance Guide</b> ”, BPB Publishers,15th Edition, 2004.
<b>Reference Books</b>	
1	Craig Zacker and John Rourke ,” <b>PC Hardware: The Complete Reference</b> ”, TMH Publication.
2	M Lotia, P Nair and P Lotia ,” <b>Modern Computer Hardware Course</b> ” , BPB Publication.
3	” <b>The Principles of Computer Hardware by Alan Clements</b> ”, Oxford University Press, 2000.
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]</b>	
1	<a href="https://nptel.ac.in/content/storage2/courses/106108101/pdf/Lecture_Notes/Mod%201_LN.pdf">https://nptel.ac.in/content/storage2/courses/106108101/pdf/Lecture_Notes/Mod%201_LN.pdf</a> Operating system lecture notes nptel
2	<a href="https://nptel.ac.in/courses/106/105/106105163/">https://nptel.ac.in/courses/106/105/106105163/</a> computer Architecture and Organization
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College,Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

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





# Fifth Semester

<b>Course code</b>	<b>8051 MICROCONTROLLER AND ITS APPLICATIONS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Core /Elective / Supportive:</b>	<b>Core paper IX</b>	<b>6</b>			<b>4</b>
<b>Pre-requisite:</b>	<b>Digital Electronics8085 Microprocessor</b>	<b>Syllabus Version</b>		<b>2021-22</b>	
<b>Course Objectives:</b>					
The main objectives of this course are to:					
<ul style="list-style-type: none"> <li>❖ To Study the architecture and addressing modes of8051</li> <li>❖ To Impart knowledge about assembly language programs of8051</li> <li>❖ to understand the importance of different peripheral devices and their interfacing to8051</li> <li>❖ To Impart knowledge of different types of external interfaces including LCD,Keypad Matrix, Stepper motor and sensors</li> </ul>					
<b>Expected Course Outcomes:</b>					
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 interfacing Microcontroller with various peripherals				K2
3	Analyse the data transfer and interfacing techniques				K3
4	Foster ability to understand the role of embedded systems in industry				K4
5	Analyze the data transfer through serial and parallel ports.				K5
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create</b>					
<b>Unit:1</b>	<b>MICROCONTROLLER OVERVIEW</b>				<b>18 hours</b>
Introduction to Microcontroller – Comparison of $\mu P$ & $\mu C$ - 8051 Microcontroller Block Diagram - 8051 Oscillator and Clock – A, B & Register Banks – Stack - Program Counter & Data Pointer – Flag & PSW – Special Function Registers – Internal Memory – Input / Output Pins & Ports.					
<b>Unit:2</b>	<b>ADDRESSING MODES, ARITHMETIC AND LOGICAL INSTRUCTION</b>				<b>18 hours</b>
Introduction – Addressing Modes: Direct – Indirect – Register - Indexed – Arithmetic Instructions: Addition, Subtraction, Multiplication, Division, Increment And Decrement – Logic & Compare Instructions: AND, OR, XOR, CPL & Compare – Rotate & Swap Instruction: RR, RL, RRC, RLC - Simple Programs.					
<b>Unit:3</b>	<b>DATA TRANSFER AND BRANCH OPERATIONS</b>				<b>18 hours</b>
Introduction – Internal Data Move - External Data Move – Code Memory Read Only Data Move - Loop and Jump Instructions – Conditional Jump – Unconditional Jump – Call Instructions: LCALL and ACALL – Push and Pop Instructions – Simple Programs.					
<b>Unit:4</b>	<b>PERIPHERALS</b>				<b>18hours</b>
Timer and Counter: Timer Registers – TMOD – TCON - Mode 1 and 2 Programming – Counter Programming – Serial: MAX232 – Baud Rate – SBUF Register – SCON Register – Program to Transfer and Receive Data Serially - Interrupts: Enabling & Disabling Interrupt.					

<b>Unit:5</b>	<b>INTERFACING</b>	<b>18hours</b>
Interfacing of LCD – LCD Operation – Pin Descriptions – Command and Data to the LCD – ADC 0804 – LM34 Temperature Sensor – Stepper Motor – Step Angle – Motor Speed – Interfacing Key Board – Scanning and Identifying the keys.		
<b>Total Lecture hours</b>		<b>90 hours</b>
<b>Text Book(s)</b>		
1	Mohamed Ali Maszidi & Janice Gillispie Maszidi, “ <b>The 8051 Microcontroller and Embedded System</b> ”, Pearson Publishers	
2	Kenneth J. Ayala, “ <b>The 8051 Microcontroller Architecture, Programming and Application</b> ” 2 <sup>nd</sup> Edition, Penram International Publications	
<b>Reference Books</b>		
1	Myke predko, “ <b>Programming and Customizing the 8051 Microcontroller</b> ”, Tata McGraw Hill, 1 <sup>st</sup> Edition	
2	Ayala J.K., “ <b>The 8051 Microcontroller: Architecture, programming and applications</b> ”, Penram International (2005) 3rd edition.	
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>		
1	<a href="https://www.youtube.com/watch?v=84YUQu8tE4w">https://www.youtube.com/watch?v=84YUQu8tE4w</a>	
2	<a href="https://www.youtube.com/watch?v=GPz_mR7Flas">https://www.youtube.com/watch?v=GPz_mR7Flas</a>	
3	<a href="https://www.youtube.com/watch?v=uFhDGagZzjs">https://www.youtube.com/watch?v=uFhDGagZzjs</a>	
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science,Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.		

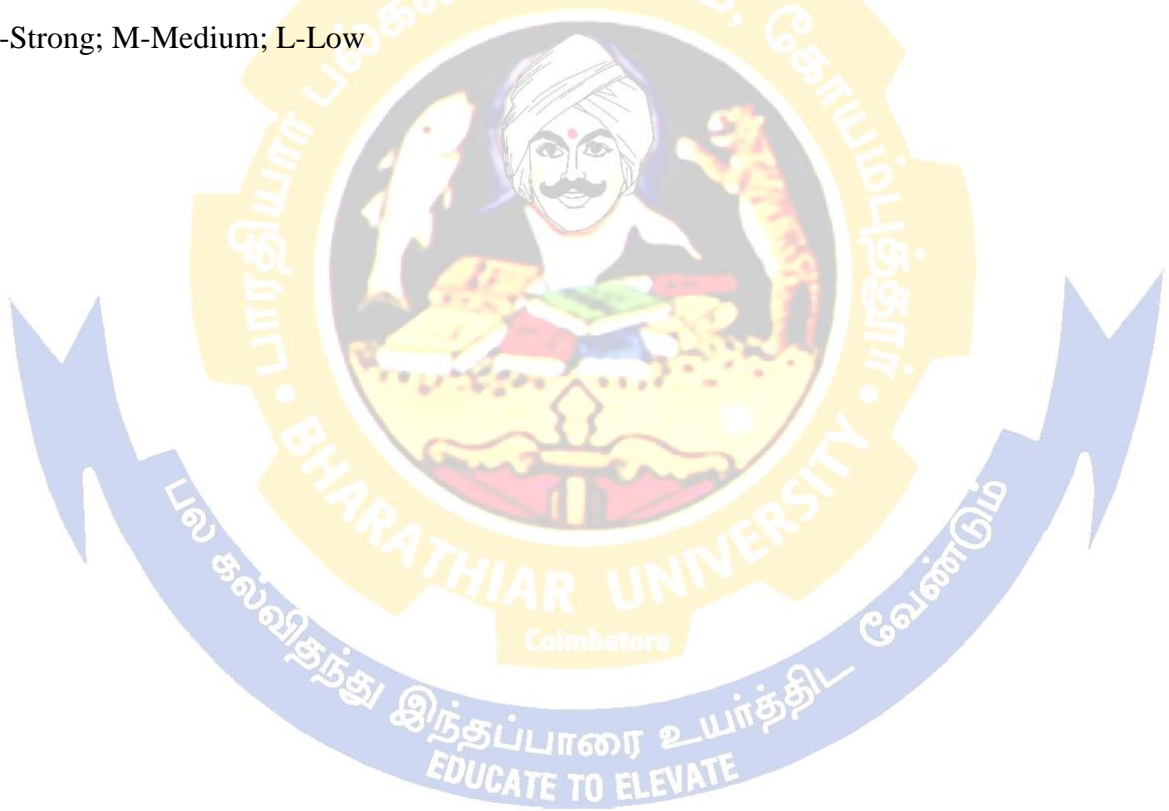
<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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

Course Code	IC, TV and Medical Electronics Lab	L	T	P	C
<b>Core /Elective / Supportive:</b>	<b>Core Practical VI</b>			<b>3</b>	<b>4</b>
<b>Pre-Requisite:</b>	<b>TV and Medical Electronics Theory</b>	<b>Syllabus Version</b>		<b>2021-22</b>	
<b>Course Objectives:</b>					
<b>The Main Objectives of this course are to:</b>					
<ul style="list-style-type: none"> <li>❖ To impart the knowledge on IC fabrication, Timer, PLL, Op-amp., transducers and bio- medical electronic instruments and TVtroubleshooting</li> <li>❖ To enable the students to acquire the knowledge of IC fabrication, and its application in electronic circuits and know the measurement techniques using bio- medical electronic instruments.</li> </ul>					
<b>Expected Course Outcomes:</b>					
On the Successful completion of the course, student will be able to:					
1	Design the circuits with ICS			K3	
2	Design and Analyse circuits with IC 555 and IC 741			K3	
3	Gain knowledge about bio- medical electronic instruments			K2	
4	Study on pacemaker and ECG			K1	
5	Understand Trouble shooting of TV Sections			K2	
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>					
<b>Part I</b>	<b>IC Lab</b>			<b>30 hours</b>	
<ol style="list-style-type: none"> <li>1. Astable Multivibrator using 555</li> <li>2. Monostable Multivibrator using 555</li> <li>3. Inverting and Non Inverting Amplifier</li> <li>4. Adder and Subtractor using IC741</li> <li>5. Instrumentation Amplifier</li> <li>6. Voltage to Current Converter and Current to Voltage Converter</li> <li>7. Wein Bridge Oscillator using IC741</li> <li>8. Square Wave and Triangular Generator</li> <li>9. Schmitt Trigger using IC741</li> </ol>					
<b>Part II</b>	<b>TV Lab</b>			<b>30 hours</b>	
<ol style="list-style-type: none"> <li>1. Video IF Section of TV Receiver</li> <li>2. Sync Separator</li> <li>3. Horizontal Section Faults</li> <li>4. Vertical Section Faults</li> <li>5. Tuner Section Faults</li> <li>6. Video Section Faults</li> </ol>					
<b>Part III</b>	<b>Medical Electronics Lab</b>			<b>30 hours</b>	
<ol style="list-style-type: none"> <li>1. Pulse Rate Monitor</li> <li>2. Temperature Monitor using AD590</li> <li>3. ECG Measurement</li> <li>4. Notch Filter</li> <li>5. Pacemaker</li> </ol>					
<b>(Any 16 Experiments)</b>					
<b>Total Lecture hours</b>				<b>90 hours</b>	
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										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

