

B.Sc.ELECTRONICS

Syllabus

AFFILIATED COLLEGES

Program Code :
22M

2023-2024



BHARATHIAR UNIVERSITY

A State University, Accredited with "A" Grade by
NAAC, Ranked 13th among Indian Universities by
MHRD-NIRF,

Program Educational Objectives (PEOs)	
The B. Sc. Electronics program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	Provide graduates with a strong foundation in Electronics domain and to enable them to devise and deliver efficient solutions to challenging problems in Electronics, Communications and allied disciplines.
PEO2	Impart analytic and thinking skills to develop initiatives and innovative ideas for R&D, Industry and societal requirements.
PEO3	Provide sound theoretical and practical knowledge of Electronics, managerial and entrepreneurial skills to enable students to contribute to the wellbeing of society with a global outlook.
PEO4	Inculcate qualities of teamwork as well as social, interpersonal and leadership skills and an ability to adapt to evolving professional environments in the domains of engineering and technology.
PEO5	Motivate graduates to become good human beings and responsible citizens for the overall welfare of the society.
PEO6	Develop attitude in lifelong learning, applying and adapting new ideas and technologies as their field evolves.
PEO7	To prepare graduates who will have knowledge, ability and courage to pursue higher studies and research.

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



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

BHARATHIAR UNIVERSITY: COIMBATORE 641 046

B. Sc. Electronics Curriculum (University Affiliated Colleges)
(For the students admitted during the academic year 2023 – 24 onwards)

Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			Theory	Practical	CIA	ESE	TOTAL
FIRST SEMESTER							
11T	Language –I	4	4	-	25	75	100
12E	English – I	4	4	-	25	75	100
13A	Core Paper I : Basic Electronics	4	6	-	25	75	100
--	Core Practical I: Basic Electronics Lab	-	-	4	-	-	-
--	Core Practical II : Semiconductor Devices Lab	-	-	4	-	-	-
1AA	Allied I Mathematics–I	4	6	-	25	75	100
1FA	Environmental Studies *	2	2	-	-	50	50
Total		18	T 22	L 08	100	350	450
SECOND SEMESTER							
21T	Language – II	4	4	-	25	75	100
22E	English – II	2	4	-	25	25	50 @
23A	Core Paper II : Semiconductor Devices	4	6	-	25	75	100
23P	Core Practical I: Basic Electronics Lab	4	-	3	25	75	100
23Q	Core Practical II: Semiconductor Devices Lab	4	-	3	25	75	100
2AA	Allied : II Mathematics–II	4	6	-	25	75	100
2FB	Value Education- Human Rights *	2	2	-	-	50	50
2NM	NAAN MUTHALVAN Generic Name: Language Proficiency for Employability Course Name: Effective English	2	2	-	25	25	50 #
Swatch Bharat- Summer internship **							
Total		26	T 24	L 06	175	475	650

THIRD SEMESTER							
31T	Language – III	4	4	-	25	75	100
32E	English – III	4	4	-	25	75	100
33A	Core Paper III : Digital Principles and Applications	4	3	-	25	75	100
33B	Core Paper IV: Electronic Circuits	4	3	-	25	75	100
3AD	Allied : III Object Oriented Programming using C++	3	3	-	20	55	75
3ZA	Skill Based Subject : I Bio Medical Instrumentation	3	3	-	20	55	75
--	Core Practical : III Digital Electronics and Linear IC's Lab - III	-	-	3	-	-	-
--	Core Practical : IV Electronics Circuits and Communication Lab -IV	-	-	3	-	-	-
3NM	NAAN MUDHALVAN Microsoft Office Fundamentals	2	2	-	25	25	50#
3FB / 3FC	Tamil **/ Advanced Tamil*(OR) Non-major elective - I (Yoga for Human excellence * Womens Rights*)	2	2	-	-	50	50
Total		26	T 24	Lab- 06	165	485	650
FOURTH SEMESTER							
41T	Language – IV	4	4	-	25	75	100
42E	English – IV	4	4	-	25	75	100

43A	Core Paper V: IC's and Instrumentation	4	5	-	25	75	100
4AD	Allied : IV Python Programming	4	5		25	75	100
4NM	Skill Based Subject :II NAAN MUDHALVAN CourseGenericName : Digital skills for Employability Course Name: Office Fundamentals	2	2	-	25	25	50#
43P	Core Practical: III Digital Electronics and Linear IC's Lab	3	-	3	30	45	75
43Q	Core Practical: IV Electronics Circuits and Communication Lab -IV	3	-	3	30	45	75
43R	ALLIED Practical: V Computer Programming Lab	2	-	2	20	30	50
4FB/ 4FE	Tamil**/Adva nced Tamil * (OR)Non- major elective- II(General Awareness *)	2	2	-	-	50	50
Total		28	T 22	Lab 08	205	495	700
FIFTH SEMESTER							
53A	Core Paper VI: 8051 Microcontroller and its Applications	4	4	-	25	75	100
53B	Core Paper VII: Internet of Things	4	4	-	25	75	100

5EA/ 5EB/ 5EC/ 5ED	Elective I	3	4		20	55	75
5EE/ 5EF/ 5EG/ 5EH	Elective II	3	4		20	55	75
--	Core Practical VI: Internet of Things System Design Lab	-	-	3	-	-	-
--	Core Practical VII: Industrial and Power Electronics Lab	-	-	3	-	-	-
--	Core Practical VIII: Microcontroller Lab	-	-	3	-	-	-
5NM	NAAN MUDHALVAN Generic Name: Technical skills for Employability Course Name: Data Analytics with Tableau	2	2	-	25	25	50#
5ZC	Skill based subject – III Visual Programming	3	3		20	55	75
Total		19	Theory 21	Lab 09	135	340	475
SIXTH SEMESTER							
63A	Core Paper VIII: Design with PIC Microcontroller	4	6		25	75	100
6EI/ 6EJ/ 6EK/ 6EL	Elective III	3	6		20	55	75
63P	Core Practical VI: Internet of Things System Design Lab	4	-	3	25	75	100

SCAADATED:18.06.2024 ,REVISED JUNE 2024

63Q	Core Practical VII: Industrial and Power Electronics Lab	4	-	3	25	75	100
63R	Core Practical VIII: 8051 Microcontroller Lab	4	-	3	25	75	100
67V	PROJECT	2	2	-	20	30	50
6ZP	Skill based Subject – IV Practical Visual Programming	2	-	3	20	30	50
67A	** Extension Activities	2	2	-	-	50	50
6NM	NAAN MUDHALVAN SALES FORCE	2	2	-	25	25	50#
	Total	27	Theory 18	Lab 12	185	490	675
	GrandTotal	144					3600

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

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

@ University semester examination will be conducted for 50 marks(As per the existing pattern of examination) and the marks will be converted to 25 marks

Naan Mudhalvan Course :CEE will be assessed by Industry for 25 marks and CIA will be done by the course teacher

For Project report *30 marks and viva-voce *20 marks

② @ English II- University semester examination will be conducted for 50 marks (As per existing pattern of Examination) and it will be converted for 25 marks.