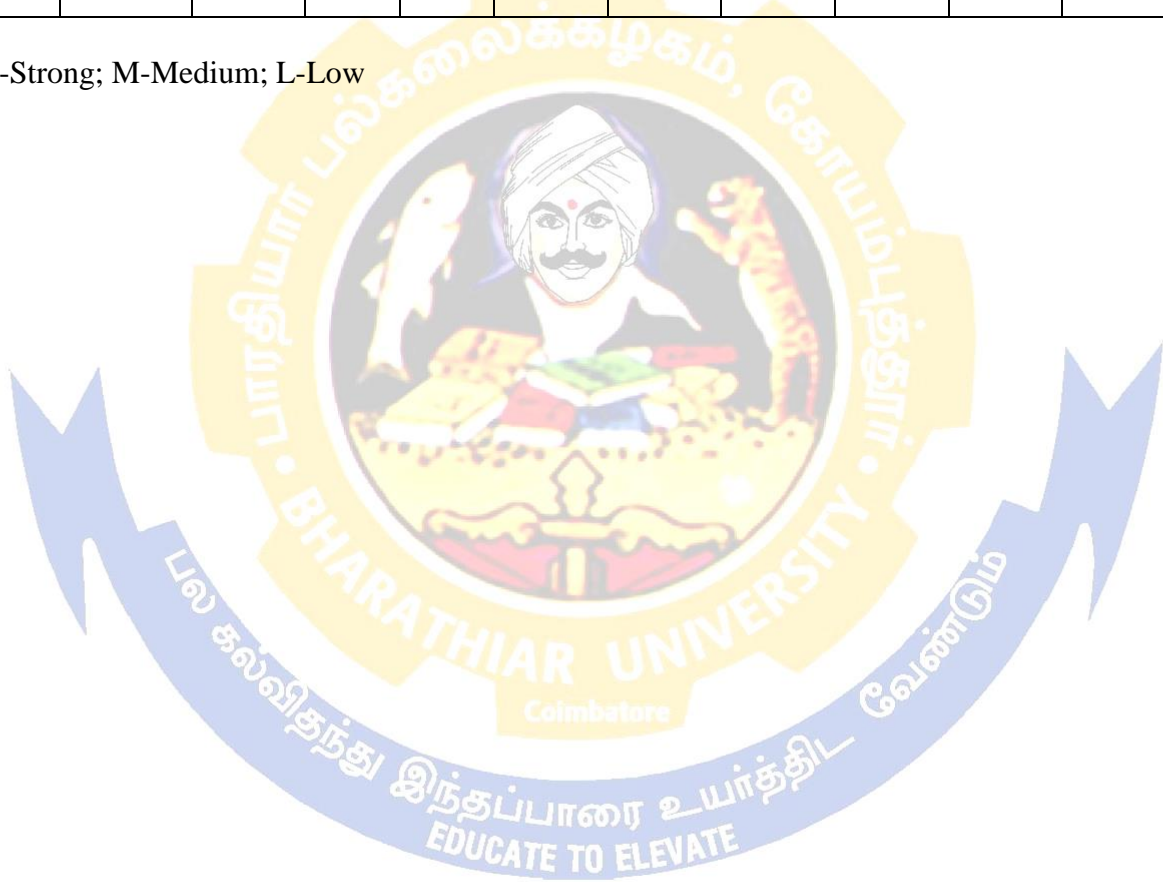
\*S-Strong; M-Medium; L-Low



Course code	INDUSTRIAL AND POWER ELECTRONICS			L	T	P	C
Core/Elective/ Supportive	Core –Practical- VII					3	4
Pre-requisite	Basic knowledge of Electronic Circuits or permission of instructor			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
The main objectives of this course are to:							
<ul style="list-style-type: none"> <li>❖ To make the students to design triggering circuits of SCR.</li> <li>❖ To understand the characteristics of power electronic devices.</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Design triggering circuits of SCR					K4	
2	Understand the characteristics of power electronic devices.					K6	
3	Design power Inverter Circuits					K5	
4	Design Various Applications of SCR					K5	
5	Design Cyclo Converter Circuits					K5	
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create</b>							
<b>Unit I</b>	<b>INDUSTRIAL AND POWER ELECTRONICS</b>					<b>90 Hours</b>	
<b>(ANY 16 EXPERIMENTS)</b>							
<ol style="list-style-type: none"> <li>1. Triggering of SCR by R, C and Diac.</li> <li>2. Design of snubber circuit.</li> <li>3. Fan regulator using Triac.</li> <li>4. Thyristor chopper.</li> <li>5. TRIAC Flasher.</li> <li>6. Commutation Techniques.</li> <li>7. Speed control of DC motor using SCR.</li> <li>8. Automatic street light controller</li> <li>9. Burglar Alarm</li> <li>10. Sequencer Circuit.</li> <li>11. Power Inverter</li> <li>12. Switching Regulators</li> <li>13. Automatic Battery Charger</li> <li>14. Fire alarm</li> <li>15. ON / OFF relay control using opto – coupler</li> <li>16. Servo stabilizer</li> <li>17. Layout and Art Work preparation for PCB</li> <li>18. Etching Drilling and Component mounting of PCB</li> <li>19. Temperature controller using AD 590/ LM 35.</li> <li>20. Construction of Emergency Lamp.</li> <li>21. Phase Control Circuit</li> <li>22. Cycloconverter</li> <li>23. Thyristor protection circuit</li> </ol>							
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.							

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

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

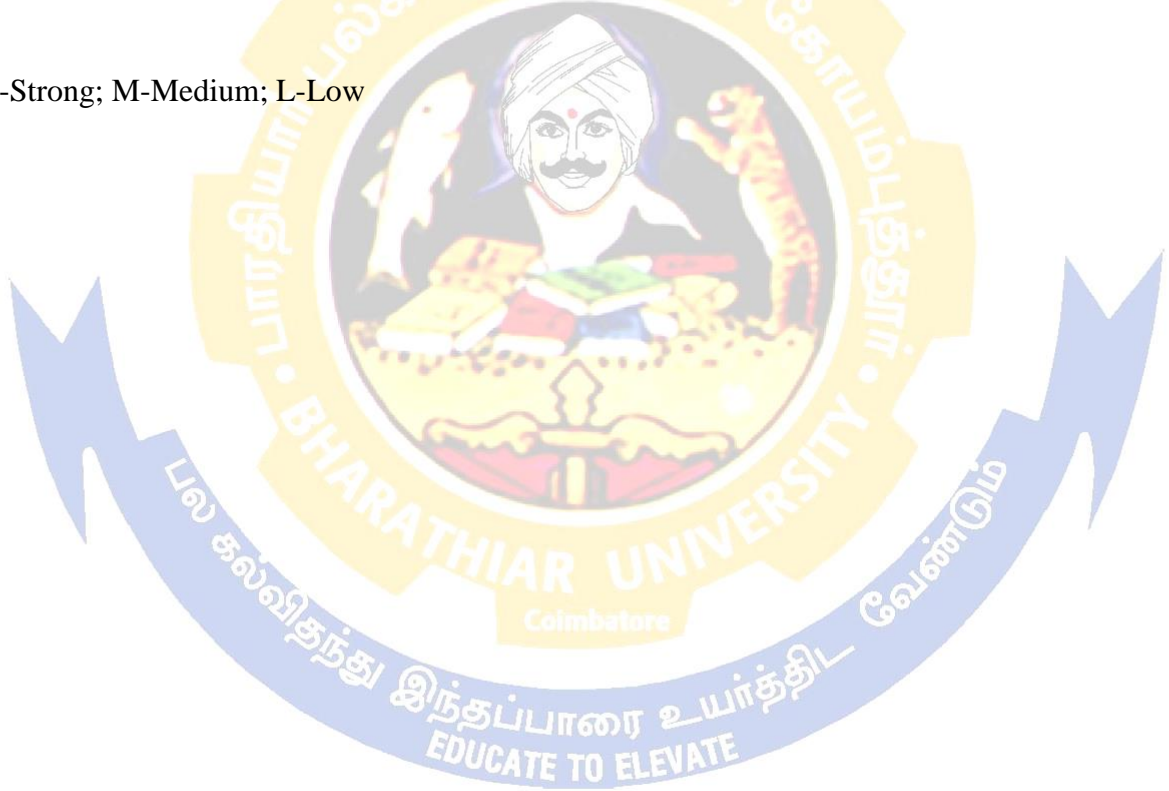


Course code		<b>8051 MICROCONTROLLER LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Core/Elective/ Supportive:</b>		<b>Core –Practical – VIII</b>			<b>3</b>	<b>4</b>
<b>Pre-requisite</b>		<b>Digital Electronics8085 Microprocessor</b>	<b>Syllabus Version</b>		<b>2021-22</b>	
<b>Course Objectives:</b>						
The main objectives of this course are to:						
<input type="checkbox"/> To introduces the assembly language programming ofMicrocontroller <input type="checkbox"/> To develop the student’s Assembly language programming skills and gives practical training of interfacing the peripheral devices with theMicrocontroller						
<b>Expected Course Outcomes:</b>						
On the successful completion of the course, student will be able to:						
1	Apply the fundamentals of assembly level programming of microcontroller					K3
2	Design and Develop program for real time interface					K6
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create</b>						
<b>8051/ PIC PROGRAMMING (ANY 16 EXPERIMENTS)</b>						
<ol style="list-style-type: none"> <li>1. Addition / Subtraction of 8 / 16 bitData</li> <li>2. Multiplication / division 8 bitData</li> <li>3. Block DataTransfer</li> <li>4. Smallest / Largest of NNumbers</li> <li>5. To Arrange in Ascending / DescendingOrder</li> <li>6. Sum of N 8 bit Numbers</li> <li>7. 1’s and 2’s Compliment of an Array (8 / 16bit)</li> <li>8. UP/DOWN Counter using 7 SegmentDisplay</li> <li>9. Traffic Light ControlInterface</li> <li>10. Wave FormGeneration</li> <li>11. ADCInterface</li> <li>12. DACInterface</li> <li>13. Stepper MotorInterface</li> <li>14. Solid State RelayInterface</li> <li>15. DC MotorInterface</li> <li>16. TemperatureController</li> <li>17. Rolling and Blinking of aMessage</li> <li>18. LCDInterface</li> <li>19. Frequency Counter</li> <li>20. Water LevelIndicator</li> </ol>						
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science,Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.						