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

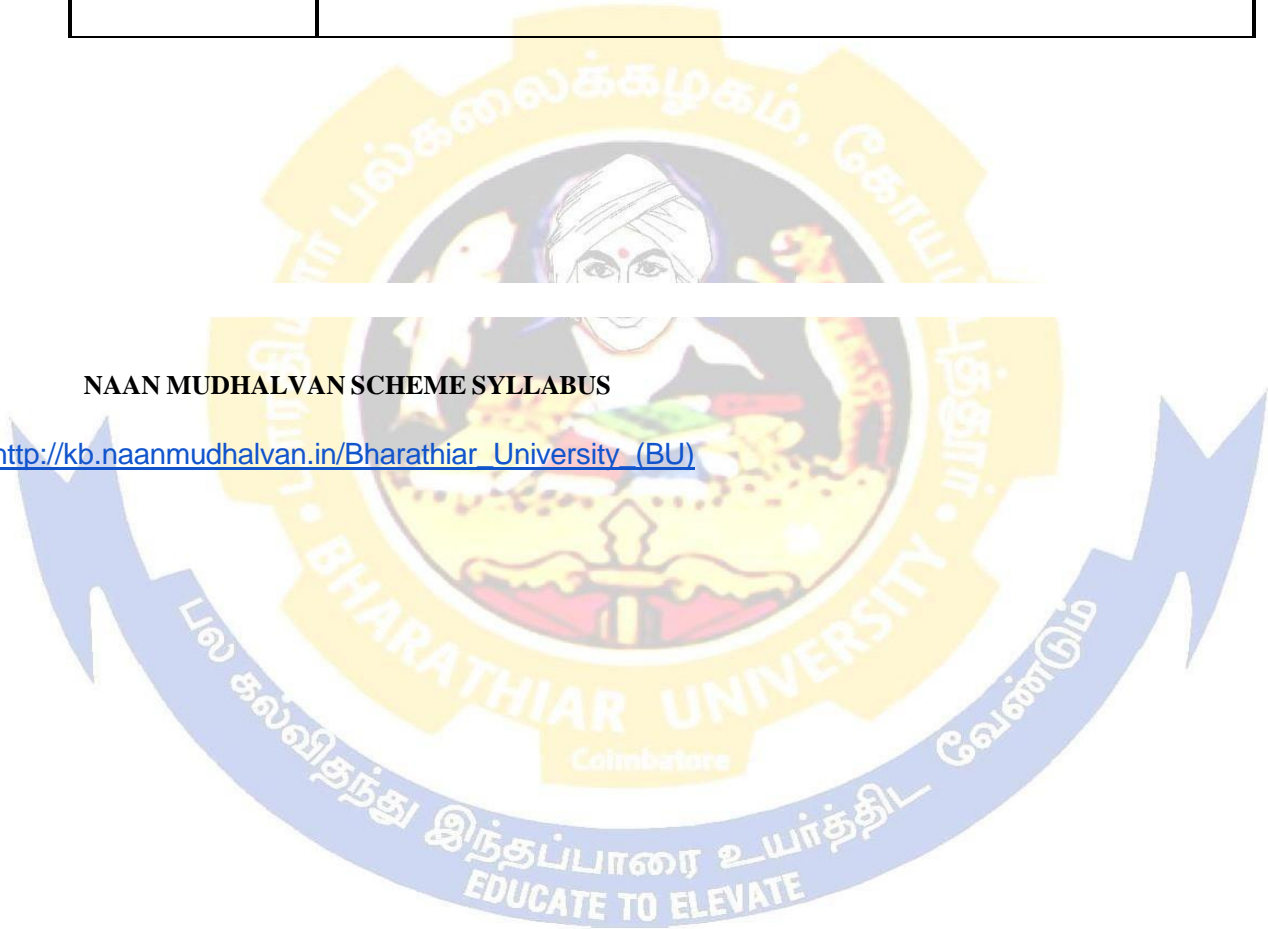
List of Elective papers (Colleges can choose any one of the paper as electives)		
Elective – I	A	PCB Design and Fabrication
	B	Advanced Communication Systems
	C	Artificial Intelligence
	D	Advanced Computer Architecture
Elective – II	E	Arduino with Sensors
	F	Microwave and Fiber Optic Communication
	G	Automotive Electronics
	H	Satellite Communications
Elective – III	I	Industrial and Power Electronics
	J	Robotics
	K	Programmable Logic Controllers
	L	VLSI Design



Government of Tamil Nadu “ NAAN MUDHALVAN SCHEME” www. naanmudhalvan.tn.gov.in List of Course for each semester	
Semester	Name of The Courses
II	Effective English
III	Microsoft Office Fundamentals
IV	Digital Skills For Employability
V	Technical Skills for Employability
VI	Emerging Technology For Employability III

NAAN MUDHALVAN SCHEME SYLLABUS

[http://kb.naanmudhalvan.in/Bharathiar University \(BU\)](http://kb.naanmudhalvan.in/Bharathiar University (BU))





First Semester

Course code	13A	BASIC ELECTRONICS			L	T	P	C
Core /Elective / Supportive:	Core Paper I			5			4	
Pre-requisite	Higher secondary physics			Syllabus Version	2023-24			
Course Objectives:								
The main objectives of this course are to:								
<ul style="list-style-type: none"> ❖ To become familiar with fundamentals of electronic components ❖ To learn to use common electronic components ❖ To design electronic circuits to perform realistic tasks 								
Expected Course Outcomes:								
On the successful completion of the course, student will be able to:								
1	Understand the basic electronic components						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	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create								
Unit:1	RESISTORS & INDUCTORS					15hours		
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.								
Unit:2	CAPACITORS					15hours		
Principles of Capacitance-Parallel PlateCapacitor- -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.								
Unit:3	ELECTRICAL ELEMENTS AND CIRCUITS					15hours		
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.								
Unit:4	NETWORK THEOREMS					15 hours		
Superposition Theorem - Thevenin Theorem- - 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.								
Unit:5	AC CIRCUITS					15hours		
IntroductionToSinusoidalWave-RMSValue-AverageValue-ACCircuitswithResistance- 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 - Passive Filters: Low Pass Filters, High Pass Filters, Band Pass Filters, Band Rejection Filters	
Total Lecture hours	
75 hours	
Text Book(s)	
1	S.Salivahanan, N.Suresh Kumar, A.Vallavaraj “ ELECTRONIC DEVICES AND CIRCUITS ”-
2	B.V.NarayanaRao— PRINCIPLES OFELECTRONICS l, WileyEasternLimited, 1992
Reference Books	
1	B.L.Theraja, “ BASIC ELECTRONICS-SOLID STATE DEVICES ”,S.Chand Company
2	BernardGrob “ BASIC ELECTRONICS ”-Tata McGraw-Hill Publishing Company Limited, 9thEdition.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/courses/108/104/108104139/
2	https://nptel.ac.in/courses/108/101/108101091/
3	https://www.youtube.com/playlist?list=PLFF553CED56CDE25D
4	https://www.youtube.com/watch?v=w8Dq8blTmSA
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.	

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	23P	BASIC ELECTRONICS LAB	L	T	P	C
Core /Elective / Supportive:		Core Practical I			3	4
Pre-requisite		Basic Electronics theory	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To understand the fundamental principles of circuit theory ❖ To make use of circuit laws and theorems and measuring the circuit parameters. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Apply the concept of basic circuit and theorems					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	Analyze Various Theorems with different resistance values					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
BASIC ELECTRONICS LAB						90 Hours
(Any 16 Experiments)						
<ol style="list-style-type: none"> 1. Study of Multimeter – Checking of Components 2. Measurement of Amplitude, Frequency & Phase Difference using CRO 3. Verification of Ohm's Law 4. Voltage sources in Series, Parallel and Series-Parallel 5. Resistance in Series, Parallel and Series-Parallel 6. Voltage and Current Dividers 7. Verification of Kirchhoff's Law 8. Wheatstone Bridge 9. Verification of Norton's Theorem 10. Verification of Thevenin's Theorem 11. Verification of Millman's Theorem 12. Verification of Superposition Theorem 13. LCR Bridge 14. Series Resonance Circuit 15. Parallel Resonance Circuit 16. Transient Response of RC Circuit 17. Transient Response of RL Circuit 18. Capacitors & Inductors in Series & Parallel 19. Frequency Response of R, L & C 20. Low Pass Filter & High Pass Filter 21. Band pass and Band Rejection Filter 22. Verification of Maximum Power Transfer Theorem 23. Measurement of resistance and capacitance in series and parallel 						

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/courses/122/106/122106025/
2	https://nptel.ac.in/courses/122/106/122106026/
Course Designed By: K.Manikantan, Assistant Professor, Government Arts College, Ooty.& Dr.N Om Muruga , Assistant Professor, Government Arts College ,Ooty.	

Mapping with Programme Outcomes										
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

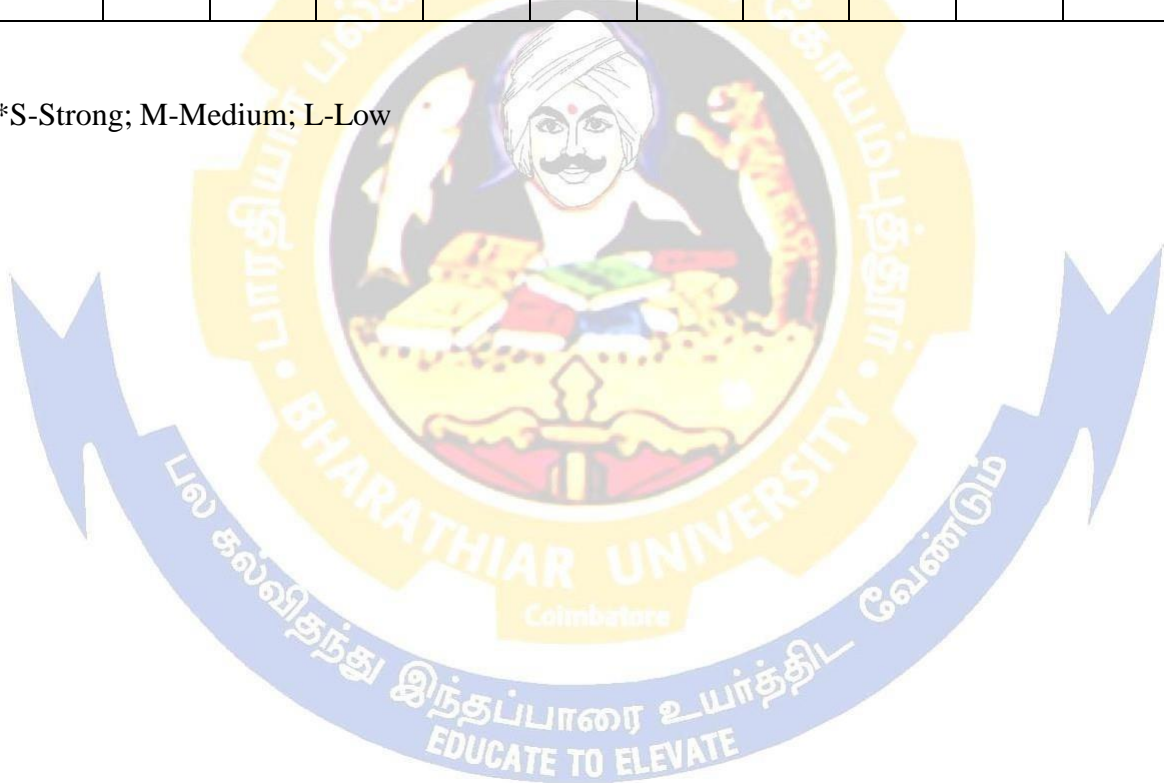
*S-Strong; M-Medium; L-Low



Course code	23Q	SEMICONDUCTOR DEVICES LAB	L	T	P	C
Core /Elective / Supportive:	Core Practical II				3	4
Pre-requisite:	Higher secondary physics		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To understand and experiment the basic parameters of electronic devices. ❖ To construct few applications using semiconductor devices. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Experiment the fundamental operations of the main semiconductor electronic devices.					K3
2	Design and construct electronic circuits using semiconductor devices.					K3
3	Understand the transistor characteristics					K2
4	Understand the characteristics of LDR and solar cell					K2
5	Apply Various transistor characteristics in applications.					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
UNIT I	SEMICONDUCTOR DEVICES LAB				90 Hours	
(Any 16 Experiments)						
<ol style="list-style-type: none"> 1. Band Gap Energy of Silicon /Germanium Diode 2. V-I Characteristics of Junction Diode 3. V-I Characteristics of Zener Diode 4. Transistor Characteristics of CE Configuration 5. Transistor Characteristics of CB Configuration 6. Transistor Characteristics of CC Configuration 7. Clipping Circuits 8. Clamping Circuits 9. Measurement of Stability Factor of Fixed Bias 10. Measurement of Stability Factor of Self Bias 11. V-I Characteristics of JFET 12. V-I Characteristics of UJT 13. UJT as Oscillator 14. Characteristics of Solar Cell 15. Study of IR (Tx & Rx) 16. Study of LED and 7 Segment display 17. Temperature Co-efficient of Junction Diode 18. Zener as a Voltage regulator 19. ON / OFF control of relay using Opto-Couplers 20. Characteristics of SCR 21. TRIAC Characteristics 						
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	23A	SEMICONDUCTOR DEVICES	L	T	P	C
Core /Elective / Supportive:		Core Paper II:	5			4
Pre-requisite		Higher secondary physics	Syllabus Version			2023-24
Course Objectives:						
The main objectives of this course are to:						
❖ To enable the students to understand and gain the knowledge on semiconductor devices.						
❖ To acquaint the students with construction, theory and characteristics of the electronic						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Explain the structure of the basic electronic devices					K1
2	Understand the characteristics and operations of special diodes					K2
3	Understand the characteristics and operations of transistors					K2
4	Understand the characteristics and operations of FET and UJT					K2
5	Use the special diodes for various applications					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 - Create						
Unit:1	PN JUNCTION DIODE					15hours
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.						
Unit:2	SPECIAL DIODES					15hours
Zener Diode - VI Characteristics – Breakdown - Backward Diode – Varactor Diode - Step Recovery Diode - Point Contact Diode - Schottky Diode - Tunnel Diode - Gunn Diode - Impatt Diode - PIN Diode - PNP Diode						
Unit:3	BJT					15hours
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 - Heat Sink						
Unit:4	FET AND UJT					15hours
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 – SCR – TRIAC - DIAC						
Unit:5	OPTOELECTRONIC DEVICES					15hours
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						
					Total Lecture hours	75 hours

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—ATEXTBOOKOFELECTRONICS
2	BernardGrob“BASIC ELECTRONICS”-Tata McGraw-Hill Publishing Company Limited,
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/courses/108/108/108108122/
2	https://nptel.ac.in/courses/108/108/108108112/
3	https://nptel.ac.in/courses/115/102/115102103/
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.	