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

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



Course code	VISUAL PROGRAMMING			L	T	P	C
Core /Elective / Supportive:	Skill Based Subject III:			3			3
Pre-requisite	Computer skills and familiarity with Microsoft Windows.			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
The main objectives of this course are to:							
<ul style="list-style-type: none"> <li>❖ To design and develop Windows-based applications using VisualBasic</li> <li>❖ To Emphasis on the fundamentals of design, development, implementation and documentation</li> <li>❖ To Gain knowledge about to write visual C++programming</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Explore Visual Basic's						K1
2	Implement syntax rules in Visual Basic programs						K2
3	Explain variables and data types used in program development						K3
4	Write and apply visual C++ principles and programming techniques						K4
5	Write and apply procedures, sub-procedures, and functions to data transfer						K5
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create</b>							
<b>Unit:1</b>	<b>VISUAL BASIC OVERVIEW</b>						<b>9hours</b>
Introduction to Windows Programming – Event Driven Programming – Data Types – Resources – Window Message – Device Context – Document Interfaces – Dynamic Linking – Software Development Kit (SDK) Tools – Context Help.							
<b>Unit:2</b>	<b>VISUAL BASIC OBJECTS</b>						<b>9hours</b>
Visual Basic Programming – Forum Design – VBX Controls – Properties – Event Procedures MenusandToolbars–UsingDialogBoxes–WorkingwithControlArrays–ActiveXControls Multiple Documents Interface (MDI) – File System Controls – Data Control – Database Applications.							
<b>Unit:3</b>	<b>BUILDING THE USER INTERFACE</b>						<b>9hours</b>
Visual C++ Programming – Frame Work Classes – VC++ Components – Resources – Event Handling – Message Dispatch System – Model and Modeless Dialogs – Important VBX Controls – Document view Architecture – Serialization – Multiple Document Interface – Splitter Windows – Coordination between Controls							
<b>Unit:4</b>	<b>DATABASE AND APPLICATIONS</b>						<b>9 hours</b>
Database Connectivity – Min Database Applications – Embedding Controls in View creating user defined DLL's – Dialog Based Applications – Dynamic Data Transfer Function – Data Base Management with ODBC – Communicating with other applications – Object Linking and Embedding							
<b>Unit:5</b>	<b>DESIGN AND DEVELOPMENT</b>						<b>9 hours</b>
Basics of GUI Design – Visual Interface Design – File System – Storage and Retrieval System -Simultaneous Multi- Platform Development							
<b>Total Lecture hours</b>						<b>45 hours</b>	

<b>Text Book(s)</b>	
1	Petzold, "Windows Programming", Microsoft Press, 1995
2	Marion Cottingham, "Visual Basic", Peachpitt Press, 1999
3	Kate Gregory, "Using Visual C++", Prentice Hall of India Pvt. Ltd
4	Pappas and Murray, "Visual C++: The Complete Reference", Tata McGraw Hill, New Delhi, 2000.
<b>Reference Books</b>	
1	John Paul Muller, "Visual C++ from the Ground Up", Tata McGraw Hill, Delhi.
2	Richard C. Leinecker and Tom Archer, "Visual C++ 6 Programming Bible", Wiley India Pvt Ltd.
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>	
1	<a href="https://www.youtube.com/watch?v=5nahqfJTQXs">https://www.youtube.com/watch?v=5nahqfJTQXs</a>
2	<a href="https://www.youtube.com/watch?v=1oGpl6qNKOQ">https://www.youtube.com/watch?v=1oGpl6qNKOQ</a>
3	<a href="https://www.youtube.com/watch?v=gcFHyVYdeFU">https://www.youtube.com/watch?v=gcFHyVYdeFU</a>
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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



# Sixth Semester

Course code	DESIGN WITH PIC MICROCONTROLLER			L	T	P	C
Core/Elective/ Supportive:	Core paper X			5			4
Pre-requisite	Students having knowledge of electronics fundamentals coupled with some programming experience are the ideal participants for this course.			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
The main objectives of this course are to:							
<ul style="list-style-type: none"> <li>❖ To Study the architecture and addressing modes of PIC Microcontroller Impartknowledge about assembly language programs of PIC Microcontroller</li> <li>❖ To know various peripheral devices and to interface them with PICMicrocontroller</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Understand the evolution in microcontroller technology						K1
2	Describe Harvard architecture model and programming techniques						K2
3	Describe the operation and need for interrupts and timers						K3
4	List out various operators in modelling the design units						K4
5	Apply the concept for I/O port expansion						K5
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create</b>							
<b>Unit:1</b>	<b>CPU ARCHITECTURE AND INSTRUCTION SET</b>						<b>15hours</b>
Overview – Harvard Architecture and Pipelining – Program Memory Considerations – Register File Structure and Addressing Modes – CPU registers – Instruction Set – SimpleOperations							
<b>Unit:2</b>	<b>LOOP TIME SUBROUTINE, TIMER 2 AND INTERRUPTS</b>						<b>15 hours</b>
Timer 2 Use – Interrupt Logic – Timer 2 Scalar Initialization – Interrupt Service - Interrupt Service Routine – Loop Time Subroutine							
<b>Unit:3</b>	<b>EXTERNAL INTERRUPTS AND TIMERS</b>						<b>15 hours</b>
RB0/INT External Interrupt Input – Timer 0 – Compare Mode – Capture Mode – Timer1/CCP Programmable Period Scalar – Timer1 External Event Counter – Timer1 and Sleep Mode – Pulse Width Modulated Outputs – Port B Change Interrupts							
<b>Unit:4</b>	<b>I/O PORT EXPANSION</b>						<b>15hours</b>
Synchronous Serial Port Module – Serial Peripheral Interface – Output Port Expansion – Input Port Expansion – LCD Display							
<b>Unit:5</b>	<b>I<sup>2</sup>C BUS FOR PERIPHERAL CHIP ACCESS</b>						<b>15hours</b>
I2C Bus Operation - I2C Bus Subroutines – DAC Output – Temperature Sensor – Serial EEPROM							
<b>Total Lecture hours</b>						<b>75 hours</b>	
<b>Text Book(s)</b>							
1	John B. Peatman, -DesignwithPICMicrocontrollers-, Pearson Education Publishing						
<b>Reference Books</b>							
1	Muhammad Ali Mazidi, Rolin D. McKinlay, and Danny Causey, “The PIC Microcontroller and Embedded systems – Using Assembly and C for PIC18,” Prentice Hall, 2007						

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	<a href="https://www.youtube.com/watch?v=nLIBssKCN2w">https://www.youtube.com/watch?v=nLIBssKCN2w</a>
2	<a href="https://www.youtube.com/watch?v=VEAYB1A9SiA">https://www.youtube.com/watch?v=VEAYB1A9SiA</a>
3	<a href="https://www.youtube.com/watch?v=aSsnLyKtIAU">https://www.youtube.com/watch?v=aSsnLyKtIAU</a>
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.	

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

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

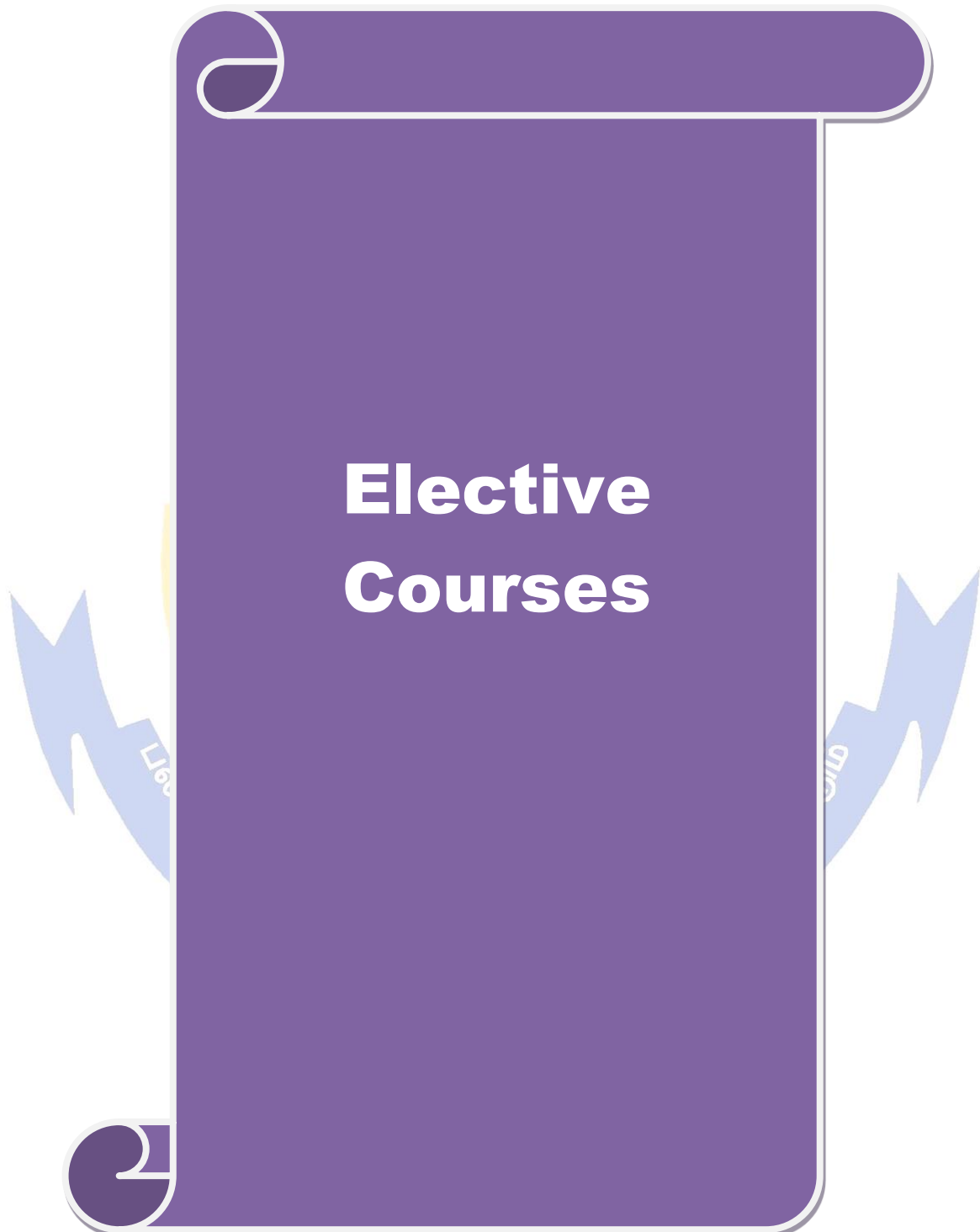
Course code	VISUAL PROGRAMMING LAB			L	T	P	C
Core/Elective/ Supportive	Skill Based Subject-IV-Practical					3	3
Pre-requisite	Basic computer skills and familiarity with Microsoft Windows.			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
The main objectives of this course are to:							
❖ Learn to design and develop Windows-based business applications using VisualBasic Emphasis on the fundamentals of structured design, development, implementation, and documentation							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Implement syntax rules in Visual Basic programs					K2	
2	Explain variables and data types used in program development					K3	
3	Write visual C++ principles and programming techniques					K6	
4	Design Application Editor and Control					K5	
5	Design VB application Link					K5	
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create</b>							
<p align="center"><b>VISUAL PROGRAMMING (ANY 8 EXPERIMENTS)</b></p> <ol style="list-style-type: none"> <li>1. Building Simple Applications using BasicTools</li> <li>2. Working with Intrinsic Control and Active Xcontrols</li> <li>3. Create an Application with Multiple Forms and Dialogs</li> <li>4. Write a VB Program to Design an e-mail RegistrationForm</li> <li>5. Create an Application with MenuEditor</li> <li>6. Create an Application with DAO Controls</li> <li>7. Create an Application using CommonDialogs</li> <li>8. Write a program for Drag and DropEvents</li> <li>9. Create a Database for library management using ADDControls</li> <li>10. Creating an Application using Active Xcontrol</li> <li>11. Create a Scientific Calculator inVB</li> <li>12. Develop a VB application to either link or Embed MS Word Document to an OLEControl</li> <li>13. Display Student Information using GridControl</li> <li>14. Create an Application using RDO Controls</li> <li>15. Develop an Application to perform the following operation in theEmployee Table usingDAO <ol style="list-style-type: none"> <li>i) Add a newRecord.</li> <li>ii) Delete aRecord.</li> <li>iii) Modify aRecord.</li> </ol> </li> </ol>							
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.							

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

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







Course Code	PCB DESIGN AND FABRICATION	L	T	P	C
Core/Elective/Supportive	Elective-I-A	6			4
Pre-requisite	Basic knowledge of circuits familiar with the functions and performance of various components and have a good logical thinking ability.	Syllabus Version	2021-22		
<b>Course Objectives:</b>					
The main objectives of this course are to: <ul style="list-style-type: none"> <li>❖ To inculcate the knowledge of PCB design</li> <li>❖ To impart knowledge on various methods of laying out a PCB</li> <li>❖ To learn how to etch and solder</li> <li>❖ To develop various techniques used for PCB design and fabrication</li> </ul>					
<b>Expected Course Outcomes:</b>					
On the Successful completion of the course, student will be able to:					
1	Classify the boards and layers				K1
2	Design layout and make use of the photo printing and etching techniques				K2
3	Understand the design rules and automation techniques				K3
4	Understand basic concepts of transmission line, crosstalk and thermal issues				K4
5	Design (schematic and layout) PCB for analog circuits, digital circuits and mixed circuits				K5
<b>K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>					
<b>Unit:1</b>	<b>TYPES OF PCB</b>				<b>18 hours</b>
Single sided board – double sided – Multilayer boards – Plated through holes technology – Benefits of Surface Mount Technology (SMT) – Limitation of SMT – Surface mount components: Resistors, Capacitor, Inductor, Diode and IC's					
<b>Unit:2</b>	<b>LAYOUT AND ARTWORK</b>				<b>18 hours</b>
Planning – General Rules Layout of Layout – Resistance, Capacitance and Inductance – Conductor Spacing – Supply and Ground Conductors – Component Placing and Mounting – Cooling Requirement and Package Density – Layout Check Basic Artwork Approaches – Artwork Taping Guidelines – General Artwork Rules – Artwork Check and inspection					
<b>Unit:3</b>	<b>LAMINATES AND PHOTO PRINTING</b>				<b>18 hours</b>
Manufacture of Copper Clad Laminates – Properties of Laminates – Types of Laminates – Manual Cleaning Process – Basic Printing Process for Double Sided PCB's – Photo Resists – Wet Film Resists – Coating Process for Wet Film Resists – Exposure and Further Process for Wet Film resists – Dry Film Resists					
<b>Unit:4</b>	<b>ETCHING AND SOLDERING</b>				<b>18 hours</b>
Introduction – Etching Machine – Etchant System - Soldering: Principles of Solder Connection – Solder Joints – Solder Alloys – Soldering Fluxes - Soldering Tools: Soldering – De-soldering Tools and Techniques – Man Soldering – Solder Mask – Safety, Health and Medical Aspects in Soldering Practice					
<b>Unit:5</b>	<b>DESIGN RULES AND AUTOMATION</b>				<b>18 hours</b>
Reflection – Crosstalk – Ground and Supply Line Noise – Electromagnetic Interference from Pulse Type EM Fields and Automation – Automated Artwork Drafting – CAD					
<b>Total Lecture hours</b>					<b>90 hours</b>

<b>Text Book(s)</b>	
1	Walter C. Bosshart, "PCB Design and Technology", Tata McGraw Hill Publications, Delhi 1983
2	RS Khandpur, "Printed Circuit Board" by Tata McGraw Hill Education Pvt Ltd., New Delhi
<b>Reference Books</b>	
1	S D Mehta , "Electronic Product Design" Volume-I , S Chand Publications
<b>Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]</b>	
1	<a href="https://www.wikihow.com/Create-Printed-Circuit-Boards">https://www.wikihow.com/Create-Printed-Circuit-Boards</a>
2	<a href="http://www.siongboon.com/projects/2005-09-07_home_pcb_fabrication/">http://www.siongboon.com/projects/2005-09-07_home_pcb_fabrication/</a>
3	<a href="https://reprap.org/wiki/MakePCBInstructions#Making_PCBs_yourself">https://reprap.org/wiki/MakePCBInstructions#Making_PCBs_yourself</a>
4	<a href="https://www.youtube.com/watch?v=mv7Y0A9YeUc">https://www.youtube.com/watch?v=mv7Y0A9YeUc</a>
4	<a href="https://www.youtube.com/watch?v=imQTCW1yWkg">https://www.youtube.com/watch?v=imQTCW1yWkg</a>
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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

Course code	ADVANCED COMMUNICATION SYSTEMS	L	T	P	C
Core/ Elective/ Supportive:	Elective I B	6			4
Pre-requisite	Principles of Communication Systems	Syllabus Version	2021-22		
<b>Course Objectives:</b>					
The main objectives of this course are to:					
<ul style="list-style-type: none"> <li>❖ To analyze various data communication systems</li> <li>❖ To make the students understand the basic concept in the field of pulse communications and cellular communication systems</li> <li>❖ To know basis of satellite communication and expose the learners to the basics of signal propagation through optical fibres</li> </ul>					
<b>Expected Course Outcomes:</b>					
On the successful completion of the course, student will be able to:					
1	Explain the different types of Pulse communication systems				K2
2	Analyse the performance of modulation techniques				K4
3	Demonstrate the Satellite and cellular communication system				K4
4	Analyse the performance of cellular communication systems				K4
5	Study the principle of optical fibre structure and its various applications				K4
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create</b>					
<b>Unit:1</b>	<b>DATA COMMUNICATION</b>	<b>18hours</b>			
Introduction – Data Forms – Transmission Modes – Simplex, Half Duplex – Full Duplex – Point to Point Network – Star Network – Ring Network – Bus Network – Telephone Lines – Dial- up Lines – Dedicated Lines – Data Communication System – Asynchronous and Synchronous Transmission – USART's and ACIA's – RS 232 Inter Connect Cable – Modems –Protocols					
<b>Unit:2</b>	<b>PULSE COMMUNICATION</b>	<b>18hours</b>			
Basic Concepts of Pulse Modulation – Sampling Theorem – PAM – PTM – PFM – PPM – PCM – Differential PCM– Delta Modulation–Adaptive Delta Modulation–TDM– FDM– ASK–FSK– PSK					
<b>Unit:3</b>	<b>SATELLITE COMMUNICATION</b>	<b>18 hours</b>			
Introduction – Satellite Orbit – Satellite Position – Up link – Down Link – Cross Link – Assignable Satellite Frequencies Inside Satellite: Transponder – Antenna System – Power Package and Station Keeping – Forms of Modulation–Free Path Space Losses–Ground Station– Aligning the Satellite Dish					
<b>Unit:4</b>	<b>CELLULAR COMMUNICATION SYSTEM</b>	<b>18hours</b>			
Introduction Cellular Mobile System – Basic Cellular System – Operational Cellular System – Maximum number of Calls per Cell – Maximum Number of Frequency Channel - Concept of Frequency Channel Cell Splitting – Permanent Splitting – Real Time Splitting – Frequency Management – Channel Assignment					
<b>Unit:5</b>	<b>OPTICAL COMMUNICATION</b>	<b>18hours</b>			
Introduction to Optical Fibers – Optical Fiber Structure – Numerical aperture – Propagation of Light Rays through it – Applications of Optical Fiber (Video link, Satellite link, Computer link, Communicating Antenna Televisionlink)					
<b>Total Lecture hours</b>					<b>90hours</b>

<b>Text Book(s)</b>	
1	Robert J. Shoernbeck, - <b>Electronic Communications Modulation and Transmission</b> , PHI,1999
2	. Anok Singh, - <b>Principles of Communication Engineering</b> , S.Chand and Company, 2 <sup>nd</sup> Edition
3	Sanjeev Gupta, - <b>Electronic Communication System</b> , Kanna Publishing Company
<b>Reference Books</b>	
1	<b>Data communications and networking</b> (sie) By behrouz a. Forouzan (author)
2	<b>Electronic Communications</b> 4th Edition by Dennis Roddy and J Coolen, Pearson Education
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>	
1	<a href="https://nptel.ac.in/courses/108/101/108101113/">https://nptel.ac.in/courses/108/101/108101113/</a>
2	<a href="https://nptel.ac.in/courses/117/105/117105143/">https://nptel.ac.in/courses/117/105/117105143/</a>
3	<a href="https://nptel.ac.in/courses/106/106/106106167/">https://nptel.ac.in/courses/106/106/106106167/</a>
Course Designed By: P.Manikantan, Assistant Professor, Government Arts College, Ooty.& Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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

Course Code	INTERNET OF THINGS				L	T	P	C
Core/Elective /Supportive:	Elective 1-C				6			4
Pre-Requisite:	Basic Electronics				Syllabus Version		2021-22	
<b>Course Objectives:</b>								
<b>The Main Objectives of this course are to:</b>								
❖ To enable the students to learn about IoT and also to understand the concept of embedded devices and Interfacing sensors.								
<b>Expected Course Outcomes:</b>								
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	
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>								
<b>Unit:1</b>	<b>IOT FUNDAMENTALS</b>						<b>18 hours</b>	
Introduction to IoT: Evolution of IoT – Definition & Characteristics of IoT - Architecture of IoT – Technologies for IoT – Developing IoT Applications – Applications of IoT – Industrial IoT – Security in IoT								
<b>Unit:2</b>	<b>DESIGN PRINCIPLES FOR CONNECTED DEVICES</b>						<b>18 hours</b>	
Introduction-IoT/M2m systems - Communication Technologies - Data management, data consolidation and Device management - Ease of Designing and Affordability.								
<b>Unit:3</b>	<b>PROGRAMMING FUNDAMENTALS WITH C USING ARDUINO IDE</b>						<b>18 hours</b>	
Arduino IDE – Basic Syntax – Data Types/ Variables/ Constant – Operators – Conditional Statements and Loops – Using Arduino C Library Functions for Serial, delay and other invoking Functions – Strings and Mathematics Library Functions.								
<b>Unit:4</b>	<b>SENSORS AND ACTUATORS</b>						<b>18 hours</b>	
Analog and Digital Sensors – Interfacing temperature sensor, ultrasound sensor and infrared (IR) sensor with Arduino – Interfacing LED and Buzzer with Arduino.								
<b>Unit:5</b>	<b>SENDING SENSOR DATA OVER INTERNET</b>						<b>18 hours</b>	
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 .								
<b>Total Lecture hours</b>							<b>90 Hours</b>	

<b>Text Book(s)</b>	
1	Arshdeep Bahga, Vijay Madiseti, “ <b>Internet of Things: A Hands-On Approach</b> ”, 2014. ISBN: 978-0996025515
2	Boris Adryan, Dominik Obermaier, Paul Fremantle, “ <b>The Technical Foundations Of Iot</b> ”, Artech Houser Publishers, 2017.
<b>Reference Books</b>	
1	Michael Margolis, “ <b>Arduino Cookbook</b> ”, O’Reilly, 2011
2	Marco Schwartz, “ <b>Internet of Things with ESP8266</b> ”, Packt Publishing, 2016
<b>Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]</b>	
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
2	<a href="https://ocw.cs.pub.ro/courses/iot/courses/02">https://ocw.cs.pub.ro/courses/iot/courses/02</a> Electronics for Internet of Things – Lecture II
3	<a href="https://nptel.ac.in/courses/106105166/">https://nptel.ac.in/courses/106105166/</a> Introduction to Arduino – I – Lecture 22
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College,Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.	