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	33A	DIGITAL PRINCIPLES AND APPLICATIONS		L	T	P	C
Core /Elective / Supportive:	Core Paper III			3			4
Pre-requisite:	Basic Physics			Syllabus Version		2023-24	
Course Objectives:							
The main objectives of this course are to: <ul style="list-style-type: none"> ❖ To acquire the basic knowledge of Number system, Digital logic circuits and its application ❖ To outline the formal procedures for the analysis and design of combinational and sequential circuits ❖ To learn the concepts of A/D, D/A conversions and their types 							
Expected Course Outcomes:							
On the successful completion of the course, student will be able to:							
1	Understand the basics of Number system and gates						K2
2	Realize the operation of various logic gates and analyzing the outputs						K1
3	Analyze and design the combinational logic circuits						K4
4	Analyze and design the Sequential logic circuits						K4
5	Design various synchronous and asynchronous sequential circuits						K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create							
Unit:1	NUMBER SYSTEM AND CODES					12hours	
Decimal, Binary, Octal and Hexa Decimal Numbers – Conversion — Binary Addition, Subtraction and Multiplication – 1’s and 2’s Compliments - Binary Coded Decimal (BCD) – Weighted Codes and Non-weighted Codes – Excess Three – Grey Code .							
Unit:2	BOOLEAN ALGEBRA AND LOGIC GATES					12hours	
Boolean logic operations – Boolean functions – Truth Tables – Basic Laws – DeMorgans Theorem – Sum of Products and Products of Sums – Karnaugh map – Universal Gates- Logic Gates – OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR Gates .							
Unit:3	COMBINATIONAL LOGIC CIRCUITS					12hours	
Half Adder – Full Adder – Half Subtractor – Full Subtractor – 4 bit Binary Adder / Subtractor – BCD adder – Multiplexer – Demultiplexer – Decoders – Encoders – Parity Generators / Checkers .							
Unit:4	SEQUENTIAL LOGIC CIRCUITS					12hours	
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 – Decade Counter – Applications							

Unit:5	D/A AND A/D CONVERTERS	12 hours
Digital to Analog Converters: Resistive Divider Type - Ladder Type – Accuracy and Resolution - Analog to Digital Converters: Counter– simultaneous Conversion – Dual Slope Type – Accuracy and Resolution.		
	Total Lecture hours	60 hours
Text Book(s)		
1	Malvino & Leech, — Digital Principles and Applications ”, Tata McGrawHill Edition V, 2002.	
2	M.Morris Mano , Digital Logic and Computer Design ”, PHI 2005.	
Reference Books		
1	Floyd and Jain, Digital Fundamentals , Prentice Hall2010	
2	M. Morris Mano Charles Kime, Digital Logic and Computer Design Fundamentals , Pearson Education Limited, 2014	
Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]		
1	https://soaneemrana.org/onewebmedia/DIGITAL%20PRINCIPLES%20AND%20APPLICATION%20BY%20LEACH%20&%20MALVINO.pdf E book, Malvino & Leech, — DIGITALPRINCIPLESANDAPPLICATIONS , TataMcGrawHillEditionXI,2011	
2	https://nptel.ac.in/courses/117/106/117106086/ Introduction to digital circuits	
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.		

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	33B	ELECTRONIC CIRCUITS	L	T	P	C
Core /Elective / Supportive:	Core paper IV		3			4
Pre-Requisite:	Basic Physics		Syllabus Version		2023-24	
Course Objectives:						
The Main Objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To enable the students to understand and gain the knowledge on power supplies, amplifiers and oscillators. ❖ To acquaint the students with construction, theory and characteristics of the electronic amplifier circuits and types of multivibrators. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	understand the concepts of Rectifiers and regulators				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	
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create						
Unit:1	RECTIFIERS AND REGULATORS				12 hours	
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 - Voltage Doubler – Voltage Regulator – Construction of DC Power Supply.						
Unit:2	SMALL SIGNAL AMPLIFIERS				12 hours	
CE, CB, CC amplifiers– Current Gain - Voltage Gain – Power Gain – Single Stage Transistor Amplifier – DC and AC load line – RC Coupled Amplifier –Transformer Coupled Amplifier.						
Unit:3	POWER AMPLIFIERS				12 hours	
Operation and Graphical Representation of Class A, Class B, Class C and Class AB Amplifiers – Maximum Collector Efficiency of Class A Power Amplifier– Harmonic Distortion – Class B Push Pull Amplifier .						
Unit:4	FEEDBACK AMPLIFIERS				12 hours	
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.						

Unit:5	OSCILLATORS AND MULTIVIBRATORS	12 hours
Barkhausen Criterion – Hartley Oscillator – Colpitts Oscillator – Phase Shift Oscillator – Wein Bridge Oscillators - Astable Multivibrator – Monostable multivibrator – Schmitt Trigger		
	Total Lecture hours	60 hours
Text Book(s)		
1	S.K.Sahdev, Electronic Principles ”,DhanpatRai&Co(P)Ltd,2ndEdition, 1998	
2	B.L.Theraja, “ Basic Electronics ”, Chand Company Ltd, 2000.	
Reference Books		
1	V.K.Metha, Rohit Metha, — Principles of Electronics ” S Chand, 2006 .	
2	B.Sasikala, C.Poornachandra, Electronic Devices and Circuits ”, Scitech 2003.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]		
1	http://www.ee.iitm.ac.in/~ani/2012/ec5135/lectures.html Lecture Notes	
2	https://nptel.ac.in/courses/108/102/108102097/# Introduction to Electronic circuits NPTEL.	
3	https://nptel.ac.in/courses/108/102/108102095/ Analog Electronic circuits NPTEL.	
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.		

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	3AD	OBJECT ORIENTED PROGRAMMING USING C++	L	T	P	C
Core /Elective / Supportive:	ALLIED PAPER III		3			3
Pre-Requisite:	Computer Fundamentals		Syllabus Version		2023-24	
Course Objectives:						
The Main Objectives of this course are to;						
<ul style="list-style-type: none"> ❖ This subject deals with the programming concepts of Object Oriented Programming using C++. ❖ To develop a skills on using MS word, MS Excel, Power Point andMSAccess 						
Expected Course Outcomes:						
On successful completion of this subject the students should have :Writing programming ability on OOPS concepts like Encapsulation, Data abstraction, Inheritance, Polymorphism and Exception handling etc.,						
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
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create						
Unit:1						9 hours
Introduction to C++ - Key Concepts of OOP – Advantages – OO Languages – I/O in C++ - C++ Declarations - Control Structures – Decision Making Statements – If...Else – Jump – GOTO– Switch Case Statements..						
Unit:2						9 hours
Class and Objects: Declaring objects – Defining member functions – Static member variables and functions – Array of objects – Overloading member functions Bit fields and Class – Characteristics – Calling constructor and Destructors						
Unit:3						9 hours
Operator Overloading: Overloading unary, Binary operators – Overloading friend functions – Type conversion - Inheritance: Types of inheritance: Single, Multilevel, Multiple, Hierarchical, Hybrid and Multi path inheritance						
Unit:4						9 hours
Pointers: Declaration – Pointer to class, object – THIS pointer – Pointer to derived classes and base classes – Arrays – Characteristics – Arrays of classes – Memory models – New and delete operators – Dynamic objects ...						
Unit:5						9 hours

Files: File stream classes – File Modes – Sequential read/write operations - Random access operation – Templates – Exception handling – Strings –Miscellaneous functions	
	Total Lecture hours 45 hours
Text Book(s)	
1	Ashok N Kamthane: Object Oriented Programming with ANSI and Turbo C++, Pearson Education Publ., 2003.
Reference Books	
1	E. Balagurusamy: Object Oriented Programming with C++, TMH Pub., 1998.
2	Maria Litvin and Gary Litvin: C++ for you++, Vikas Publ, 2002
3	John R Hubbard: Programming with C++, TMH Publ. II Edition, 2002
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.	

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-L

Course code	3ZA	BIOMEDICAL INSTRUMENTATION	L	T	P	C
Core /Elective / Supportive:	Skill Based Subject: I		3			3
Pre-requisite	Higher secondary biology		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To presents various bio-potentials and working principles of medical instruments ❖ To enable the students to learn about bio-potentials and medical instruments 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the Concept of bio-potential					K2
2	Understand the concept of medical instruments					K2
3	Develop the troubleshooting Skills of medical instruments					K3
4	Understand the concepts of signal conditioners & diagnostic equipment					K2
5	Analyse physiological assist devices					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	BASIC PHYSIOLOGY				9 hours	
Cells and their Structures - Transport of Ions through Cell Membrane - Resting and Excited State Transmembrane Potential - Nervous System - Physiology of Muscles - Heart and Blood Circulation						
Unit:2	ELECTRODES AND TRANSDUCERS				9 hours	
Basic Electrode Theory - Micro Electrodes - Skin Surface Electrodes - Needle Electrodes - Equivalent Circuit - Electrode Materials - Chemical Electrodes - Reference Electrodes - The pH Electrode - Blood Gas Electrode – Thermistor						
Unit:3	SIGNAL CONDITIONERS & DIAGNOSTIC EQUIPMENTS				9 hours	
Instrumentation Amplifiers - Current Amplifiers - Isolation Amplifier - Need for Filters - Low Pass, High Pass and Band Pass Active Filters - Notch Filters - Heated Stylus and Ink Pen Recorders. DIAGNOSTIC EQUIPMENTS: Typical Electrocardiogram (ECG)-Electrocardiograph - Electroencephalogram (EEG) .						
Unit:4	DIAGNOSTIC EQUIPMENTS & BIOTELEMETRY				9 hours	
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 .						

Unit:5	PHYSIOLOGICAL ASSIST DEVICES	9 hours
Need for Pacemakers - Pacemaker Parameters and Circuits - Different Modes of Operation - DC Defibrillator - Heart Lung Machines - Nerve and Muscle Stimulator. COMPUTER APPLICATIONS: Analysis of ECG signals .		
Total Lecture hours		45 hours
Text Book(s)		
1	Joseph J. Carr and John M. Brown, “ Introduction to Biomedical Equipment Technology ”,	
2	Leslie Cromwell.,FredJ. Webell., Erich A. Pfeffer,“ Bio-medical Instrumentation ”	
Reference Books		
1	Khandpur, “ Handbook on Biomedical Instrumentation ”, Tata McGraw Hill Company, New	
2	Ohn G Webster, Ed., “ Medical Instrumentation Application and Design ”, Third Edition, John Wiley & Sons, Singapore, 1999	
3	Arumugam.M,“ BiomedicalInstrumentation ”,AnuradhaAgenciesPublishers,Chennai,1992	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.youtube.com/watch?v=i2mZylgP1Fk	
2	https://www.youtube.com/watch?v=4ldv98F7Zng	
3	https://nptel.ac.in/courses/108/105/108105101/	
4	https://nptel.ac.in/courses/108/105/108105091/	
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.		

Mapping with Programme Outcomes										
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



**FOURTH
Semester**

Course code	43A	IC'S AND INSTRUMENTATION	L	T	P	C
Core /Elective / Supportive:		Core paper V	5			4
Pre-requisite		Basic Electronics	Syllabus Version	2023-24		
Course Objectives:						
<ul style="list-style-type: none"> ❖ 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 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Recognize the standards in IC Fabrication Technology					K1
2	Understand the working of Timer and PLL					K2
3	Design simple circuits using Op-amp.					K3
4	Understand the principle of various types of transducers and working of frequently used equipment's like CRO			K2 Study the construction		K4
5	Digital Voltmeter etc.					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	IC FABRICATION TECHNOLOGY					12hours
Fundamentals of Monolithic IC Technology – Basic Planar Process- Wafer Preparation Epitaxial Growth–Oxidation–Photolithography–Diffusion of Impurities–Isolation Techniques– Metallization–Monolithic Transistors–Integrated Resistors- Thin and Thick Film Technology.						
Unit:2	TIMER AND PLL					12hours
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 .						
Unit:3	OPERATIONAL AMPLIFIER					12hours
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 – Phase Shift Oscillator – Wein Bridge Oscillator–Square Wave and Triangular Wave Generator .						
Unit:4	TRANSDUCERS					12hours
Introduction – Electrical Transducer – Basic requirements of Transducer – Classification of Transducers – Selection of Transducers – Resistive Transducers – Potentiometers – Thermistors – Thermocouple – Piezoelectric Transducers – Hall Effect Transducers – Photoelectric Transducers – Digital Displacement Transducers.						