**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

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

Course Code	ADVANCED COMPUTER ARCHITECTURE		L	T	P	C
Core/Elective/Supportive:	ELECTIVE I-D		6	0	0	4
Pre-requisite:	Basic Computer Architecture		Syllabus version		2021-22	
<b>Course Objectives:</b>						
The objectives of this course are:						
<ul style="list-style-type: none"> <li>❖ To provide knowledge on fundamentals of Advanced Computer design.</li> <li>❖ To understand the concept of instruction level parallelism, pipelining and memory hierarchy associated with it.</li> <li>❖ To enhance the knowledge on advanced processors.</li> </ul>						
<b>Expected Course Outcomes:</b>						
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
<b>K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create</b>						
<b>Unit: 1</b>		<b>PRINCIPLES OF COMPUTER DESIGN</b>			<b>18 Hours</b>	
Introduction-Quantitative principles of computer design - Control Units-Hardwired and Micro Programmed Design Concept – Microprogramming - Bus architectures: Uni-bus and multi-bus architectures.						
<b>Unit: 2</b>		<b>INSTRUCTION LEVEL PARALLELISM</b>			<b>18 Hours</b>	
Classification of parallel computers-Multiprocessors and multi-computers - Multi-vector and SIMD computers-Instruction Level Parallelism - Overcoming Data Hazards with Dynamic Scheduling-Reducing Branch Penalties with Dynamic - Hardware Support for Extracting More Parallelism.						
<b>Unit: 3</b>		<b>PIPELINING</b>			<b>18 Hours</b>	
Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.						
<b>Unit: 4</b>		<b>MEMORY HIERARCHY</b>			<b>18 Hours</b>	
Introduction- the Fundamentals of Caches-Reducing Cache Misses and Miss Penalty - Reducing Hit Time-Main Memory-Virtual Memory-Issues in Memory Hierarchy design.						
<b>Unit: 5</b>		<b>PRINCIPLES OF ADVANCED PROCESSOR</b>			<b>18 Hours</b>	
Advanced processor technology, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors						
					<b>Total Lecture Hours</b>	<b>90 Hours</b>
<b>Text Books</b>						
1	Kai Hwang, “Advanced computer architecture”, Tata Mc.Graw Hill Science/Engineering/Math 1 <sup>st</sup> Edition, 1992.					
2	D. A. Patterson and J. L. Hennessey, “Computer organization and design,” Morgan Kaufmann, ARM Edition, 2010.					
<b>Reference Books</b>						
1	Hayes, J.P., “Computer Architecture and Organization”, 3rd Edition, Tata Mc-Graw Hill, 1998.					
2	William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6th Edition, Pearson Education, 2003.					



Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	<a href="https://nptel.ac.in/courses/106/103/106103206/">https://nptel.ac.in/courses/106/103/106103206/</a>
2	<a href="https://www.youtube.com/watch?v=v7iefsovo9M">https://www.youtube.com/watch?v=v7iefsovo9M</a>
3	<a href="https://www.youtube.com/watch?v=L9X7XXfHYdU&amp;list=PLxCzCOWd7aiHMonh3G6QNKq53C6oNXGrX">https://www.youtube.com/watch?v=L9X7XXfHYdU&amp;list=PLxCzCOWd7aiHMonh3G6QNKq53C6oNXGrX</a>
Course Designed by: Dr.S.Vijayakumar, Associate Professor in ECE, Sreenivasa Institute of Technology and Management Studies, Autonomous, Chittoor.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.	

Mapping with Program Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	L	L	L	L	L
CO2	S	M	L	L	M	L	M	L	L	M
CO3	S	M	S	L	L	L	L	L	L	M
CO4	S	S	L	L	L	L	L	L	L	L
CO5	S	S	M	M	M	L	M	L	L	M

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



Course Code	MODERN TELEVISION ENGINEERING		L	T	P	C
Core/Elective/Supportive:	Elective II –E		6			4
Pre-Requisite:	Basic Electronics		Syllabus Version		2021-22	
<b>Course Objectives:</b>						
<b>The Main Objectives of this course are to:</b>						
❖ To design of the subject is to impart the knowledge on Television standards, receiver section, and sync separator color television with advanced techniques.						
❖ To acquire the knowledge about color television and its recent developments						
<b>Expected Course Outcomes:</b>						
On the Successful completion of the course, student will be able to:						
1	Acquire knowledge on television standards					K1
2	Study on Transmitter and receiver standards					K2
3	Understand the Picture tube of color TV					K2
4	Knowledge on performance of Color TV and other modern devices					K3
5	Familiarize Advanced TV Systems					K4
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>						
<b>Unit:1</b>	<b>FUNDAMENTALS OF TELEVISION</b>				<b>18 hours</b>	
Aspect ratio - Image continuity - Number of scanning lines - Interlaced scanning - Picture resolution - Camera tubes - Image Orthicon – Videocon - Plumbicon - Monochrome picture tubes - Composite video signal - video signal dimension - horizontal sync. Composition- vertical sync - Details functions of vertical pulse train - Scanning sequence details - VSB transmission - Sound signal transmission - Standard channel bandwidth.						
<b>Unit:2</b>	<b>MONOCHROME TELEVISION TRANSMITTER AND RECEIVER</b>				<b>18 hours</b>	
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.						
<b>Unit:3</b>	<b>ESSENTIALS OF COLOUR TELEVISION</b>				<b>18 hours</b>	
Three colour theory - Luminance, Hue and saturation - Colour television cameras -Values of luminance and colour difference signals - Colour television display tubes - Delta-gun Precision-in-line and Trinitron colour picture tubes - Purity and convergence - Purity and static and Dynamic convergence adjustments – Pincushion -correction techniques - Automatic degaussingcircuit.						
<b>Unit:4</b>	<b>COLOUR TELEVISION SYSTEMS</b>				<b>18 hours</b>	
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.						

<b>Unit:5</b>	<b>ADVANCED TELEVISION SYSTEMS</b>	<b>18 hours</b>
Satellite TV technology - Geo Stationary Satellites - Domestic Broadcast System – CableTV Cable Signal Sources - Cable Signal Processing, Distribution & Scrambling- Video Recording Video Home Formats - DVD Players - Digital television - Transmission and reception – Projection television - Flat panel display TV receivers - LCD and Plasma screen receivers -3D TV-EDTV.		
<b>Total Lecture hours</b>		<b>90 hours</b>
<b>Text Book(s)</b>		
1	R.R.Gulati, “ <b>Monochrome Television Practice, Principles, Technology and servicing.</b> ” Third Edition 2006, New Age International (P) Publishers.	
2	R.R.Gulati,” <b>Monochrome &amp; Color Television</b> ”, New Age International Publisher, 2003.	
<b>Reference Books</b>		
1	A.M Dhake, “ <b>Television and Video Engineering</b> ”, 2nd ed., TMH, 2003.	
2	2. R.P.Bali, “ <b>Color Television, Theory and Practice</b> ”, Tata McGraw-Hill, 1994	
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]</b>		
1	<a href="https://nptel.ac.in/courses/117/102/117102059/">https://nptel.ac.in/courses/117/102/117102059/</a> Introduction to communication	
2	<a href="https://www.youtube.com/watch?reload=9&amp;v=EAybx dgS2T4">https://www.youtube.com/watch?reload=9&amp;v=EAybx dgS2T4</a> TV Transmission	
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.		

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

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

Course Code	MICROWAVE AND FIBER OPTIC COMMUNICATION	L	T	P	C
Core/Elective/ Supportive:	Elective II-F	6			4
Pre-Requisite:	Basic Electronics and Principles of Communication systems	Syllabus Version		2021-22	
<b>Course Objectives:</b>					
<b>The Main Objectives of this course are to:</b>					
<ul style="list-style-type: none"> <li>❖ To inculcate the principle of microwave theory and working of wave guides</li> <li>❖ To know the operation and applications of fibre optic communication</li> <li>❖ To impart knowledge on the working principle of microwave amplifiers and oscillators</li> </ul>					
<b>Expected Course Outcomes:</b>					
On the Successful completion of the course, student will be able to:					
1	Understand various parameters of waveguide and use of component as per applications.				K1
2	Analyse and find applications and limitations of microwave Semiconductor devices.				K4
3	Discriminate different Radars, find applications and use of its supporting systems				K5
4	Understand The structures of Fiber Optics and types				K2
5	Apply Fiber optics in Sensors Application and in Network Design				K3
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>					
<b>Unit:1</b>	<b>INTRODUCTION TO MICROWAVES</b>				<b>18 Hours</b>
Introduction – Maxwell’s Equation – Amperes Law – Faradays Law – Gauss Law – Wave Equation – Types of Wave Guides – TE and TM Modes – Propagation of TM Waves in Rectangular Wave Guide – TM Modes in Rectangular Wave Guide.					
<b>Unit:2</b>	<b>MICROWAVE AMPLIFIERS AND OSCILLATORS</b>				<b>18 Hours</b>
Microwave Tubes: - Two Cavity Klystron – Multi cavity Klystron – Reflex Klystron – Traveling Wave Tube (TWT) – Backward Wave Oscillator (BWO) – Magnetron – Applications.					
<b>Unit:3</b>	<b>MICROWAVE DEVICES &amp; RADAR</b>				<b>18 Hours</b>
Microwave Transistors – Gallium Arsenide (GaAs) Metal Semi-conductor FET – Varactor Diode – PIN Diode – Schottky Diode – MASER Principle – Applications – RADAR Block Diagram – Classification – Radar Range Equation – Factors Affecting the Range of a Radar Receivers – Line Pulse Modulator – PPI (Plane Position Indicator) – Moving Target Indicator (MTI) – FM CW Radar- Applications.					
<b>Unit:4</b>	<b>OPTICAL FIBER COMMUNICATION</b>				<b>18 Hours</b>
Basic Fiber Optic System – Frequencies – Fiber Optic Cables – Refraction – Numerical Aperture – Graded Index Cables – Single Mode – Multi Mode – Cable Constructions – Cable Losses – Connectors – Light Sources – Light Detector – Systems Components – Advantages and Disadvantages.					