Unit:5	ELECTRONIC INSTRUMENTS	12 hours
Q Meters- CRO: Block Diagram – Cathode Ray Tube – Measurement of Frequency – Measurement of Voltage and Current – Digital Oscilloscope – Digital voltmeter– Dual Slope Integrating Type DVM – Digital Multimeter – Humidity Measurement – Measurement of PH.		
Total Lecture hours		60 hours
Text Book(s)		
1	D.Roy Choudhury and Shahil B Jain, Linear Integrated Circuits ”, Second Edition New Age International Publishers, 2004	
2	K.R.Botkar,— Integrated Circuits ”, 10th Edition KhannaPublishers , 2006	
Reference Books		
1	J.B.GUPTA, A Course In Electronic and Electrical Measurements and Instrumentation ”, 12th Edition, S.K Kataria & Sons.	
2	A.K. Sawhney, ELECTRICAL & ELECTRONIC MEASUREMENTS AND INSTRUMENTATION: , Dhanpath Rai & Co (P) Ltd, 2004.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]		
1	https://nptel.ac.in/courses/108/108/108108111/ Integrated circuits,opamps and their applications	
2	https://nptel.ac.in/courses/117/106/117106030/ Analog IC Design	
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode..		

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	4AD	PYTHON PROGRAMMING	L	T	P	C
Core/Elective/ Supportive		ALLIED PAPER IV	3	0	0	4
Pre-requisite	Knowledge on logic of the programs and oops concept.		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 1. To introduce the fundamentals of Python Programming. 2. To teach about the concept of Functions in Python. 3. To impart the knowledge of Lists, Tuples, Files and Directories. 4. To learn about dictionaries in python. 5. To explore the object-oriented programming, Graphical programming aspects of python with help of built in modules. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remembering the concept of operators, data types, looping statements in Python programming.				K1	
2	Understanding the concepts of Input / Output operations in file.				K2	
3	Applying the concept of functions and exception handling				K3	
4	Analyzing the structures of list, tuples and maintaining dictionaries				K4	
5	Demonstrate significant experience with python program development environment				K4-K6	
K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5 -Evaluate; K6 -Create						
Unit:1	BASICS OF PYTHON				10hours	
BASICS : Python - Variables - Executing Python from the Command Line - Editing Python Files - Python Reserved Words - Basic Syntax-Comments - Standard Data Types – Relational Operators – Logical Operators -Bit Wise Operators-Simple Input and Output.						
Unit:2	CONTROL STATEMENTS				10hours	
CONTROL STATEMENTS: Control Flow and Syntax - Indenting - if Statement - statements and expressions- string operations- Boolean Expressions -while Loop - break and continue - for Loop. LISTS: List-listslices-listmethods-listloop–mutability–aliasing-cloninglists-listparameters. TUPLES: Tupleassignment, tupleasreturn value-Sets– Dictionaries						
Unit:3	FUNCTIONS				10hours	
FUNCTIONS: Definition - Passing parameters to a Function - Built-in functions- Variable NumberofArguments. Libraries in Python: TensorFlow,Matplotlib,OpenCV,Pandas, NumPy, SciPy, Scrapy, PyTorch, Scikit Learn.						
Unit:4	ERROR HANDLING				12hours	
ERROR HANDLING: Run Time Errors - Exception Model - Exception Hierarchy – Handling Multiple Exceptions-Handling IO Exceptions .DataStreams -AccessModesWriting-Data to a File Reading- Data From a File - File Methods – Working with Directories.						

Unit:5	OBJECT ORIENTED FEATURES	10hours
OBJECT ORIENTED FEATURES: Classes Principles of Object Orientation - Creating Classes – Instance Methods-Class Variables–Inheritance – Polymorphism - Regular Expressions.		
Unit:6	ContemporaryIssues	3hours
Expert lectures,online seminars -webinars		
	TotalLecturehours	55hours
TextBook(s)		
1	Mark Summerfield,Programming in Python3:AComplete introduction to the Python Language, Addison-Wesley Professional, 2009.	
2	Martin C.Brown, PYTHON: The Complete Reference, McGraw-Hill, 2001	
3	E. Balagurusamy (2017), “Problem Solving and Python Programming”, McGraw-Hill, First Edition.	
Reference Books		
1	Allen B.Downey,“Think Python: How to Think Like a Computer Scientist”, 2 nd edition, Updated for Python 3, Shroff /O’ Reilly Publishers, 2016	
2	Guido van Rossum and Fred L. Drake Jr, An Introduction to Python – Revised and updated forPython3.2, NetworkTheory Ltd., 2011	
3	Wesley J Chun, Core Python Applications Programming,Prentice Hall,2012.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	Python for Everybody-Specialisation - Coursera	
2	Learn Python: The Complete Python Programming Course - Udemy	
3	Python for Data Science – NPTEL / Swayam	
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.		

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

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



Course Code	43P	DIGITAL ELECTRONICS AND LINEAR IC's LAB	L	T	P	C
Core /Elective / Supportive:	Core Practical III				2	3
Pre-Requisite:	Digital Electronics and Microprocessor theory		Syllabus Version	2023-24		
Course Objectives:						
The Main Objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To understand the logical operation of various gates and theorems ❖ To develop various digital circuits ❖ To develop the assembly language programming of Microprocessor and to interface it with various peripheral devices 						
Expected Course Outcomes:						
On the Successful completion of the course, student will be able to:						
1	Analyze the circuit using Boolean laws				K6	
2	Design the Adder and subtractor circuit using logic gate				K6	
3	Gain knowledge of arithmetic Programming of 8085				K6	
4	Knowledge about logic Programming of 8085				K6	
5	Understand the wave form generation				K1	
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create						
Part I	DIGITAL ELECTRONICS(ANY 6)				40 Hours	
<ol style="list-style-type: none"> 1 Verification of Basic Gates and Universal gates 2 Verification of Demorgan's Theorem 3 Half Adder and Full Adder & Half Subtractor and Full Subtractor 4 Decade Counter & BCD Counter 5 Study of Flip-Flops 6 Multiplexer and De-Multiplexers 7 Encoder and Decoder 8 BCD to 7-Segment Display 9 Binary to Grey code and Grey to Binary code 10 Synchronous and Asynchronous Counter 11 Design and Simulation of Logic Gate using VHDL Coding 12 Design and Simulation of Adder Circuits using VHDL Coding 						
Part II	LINEAR IC'S LAB (ANY 6)				45 ours	
<ol style="list-style-type: none"> 1 Astable Multivibrator using 555 2 Monostable Multivibrator using 555 3 Inverting and Non Inverting Amplifier 4 Phase Shift Oscillator 5 Instrumentation Amplifier 6 Voltage to Current Converter and Current to Voltage Converter 						

- 7 Wein Bridge Oscillator using IC741
- 8 Square Wave and Triangular Generator
9. Adder and Subtractor using IC741

	Total Lecture hours	85 hours
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.		

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	43Q	ELECTRONIC CIRCUITS & COMMUNICATION LAB	L	T	P	C	
Core /Elective / Supportive:	Core Practical IV				2	3	
Pre-Requisite:	Electronic circuits theory and Communication theory		Syllabus Version		2023-24		
Course Objectives:							
The Main Objectives of this course are to:							
<ul style="list-style-type: none"> ❖ To understand the concept of working of regulated power supplies, rectifiers, amplifiers and oscillators. ❖ To experiment the modulation and detection techniques. 							
Expected Course Outcomes:							
On the Successful completion of the course, student will be able to:							
1	sign power supply and rectifier circuits					K6	
2	sign Amplifier circuits					K6	
3	sign different Oscillator circuits					K6	
4	sign different Modulation circuits					K6	
5	Study on communication antennas					K1	
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create							
Part I	ELECTRONIC CIRCUITS					45 hours	
<ol style="list-style-type: none"> 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. RCCoupled Amplifier 11. Half Wave and Full Wave Rectifier 12. Filter Circuits 							
Part II	ELECTRONIC COMMUNICATION					40 hours	
<ol style="list-style-type: none"> 1. Performance of IF Amplifier 2. AM Modulation and Detection 3. FM Modulation and Detection 4. PAM Modulation 							

5. PINDiodeOscillator 6. Alignment ofDishAntenna 7. Alignment ofSatelliteReceiver 8. PWMModulation 9. PPMModulation 10. PCMModulation 11. GUNNDiodeOscillator (Any 16 Experiments)		
Total Lecture hours		85 hours
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.		

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	43R	<u>ALLIED LAB : COMPUTER PROGRAMMING LAB</u>	L	T	P	C
		OBJECT ORIENTED PROGRAMMING USING C++ & PYTHON PROGRAMMING LAB				
Core/Elective/Supportive	Allied Lab V				2	2
Pre-requisite	Basics of any Programming Language		Syllabus		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 1. This course presents an overview of elementary data items, lists, dictionaries, sets and tuples 2. To understand and write simple OOP WITH C++ Python programs 3. To Understand the OOPS concepts of Python 4. To develop web applications using Python 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To write programs in Python using OOPS concepts				K1,K2	
2	To understand the concepts of File operations and Modules in Python				K2,K3	
3	Implementation of lists, dictionaries, sets and tuples as programs				K3,K4	
4	To develop web applications using Python				K5,K6	
K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5 -Evaluate; K6 -Create						
LIST OF PROGRAMS					45 hours	
OBJECT ORIENTED PROGRAMMING WITH C++ (Any 6)						
<ol style="list-style-type: none"> 1. Create a class to implement the data structure STACK . Write a constructor to initialize the TOP of the stack to 0 . Write a member function POP() to delete an element . Check for overflow and underflow conditions. 2. Create a class ARITH which consists of a FLOAT and an integer Variable . Write member ADD(), SUB (), MUL (), DIV (), MOD () to perform addition, multiplication, division and modulus respectively . Write member functions to get and display values. 3. Create a class MAT has a 2-d matrix and R&C represents the rows and columns of the matrix . Overload the operators +, -, * to add subtract and multiply two matrices. Write member functions to get and display MAT object values. 4. Create a class STRING . Write member function to initialize, get and display strings. Overload the operator + to concatenate two strings, == to compare two strings and a member function to find the length of the string. 5. Create a class which consists of EMPLOYEE detail like eno, ename, dept, basic-salary, grade. Write member functions to get and display them. Derive a class PAY from the above class and write a member function to calculate da , hra , pf depending on the grade and Display the Payslip in a neat format using console I/O. 						

6. Create a class SHAPE which consist of two VIRTUAL FUNCTIONS Cal_Area() and Cal_PERI to calculate AREA and PERIMETER of various figures. Derive three classes SQUARE,RECTANGLE and TRIANGLE from the class SHAPE and calculate AREA and PERIMETER of each class separately and Display the result.

7. Create two classes which consists of two private variables, one float And one integer variables in each class. Write member functions to get and display them . Write FRIEND function common to arguments. And the integer and float values of both the objects separately and Display the result.

8. Write a user defined function USERFUN() which has the formatting commands like setw(), showpoint , showpos precision(). Write a program which prints an multiplication table and uses USERFUN() for formatting.

9. Write a program to perform Insertion , Deletion and Updation using files .

10. Write a program which takes a file as argument and copies in to another file with line numbers using Command Line Arguments.

PYTHON PROGRAMMING LAB (Any 6)

Implement the following in Python:

1. Write a Python program by getting input from the user and displays the following information: Your name, Full address, Mobile number, College name, Course, Subjects.
2. Write a Python program to find the largest three integers using if-else and conditional operator.
3. Write a Python program that asks the user to enter a series of positive numbers (The user should enter a negative number to signal the end of the series) and the program should display the numbers in order and their sum.
4. Write a Python program to find the product of two matrices [A] m x p and [B] p x r.
5. Write recursive functions for Fibonacci sequence up to given number n.
6. Write recursive functions to display prime number from 2 to n.
7. Write a Python program that writes a series of random numbers to a file from 1 to n and display.
8. Write a Python program to sort a given sequence: String, List and Tuple.
9. Write a Python program to make a simple calculator using functions.
10. Write a Python program for Linear Search using functions.
11. Write a Python program for Inheritance
12. Write a Python program to slice a given list.
13. Write a Python program to count the number of words.
14. Write a Python program to copy a file.
15. Write a Python program to check the given password is correct or not using regular expressions.

Total Lecture hours

45 hours

Text Books

- | | |
|---|---|
| 1 | Bill Lubanovic, "Introducing Python", O'Reilly, First Edition - Second Release, 2014. |
| 2 | Mark Lutz, "Learning Python", O' Reilly, Fifth Edition, 2013. |

Course Designed By:

Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur &
Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.



**FIFTH
Semester**

Course code	53A	8051 MICROCONTROLLER AND ITS APPLICATIONS	L	T	P	C
Core /Elective / Supportive:		Core paper VI	5			4
Pre-requisite:		Digital Electronics8085 Microprocessor	Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: <ul style="list-style-type: none"> ❖ To Study the architecture and addressing modesof8051 ❖ To Impart knowledge about assembly language programsof8051 ❖ to understand the importance of different peripheral devices and their interfacingto8051 ❖ To Impart knowledge of different types of external interfaces includingLCD,Keypad Matrix, Stepper motorandsensors 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Describe architecture and operation of Microcontroller 8051					K1
2	Foster ability to understand the design concept of 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
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	MICROCONTROLLER OVERVIEW					18 hours
Introduction to Microcontroller – Comparison of μP & μC - 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.						
Unit:2	ADDRESSING MODES, ARITHMETIC AND LOGICAL INSTRUCTION					18 hours
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.						
Unit:3	DATA TRANSFER AND BRANCH OPERATIONS					18 hours
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.						
Unit:4	PERIPHERALS					18hours
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.						

Unit:5	INTERFACING	18hours
Interfacing of LCD – LCD Operation – Pin Descriptions – Command and Data to the LCD – ADC 0804 – LM34 Temperature Sensor – Stepper Motor – Interfacing Key Board.		
Total Lecture hours		90 hours
Text Book(s)		
1	Mohamed Ali Maszidi & Janice Gillispie Maszidi, “ The 8051 Microcontroller and Embedded System ”, Pearson Publishers	
2	Kenneth J. Ayala, “ The 8051 Microcontroller Architecture, Programming and Application ” 2 nd Edition, Penram International Publications	
Reference Books		
1	Myke predko, “ Programming and Customizing the 8051 Microcontroller ”, Tata McGraw Hill, 1 st Edition	
2	AyalaJ.K., — The8051 Microcontroller:Architecture, programming and applications ”, Penram International (2005) 3rd edition.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.youtube.com/watch?v=84YUQu8tE4w	
2	https://www.youtube.com/watch?v=GPz_mR7Flas	
3	https://www.youtube.com/watch?v=uFhDGagZzjs	
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode..		