<b>Unit:5</b>	<b>FIBER OPTICS SENSORS AND APPLICATIONS</b>	<b>18 Hours</b>
Intensity Modulated Sensors - Hybrid sensors- phase sensors - Diffraction Grating Sensor Inter ferometric sensor - Fiber Fabry Perot Fiber Optic sensor - Chemical Sensor Community Antenna Television – Networking - Digital VideoTransmission.		
<b>Total Lecture hours</b>		<b>90 Hours</b>
<b>Text Book(s)</b>		
1	Kennedy; Davis, "Electronic Communication Systems", Tata McGraw Hill Publishing Company Limited, III edition	
2	Gerd Keiser, "Optical Fiber Communication", McGraw Hill Publication, IV <sup>th</sup> Edition, 2011.	
<b>Reference Books</b>		
1	Samuel Y. Liao, "Microwave Devices and Circuits", PHI, III Edition.	
2	Govind P. Agrawal, "Fiber Optic Communication Systems", Wiley Publications, IV <sup>th</sup> Edition, 2012.	
<b>Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]</b>		
1	<a href="https://nptel.ac.in/courses/108/103/108103141/">https://nptel.ac.in/courses/108/103/108103141/</a> Introduction to microwave Engineering	
2	<a href="https://www.classcentral.com/course/swayam-microwave-engineering-14199">https://www.classcentral.com/course/swayam-microwave-engineering-14199</a> Microwave engineering swayam course	
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.		

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	M	S	M	M	L	L	L	M	M
CO4	S	S	M	S	S	S	L	L	M	M
CO5	S	S	S	S	M	L	M	M	S	M

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

Course code	AUTOMOTIVE ELECTRONICS			L	T	P	C
Core/Elective/ Supportive	Elective-II –G			6			4
Pre-requisite	Basic Electronics			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
<p>The main objectives of this course are to:</p> <ul style="list-style-type: none"> <li>❖ To understand the concepts of Automotive Electronics and its evolution and Trends automotive systems &amp; subsystemsoverview.</li> <li>❖ To understand sensors and sensor monitoring mechanisms aligned to automotive Systems, different signal conditioning techniques, interfacing techniques andactuator</li> <li>❖ To understand, design and model various automotive control systems using Model based developmenttechnique.</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Obtain an overview of automotive components andsubsystems.						K2
2	Interface automotive sensors and actuators with microcontrollers						K4
3	Understand the design cycles, communication protocols and safety systems employed in today's automotive industry.						K2
4	Understand the engine management systems						K2
5	Analyse Engine Management System						K4
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 – Create</b>							
<b>Unit:1</b>	<b>INTRODUCTION</b>					<b>18hours</b>	
Automotive Component, Operation, Electrical Wiring Terminals and Switching, Multiplexed Wiring Systems, Circuit Diagrams and Symbols. Charging Systems and Starting Systems: Charging Systems Principles, Alternations and Charging Circuits, New Developments, Requirements of the Starting System, Basic Starting Circuit							
<b>Unit:2</b>	<b>IGNITION SYSTEMS</b>					<b>18hours</b>	
Ignition Fundamental, Electronic Ignition Systems. Programmed Ignition, Distribution Less Ignition, Direct Ignition, Spark Plugs. Electronic Fuel Control: Basics of Combustion, Engine Fuelling and Exhaust Emissions, Electronic Control of Carburetion Petrol Fuel Injection, Diesel FuelInjection							
<b>Unit:3</b>	<b>INSTRUMENTATION SYSTEMS</b>					<b>18hours</b>	
Introduction to Instrumentation Systems, Various Sensors Used for Different Parameters, Sensing Driver Instrumentation Systems, Vehicle Condition Monitoring Trip Computer, Different Types of Visual Display							
<b>Unit:4</b>	<b>ELECTRONIC CONTROL OF BRAKING AND TRACTION</b>					<b>18 hours</b>	
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							

<b>Unit:5</b>	<b>ENGINE MANAGEMENT SYSTEMS</b>	<b>18hours</b>
Combined Ignition And Fuel Management Systems, Exhaust Emission Control, Digital Control Techniques, Complete Vehicle Control Systems, Artificial Intelligence and Engine Management, Automotive Microprocessor Uses. Lighting and Security Systems: Vehicles Lighting Circuits, Signalling Circuit, Central Locking and Electric Windows Security Systems, Airbags and Seat Belt Tensioners, Miscellaneous Safety and ComfortSystems		
<b>Total Lecture hours</b>		<b>90hours</b>
<b>Text Book(s)</b>		
1	TOM DENTON, <b>Automobile Electrical and Electronic Systems</b> , Edward Arnold pb., 1995	
<b>Reference Books</b>		
1	1.DON KNOWLES, <b>Automotive Electronic and Computer controlled Ignition Systems, Don</b>	
2	WILLIAM, T.M., <b>Automotive Mechanics</b> , McGraw Hill Book Co.,	
3	WILLIAM, T.M., <b>Automotive Electronic Systems</b> , Heiemann Ltd., London, 1978.	
4	Ronald K Jurgen, <b>Automotive Electronics Handbook</b> , McGraw Hill, Inc, 1999.	
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>		
1	<a href="https://nptel.ac.in/courses/107/103/107103084/">https://nptel.ac.in/courses/107/103/107103084/</a>	
2	<a href="https://nptel.ac.in/courses/107/106/107106088/">https://nptel.ac.in/courses/107/106/107106088/</a>	
3	<a href="https://www.youtube.com/watch?v=vJ4EfyGXehg">https://www.youtube.com/watch?v=vJ4EfyGXehg</a>	
4	<a href="https://www.youtube.com/watch?v=BG4N2dBgJrQ">https://www.youtube.com/watch?v=BG4N2dBgJrQ</a>	
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.		

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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

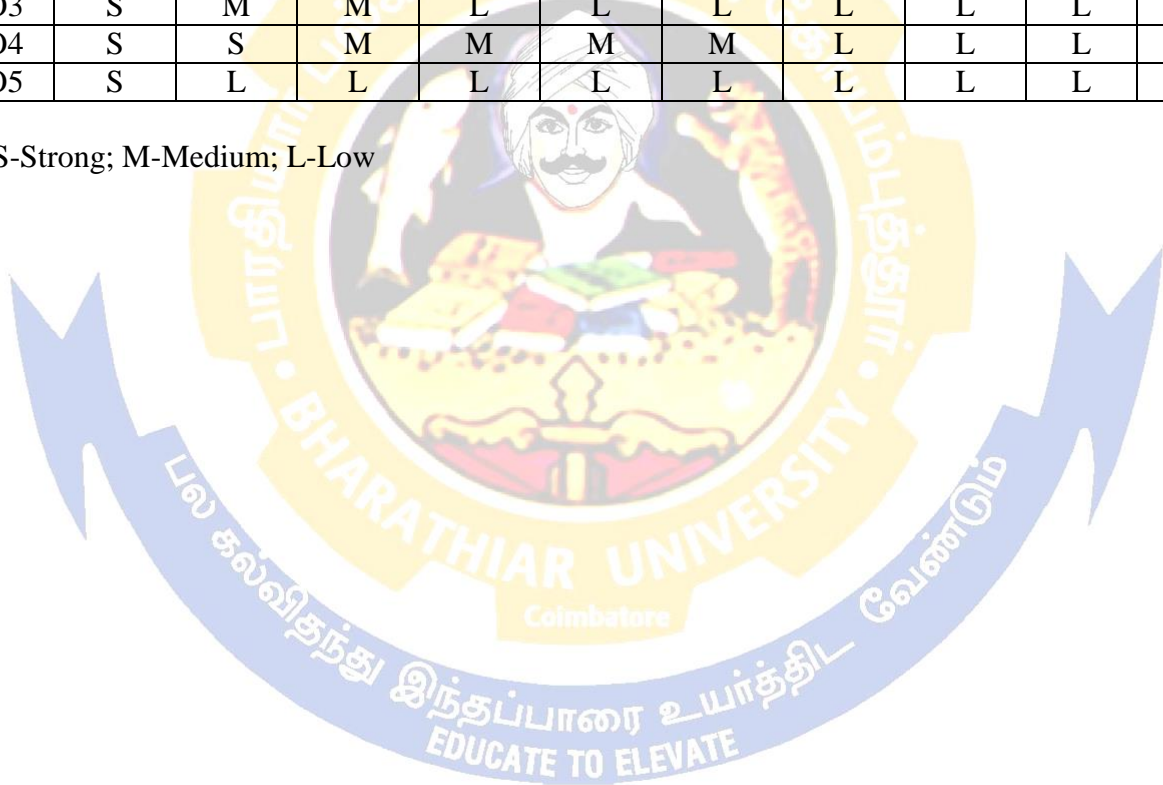
Course Code	SATELLITE COMMUNICATIONS		L	T	P	C
Core/Elective/Supportive:	ELECTIVE-II-H		6	0	0	4
Pre-requisite:	PRINCIPLES OF COMMUNICATION		Syllabus version		2021-22	
<b>Course Objectives:</b>						
The objectives of this course are:						
<ul style="list-style-type: none"> <li>❖ To provide knowledge on fundamentals of Advanced Computer design.</li> <li>❖ To understand the concept of instruction level parallelism, pipelining and memory hierarchy associated with it.</li> <li>❖ To enhance the knowledge on advanced processors.</li> </ul>						
<b>Expected Course Outcomes:</b>						
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
<b>K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create</b>						
<b>Unit: 1</b>	<b>SATELLITE SYSTEMS – OVERVIEW</b>				<b>18 Hours</b>	
Introduction- Basic concepts of Satellite communications- Frequency allocations for satellite systems. Advantages and applications of satellite communications over other communications						
<b>Unit: 2</b>	<b>ORBITAL ASPECTS OF SATELLITE SYSTEMS</b>				<b>18 Hours</b>	
Orbital Mechanics- look angle determination- orbit perturbations- Orbital determination- launches and launch vehicles- orbital effects in communication systems performance.						
<b>Unit: 3</b>	<b>THE SPACE SEGMENT</b>				<b>18 Hours</b>	
Introduction- spacecraft subsystems- attitude and orbit control systems- Telemetry- tracking and command- power systems- communication subsystems.						
<b>Unit: 4</b>	<b>SATELLITE LINK DESIGN</b>				<b>18 Hours</b>	
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.						
<b>Unit: 5</b>	<b>APPLICATIONS OF SATELLITE SYSTEMS</b>				<b>18 Hours</b>	
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.						
					<b>Total Lecture Hours</b>	<b>90 Hours</b>
<b>Text Books</b>						
1	Timothy Pratt, Charles Bostian,JeremyAllnut, Satellite Communications, 2 <sup>nd</sup> edition, John willey, 2006.					
2	W. L. Pritchard, H. G. Suyderhoud and R. A. Nelson, Satellite Communication systems Engineering, 2 <sup>nd</sup> edition, Pearson educational publishers, New Delhi, 2003.					
<b>Reference Books</b>						
1	Dennis Roddy, Satellite Communications, 3 <sup>rd</sup> edition, Mc Graw Hill, International, 2001.					
2	Dr D.C. Agrwal, Satellite Communications, 4 <sup>th</sup> edition, Khanna Publications, New Delhi, 2001.					



Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	<a href="https://nptel.ac.in/courses/117/105/117105131/">https://nptel.ac.in/courses/117/105/117105131/</a>
2	<a href="https://www.youtube.com/watch?v=hXa3bTcIGPU">https://www.youtube.com/watch?v=hXa3bTcIGPU</a>
3	<a href="https://www.youtube.com/watch?v=Bvj1BpP4zU8">https://www.youtube.com/watch?v=Bvj1BpP4zU8</a>
Course Designed by: Dr.S.Vijayakumar, Associate Professor in ECE, Sreenivasa Institute of Technology and Management Studies, Autonomous, Chittoor.& Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.	

Mapping with Program Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	L	L	L	L	L
CO2	S	M	L	M	M	L	L	L	L	M
CO3	S	M	M	L	L	L	L	L	L	L
CO4	S	S	M	M	M	M	L	L	L	M
CO5	S	L	L	L	L	L	L	L	L	M

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



Course code	INDUSTRIAL AND POWER ELECTRONICS			L	T	P	C
Core/Elective/ Supportive	Elective-III –I			5			4
Pre-requisite	Basic knowledge of Electronic Circuits or permission of instructor			Syllabus Version	2021-22		
<b>Course Objectives:</b>							
The main objectives of this course are to:							
<ul style="list-style-type: none"> <li>❖ To presents the principles and applications of industrial and powerelectronics</li> <li>❖ To enable the students to learn and design industrial and power electroniccircuits</li> <li>❖ To develop the circuits designing skills related to the power electronics and understoodthe concept of industrialelectronics</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the successful completion of the course, student will be able to:							
1	Developed the Circuit designing skills power electronics. Understood the concept industrial electronics system design.					K1	
2	Acquire knowledge about fundamental concepts and techniques used in power electronics.					K2	
3	Ability to analyze various single phase and three phase power converter circuits and understand their applications.					K3	
4	Foster ability to identify basic requirements for power electronics based design application.					K4	
5	To develop skills to build, and troubleshoot power electronics circuits.					K5	
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create</b>							
<b>Unit:1</b>	<b>THYRISTORS</b>					<b>15hours</b>	
Introduction– Principles, Construction, Operation and Characteristics of SCR – Two Transistor Model –TRIAC – DIAC – GTO – SCS – SUS – SBS – LASCR – MOSFET – UJT– Relaxation Oscillator – PUT							
<b>Unit:2</b>	<b>TURN ON/OFF MECHANISMS</b>					<b>15 hours</b>	
Introduction– Types of Turn on Methods: AC Gate Triggering: Forward Voltage Triggering– Thermal Triggering– Radiation Triggering– DC Gate Triggering: Pulse Triggering – Types of Turn Off Methods: Natural Commutation – Forced Commutation: Self Commutation – Complimentary Commutation – Auxiliary Commutation – External Pulse Commutation—Line Commutation – Thyristor Rating							
<b>Unit:3</b>	<b>CONTROLLED RECTIFIERS &amp; INVERTERS</b>					<b>15 hours</b>	
Introduction– Single phase Half Wave Controlled Rectifiers with Resistive Load – HWCR with Inductive Load – HWCR with Free Wheeling Diode – Single phase Full Wave Controlled RectifierswithResistive,InductiveLoads–FWCRwithFreewheelingDiode-INVERTERS: Single Phase Half & Full Bridge Voltage Inverters							
<b>Unit:4</b>	<b>CYCLO CONVERTERS AND CHOPPERS</b>					<b>15hours</b>	
Introduction – Single Phase Centre Tapped Step-Up Cyclo Converter – Single Phase Centre Tapped Step- Down Cyclo Converter – Three Phase to Single Phase Cyclo converter—Three Phase To Three Phase Cyclo Converters— Step-up and Step-downChoppers							
<b>Unit:5</b>	<b>APPLICATIONS</b>					<b>15 hours</b>	
Introduction –Dielectric Heating – Induction Heating – SMPS – UPS – Static Circuit Breaker – Battery Charger –Emergency Lighting System – Time Delay Control – StaticSwitches							
<b>Total Lecture hours</b>						<b>75 hours</b>	

<b>Text Book(s)</b>	
1	MDSingh, - <b>PowerElectronics</b> , 2 <sup>nd</sup> Edition, Tata-McGrawHill, 2007.
2	M.Ramamoorthy, " <b>ThyristorandtheirApplications</b> ", 2 <sup>nd</sup> Edition, EastWestPvt.Ltd, 1999
<b>Reference Books</b>	
1	Harish C Rai, " <b>Industrial and Power Electronics</b> " 10th edition, Umesh publications 2002
2	Timothy J Maloni, " <b>Industrial Solid State Electronic Devices and Circuits</b> " 2nd edition 1986
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>	
1	<a href="https://www.youtube.com/watch?v=1Auay7ja2oY">https://www.youtube.com/watch?v=1Auay7ja2oY</a>
2	<a href="https://www.youtube.com/watch?v=oqnLQVFaqYI">https://www.youtube.com/watch?v=oqnLQVFaqYI</a>
3	<a href="https://www.youtube.com/watch?v=naxnRkOfh2Q">https://www.youtube.com/watch?v=naxnRkOfh2Q</a>
Course Designed By: M.Baskaran, Head & Assistant Professor, KSG College of Arts and Science, Coimbatore.&Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

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

Course Code	ROBOTICS			L	T	P	C
Core/Elective/ Supportive:	Elective III –J			5			6
Pre-Requisite:	Basic Electronics			Syllabus Version		2021-22	
<b>Course Objectives:</b>							
<b>The Main Objectives of this course are to:</b>							
<ul style="list-style-type: none"> <li>❖ To familiarize the students with the applications of Robots</li> <li>❖ To know about the sensors, actuators used in Robots designing</li> </ul>							
<b>Expected Course Outcomes:</b>							
On the Successful completion of the course, student will be able to:							
1	scribe the working concept and types of Robots					K3	
2	Apply the knowledge of types of sensors and actuators					K2	
3	e Programming Languages for Robot design models					K6	
4	derstand the concept of Mobile Robotic Locomotion					K2	
5	Study the various applications of Robots					K3	
<b>K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create</b>							
<b>Unit:1</b>	<b>FUNDAMENTALS OF ROBOTS</b>					<b>15 hours</b>	
Introduction: Automations and Robotics - Robotics Drive System - Robot Anatomy - Work Volume - Control System and Precision of Movement - Serial Robot - Robot Subsystems - Motion Sub Systems - Recognition Sub System: Robot Classification : Coordinate Systems - Actuation Systems - Control Method - Program Method.							
<b>Unit:2</b>	<b>ROBOT END EFFECTORS</b>					<b>15 hours</b>	
Introduction: Types of End Effectors - Mechanical Grippers - Other Types of Gripper – Vacuum Cups -Magnetic Gripper - Adhesive Gripper – Hook - Scoops other Miscellaneous Device - Tools as End Effectors - Considerations in Gripper Selections and Design							
<b>Unit:3</b>	<b>SENSORS IN ROBOTS</b>					<b>15 hours</b>	
Sensor Classification - Internal Sensors - External Sensors - Vision System - Sensors in Robotics: Tactile Sensors - Proximity and Range Sensors - Miscellaneous Sensors and Sensor based Systems - Uses of Sensors in Robotics - Actuators in Robotics - Pneumatic Actuators - Hydraulic Actuators - Electric Actuators - DC Motors - AC Motors.							
<b>Unit:4</b>	<b>MOBILE ROBOTICS LOCOMOTION</b>					<b>15 hours</b>	
Introduction Key Uses for Locomotion - Leg Mobile Robots - Leg Configuration and Assembly - Consideration for Dynamics - Types of Legged Robot Locomotion - One Leg; Two Legs Biped - Four Legs (Quadruped) - Six Legs (Hexapod) - Concept of Wheeled Mobile Robots							
<b>Unit:5</b>	<b>ROBOTIC APPLICATIONS</b>					<b>15 hours</b>	
Industrial Applications: Material Handling - Processing Applications - Arc Welding - Assembly Applications - Inspection Applications - Robotics for Arc Welding - Assembly Applications - Robot Safety - Non Industrial Application of Robotics: Home Sector - Health Sector - Service Sector - Agriculture Farms - Research and Exploration.							
<b>Total Lecture hours</b>						<b>75 hours</b>	

<b>Text Book(s)</b>	
1	M.P.Groover,Mitchellweiss,Roger.N.Nagel,NicholasG.Odrey," <b>Industrial Robotics– Technology, programming and Application</b> ", McGraw-Hill, 2008.
2	Ghosh, " <b>Control in Robotics and Automation: Sensor Based Integration</b> ", Allied Publishers, Chennai,1998.
<b>Reference Books</b>	
1	Deb. S.R., " <b>Robotics Technology and flexible Automation</b> ", John Wiley, USA 1992.
2	Klafter R.D., Chimielewski T.A., Negin M., " <b>Robotic Engineering – An integrated approach</b> ", Prentice Hall of India, New Delhi, 1994.
<b>Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]</b>	
1	<a href="https://nptel.ac.in/courses/112/105/112105249">https://nptel.ac.in/courses/112/105/112105249</a> /Introduction to Robots
2	<a href="https://nptel.ac.in/courses/112/101/112101098">https://nptel.ac.in/courses/112/101/112101098</a> /Robotics and Automation
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College,Coimbatore.& Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.	

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	M	S	M	M	L	L	L	M	M
CO4	S	S	M	S	S	S	L	L	M	M
CO5	S	S	S	S	M	L	M	M	S	M

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

Course code	PROGRAMMABLE LOGIC CONTROL			L	T	P	C
<b>Core/Elective/ Supportive:</b>	<b>Elective III – K</b>			<b>5</b>			<b>4</b>
<b>Pre-requisite</b>	<b>Digital Electronics and computer Architecture and Organization</b>			<b>Syllabus Version</b>	<b>2021-22</b>		
<b>Course Objectives:</b>							
The main objectives of this course are to: <ul style="list-style-type: none"> <li>❖ To provide knowledge levels needed for PLC programming and operating input and output modules.</li> <li>❖ To train the students to create ladder diagrams from process control description and understand various types of PLC registers</li> <li>❖ Apply PLC Timers and Counters for the control of industrial processes, PLC functions and Data Handling Functions.</li> </ul>							
<b>Expected Course Outcomes:</b>							
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						K2
2	Gain knowledge about various types of PLC registers, ladder diagrams from process control descriptions						K2
3	Develop a coil and contact control system and analog PLC operations						K4
4	Apply time delay on PLC operations						K3
5	Able to use different types PLC functions, data handling functions and its various						K2
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 - Create</b>							
<b>Unit:1</b>	<b>PROGRAMMABLE LOGIC</b>					<b>15hours</b>	
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							
<b>Unit:2</b>	<b>PROGRAMMABLE LOGIC CONTROLLERS</b>					<b>15hours</b>	
Programmable Logic Controllers (PLCS) - Introduction Parts Of PLC - Principles of Operation-PLCSizes - 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							
<b>Unit:3</b>	<b>BASICS OF PLC PROGRAMMING</b>					<b>15hours</b>	
PLC Programming-Simple Instructions - Programming EXAMINE ON And EXAMINE OFF Instructions -Electromagnetic Control Relays-Motor Starters -Manually Operated Switches -Mechanically Operated and Proximity Switches - Output Control Devices - Latching Relays - PLCLadderDiagram - Converting Simple Relay Ladder Diagram into PLC Relay LadderDiagram							
<b>Unit:4</b>	<b>PLC INSTRUCTIONS</b>					<b>15 hours</b>	
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							

<b>Unit:5</b>	<b>APPLICATIONS OF PLC</b>	<b>15hours</b>
Applications of PLC - Simple Materials Handling Applications - Automatic Control of Warehouse Door - Automatic Lubricating Oil Supplier Conveyor Belt - Motor Control Automatic Car Washing Machine - Bottle Label Detection - Process Control Application		

	<b>Total Lecture hours</b>	<b>75 Hours</b>
--	----------------------------	-----------------

<b>Text Book(s)</b>		
1	Charles H. Roth, Jr “ <b>Fundamentals of Logic Design</b> ”, Fourth Edition, Jaico Publishing	
2	Frank D. Petruzella" <b>Programmable Logic Controllers</b> ", McGraw- Hill book, company,	
3	<b>Siemens “PLC Handbook</b> ”.	

<b>Reference Books</b>		
1	1. William I. Fletcher “ <b>An Engineering Approach to Digital Design</b> ”, Prentice, Hall of India Ltd., New Delhi, 1999.	

<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>		
1	<a href="https://unitronicsplc.com/what-is-plc-programmable-logic-controller/">https://unitronicsplc.com/what-is-plc-programmable-logic-controller/</a>	

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

<b>Mapping with Programme Outcomes</b>										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	M	S	M	M	L	L	L	M	M
CO4	S	S	M	S	S	S	L	L	M	M
CO5	S	S	S	S	M	L	M	M	S	M

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

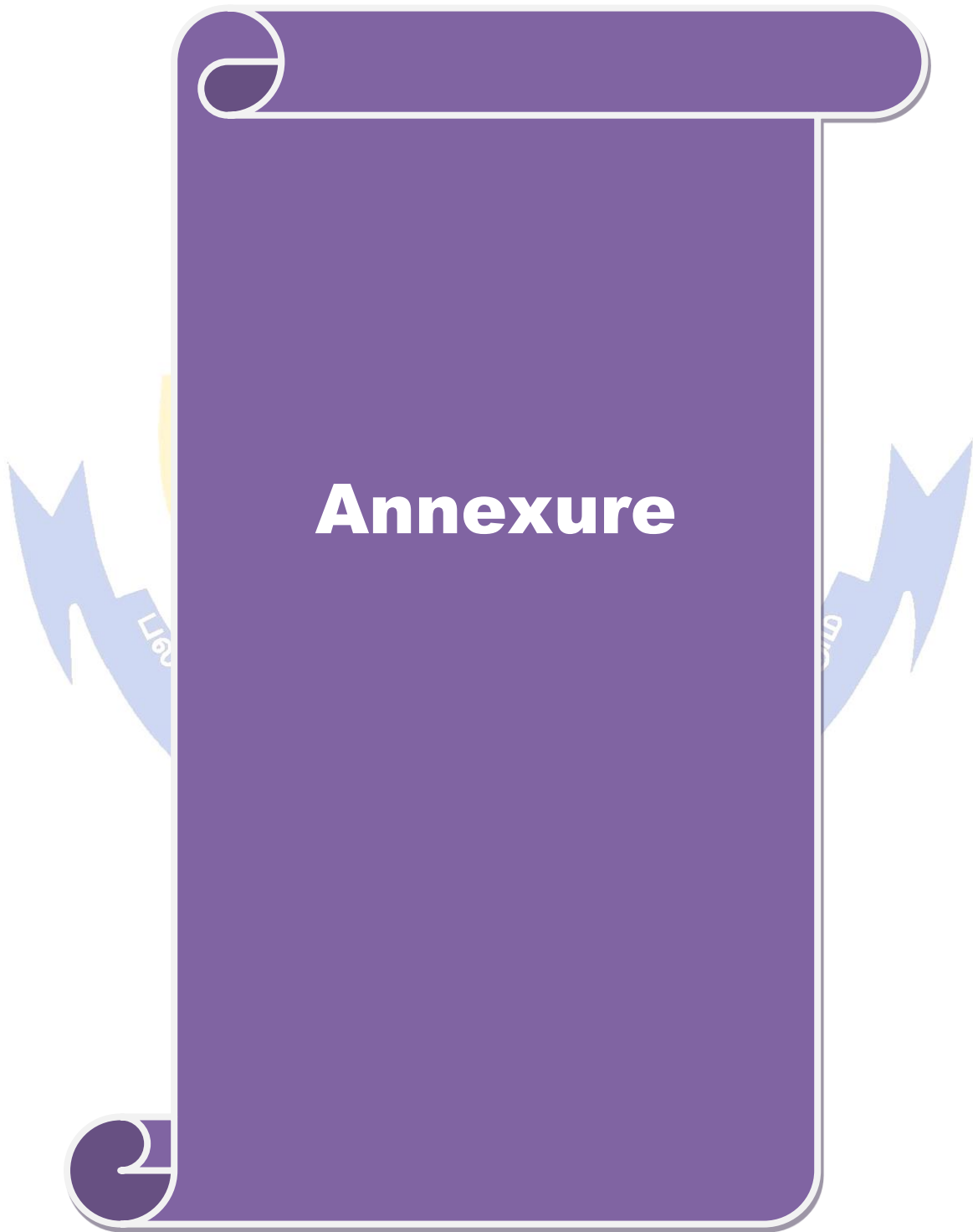
Course Code	VLSI DESIGN			L	T	P	C
<b>Core/Elective/Supportive:</b>	<b>ELECTIVE – III-L</b>			<b>5</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>Pre-requisite:</b>	<b>Digital Principles and Applications</b>			<b>Syllabus version</b>		<b>2021-22</b>	
<b>Course Objectives:</b>							
The objectives of this course are:							
<ul style="list-style-type: none"> <li>❖ To provide knowledge on Fabrication Process of NMOS,PMOS ,CMOS AND BICMOS, Super integration concepts.</li> <li>❖ To develop the skill to analyze the electrical properties of MOS transistor, design stick diagrams and layout diagrams for MOS transistors, contacts and wires.</li> <li>❖ To investigate the effect of floor planning, placement, routing and power delay estimation in physical design of digital circuits and memory design.</li> <li>❖ To apply the concept of Combinational and Sequential Circuit Testing.</li> </ul>							
<b>Expected Course Outcomes:</b>							
On successful completion of the course, student will be able to:							
1	Gain the knowledge on fabrication principles.						K1
2	Able to analyze the electrical properties of MOS transistors.						K4
3	Apply the appropriate layout design rule to create a VLSI layout for a design.						K6
4	Understand the physical design steps and gain the knowledge on types of VLSI design styles.						K2
5	Gain the knowledge, analyze and apply test principles to evaluate the VLSI designs.						K5
<b>K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create</b>							
<b>Unit: 1</b>	<b>VLSI TECHNOLOGY</b>					<b>15 Hours</b>	
Fabrication sequence – process flow – Testing – Super integration concepts – Integrated Passive components – MOS Resistors and capacitors – Crossovers – NMOS – PMOS – CMOS – BICMOS fabrication processes – comparison.							
<b>Unit: 2</b>	<b>ELECTRICAL PROPERTIES OF MOS DEVICES</b>					<b>15 Hours</b>	
Drain to source current ( $I_{ds}$ ) versus Drain to source voltage ( $V_{ds}$ ) relationships – MOS transistor threshold voltage ( $V_t$ ) – MOS transistor trans-conductance $g_m$ and output conductance $g_{ds}$ – figure of merit ( $\omega_0$ ) – pass transistor- pull – up to pull – down ratio.							
<b>Unit: 3</b>	<b>DESIGN PROCESSES</b>					<b>15 Hours</b>	
VLSI design flow - stick diagram design rules with examples - Design rules for Layout diagrams of digital circuits– sheet resistance $R_s$ –standard unit of capacitance – Inverter delays – Propagation delays- scaling of MOS circuits – limitations of scaling.							
<b>Unit: 4</b>	<b>VLSI PHYSICAL DESIGN AND STYLES</b>					<b>15 Hours</b>	
<b>PHYSICAL DESIGN:</b>							
Floor Planning – Placement – Routing – Power Delay Estimation – Clock Routing – Power Routing.							
<b>VLSI DESIGN STYLES:</b>							
Full Custom – Semi custom – Standard Cells – Gate Arrays – FPGAs – CPLDs.							
<b>Unit: 5</b>	<b>TESTING OF VLSI CIRCUITS</b>					<b>15 Hours</b>	
Test Principles-BIST-Test Bench- Combinational Circuit Testing, Sequential Circuit Testing, Test Bench Techniques.							
<b>Total Lecture Hours</b>						<b>75 Hours</b>	



<b>Text Books</b>	
1	Basic VLSI Design, Douglas ,3rd Edition, A. Pucknell, Kamran Eshraghian, PHI, New Delhi, 2011.
2	Modern VLSI design, Wayne Wolf, 3rdEdition, Pearson Education, New Delhi, 4th impression 2008.
<b>Reference Books</b>	
1	Introduction to VLSI Circuits and Systems, John .P. Uyemura, John Wiley, Student Edition, New Delhi, Reprint 2006.
2	Principles of CMOS VLSI Design, N.H.E Weste , K.Eshraghian, Adisson Wesley, 2nd Edition, New Delhi.
3	Application Specific Integrated Circuits, Michel John Sebastian Smith, Addison Wesley, Indian Edition, 4th Indian Reprint 2001, New Delhi.
<b>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</b>	
1	<a href="https://nptel.ac.in/courses/117/101/117101058/">https://nptel.ac.in/courses/117/101/117101058/</a>
2	<a href="https://www.youtube.com/watch?v=9SnR3M3CIm4">https://www.youtube.com/watch?v=9SnR3M3CIm4</a>
3	<a href="https://www.youtube.com/watch?v=Y8FvzcocT4">https://www.youtube.com/watch?v=Y8FvzcocT4</a>
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.	

<b>Mapping with Program Outcomes</b>										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	L	L	L	L	L
CO2	S	S	L	S	M	L	M	L	L	L
CO3	S	M	S	L	S	L	M	M	L	S
CO4	S	L	M	L	S	L	L	L	M	L
CO5	S	S	M	M	S	L	L	L	M	S

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



**BHARATHIAR UNIVERSITY : : COIMBATORE 641046**  
**DEPARTMENT OF ELECTRONICS**

**MISSION**

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