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	53B	INTERNET OF THINGS	L	T	P	C
Core/Elective /Supportive:	CORE PAPER VIII			5		4
Pre- Requisite:	Basic Electronics			Syllabus Version		2023-24
Course Objectives:						
The Main Objectives of this course are to:						
❖ To enable the students to learn about IoT and also to understand the concept of embedded devices and Interfacing sensors.						
Expected Course Outcomes:						
On the Successful completion of the course, student will be able to:						
1	Study the concept of basic IoT					K1
2	Familiarize the principle of connected devices					K2
3	Gain knowledge about embedded devices					K3
4	Analyze different sensor Interface technology					K4
5	Analyze the IoT applications					K4
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create						
Unit:1	IOT FUNDAMENTALS					18 hours
Introduction to IoT: Evolution of IoT – Definition & Characteristics of IoT - Architecture of IoT – Technologies for IoT– Applications of IoT – Industrial IoT – Security in IoT						
Unit:2	DESIGN PRINCIPLES FOR CONNECTED DEVICES					18 hour s
Introduction-IoT/M2m systems - Communication Technologies - Data management, data consolidation and Device management - Ease of Designing and Affordability.						
Unit:3	PROGRAMMING FUNDAMENTALS WITH C USING ARDUINO IDE					18 hours
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.						
Unit:4	SENSORS AND ACTUATORS					18 hours
Analog and Digital Sensors – Interfacing temperature sensor, ultrasound sensor and infrared (IR) sensor with Arduino – Interfacing LED and Buzzer with Arduino.						
Unit:5	SENDING SENSOR DATA OVER INTERNET					18 hours
Introduction to ESP8266 NODEMCU WiFi Module – Programming NODEMCU using Arduino IDE – Using WiFi and NODEMCU to transmit data from temperature sensor.						
Total Lecture hours						90 Hours

Text Book(s)	
1	Arshdeep Bahga, Vijay Madiseti, — Internet of Things:A Hands-On Approach “, 2014. ISBN: 978-0996025515
2	Boris Adryan, Dominik Obermaier, Paul Fremantle, — The Technical Foundations Of Iot “, Artech Houser Publishers, 2017.
Reference Books	
1	Michael Margolis,— Arduino Cookbook “, O”Reilly, 2011
2	Marco Schwartz, — Internet of ThingswithESP8266 “, Packt Publishing,2016
Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]	
1	https://nptel.ac.in/courses/106/105/106105166 /Introduction to IoT Part I – Lecture 1
2	https://ocw.cs.pub.ro/courses/iot/courses/02 Electronics for Internet of Things – Lecture II
3	https://nptel.ac.in/courses/106105166 /Introduction to Arduino – I – Lecture 22
<p align="center">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.</p>	

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	5ZC	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		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To design and develop Windows-based applications using Visual Basic ❖ To Emphasis on the fundamentals of design, development, implementation and documentation ❖ To Gain knowledge about to write visualC++programming 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Explore Visual Basic's					K1
2	Implement syntax rules in Visual Basic programs					K2
3	Explain variables and data types used in program development					K3
4	Write and apply visual C++ principles and programming techniques					K4
5	Write and apply procedures, sub-procedures, and functions to data transfer					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	VISUAL BASIC OVERVIEW					9hours
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.						
Unit:2	VISUAL BASIC OBJECTS					9hours
Visual Basic Programming – Forum Design – VBX Controls – Properties – Event Procedures Menus and Toolbars – Using Dialog Boxes – Working with Control Arrays – ActiveX Controls Multiple Documents Interface (MDI) – File System Controls – Data Control – Database Applications.						
Unit:3	BUILDING THE USER INTERFACE					9hours
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						
Unit:4	DATABASE AND APPLICATIONS					9 hours
Database Connectivity – Min Database Applications – Embedding Controls in View creating user defined DLL's – Dialog Based Applications – Dynamic Data Transfer Function – Data Base Management with ODBC – Communicating with other applications – Object Linking and Embedding						
Unit:5	DESIGN AND DEVELOPMENT					9 hours
Basics of GUI Design – Visual Interface Design – File System – Storage and Retrieval System - Simultaneous Multi- Platform Development						
Total Lecture hours						45 hours

Text Book(s)	
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	PapparandMurray, VisualC++:TheCompleteReferencel ,TataMcGrawHill,NewDelhi, 2000.
Reference Books	
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.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.youtube.com/watch?v=5nahqfJTQXs
2	https://www.youtube.com/watch?v=1oGpl6qNkoQ
3	https://www.youtube.com/watch?v=gcFHyVYdeFU
<p>Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.</p>	

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



SIXTH Semester

Course code	63A	DESIGN WITH PIC MICROCONTROLLER	L	T	P	C
Core/Elective/ Supportive:	Core paper VIII			6		4
Pre-requisite	Students having knowledge of electronics fundamentals coupled with some programming experiences are the ideal participants for this course.			Syllabus Version	2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To Study the architecture and addressing modes of PIC Microcontroller ❖ To know various peripheral devices and to interface them with PIC Microcontroller 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the evolution in microcontroller technology					K1
2	Describe Harvard architecture model and programming techniques					K2
3	Describe the operation and need for interrupts and timers					K3
4	List out various operators in modelling the design units					K4
5	Apply the concept for I/O port expansion					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	CPU ARCHITECTURE AND INSTRUCTION SET					15hours
Overview – Harvard Architecture and Pipelining – Program Memory Considerations – Register File Structure and Addressing Modes – CPU registers – Instruction Set – Simple Operations						
Unit:2	LOOP TIME SUBROUTINE, TIMER 2 AND INTERRUPTS					15 hours
Timer 2 Use – Interrupt Logic – Timer 2 Scalar Initialization – Interrupt Service - Interrupt Service Routine – Loop Time Subroutine						
Unit:3	EXTERNAL INTERRUPTS AND TIMERS					15 hours
RB0/INT External Interrupt Input – Timer 0 – Compare Mode – Capture Mode – Timer1/CCP Programmable Period Scalar – Timer1 External Event Counter – Timer1 and Sleep Mode – Pulse Width Modulated Outputs – Port B Change Interrupts						
Unit:4	I/O PORT EXPANSION					15hours
Synchronous Serial Port Module – Serial Peripheral Interface – Output Port Expansion – Input Port Expansion – LCD Display						
Unit:5	I²C BUS FOR PERIPHERAL CHIP ACCESS					15hours
I2C Bus Operation - I2C Bus Subroutines – DAC Output – Temperature Sensor – Serial EEPROM						
Total Lecture hours					75 hours	
Text Book(s)						
1	John B.Peatman,— Design with PIC Microcontrollers —,Pearson Education Publishing					
Reference Books						
1	Muhammad Ali Mazidi, Rolin D. McKinlay, and Danny Causey, “ The PIC Microcontroller and Embedded systems –Using Assembly and C for PIC18, Prentice Hall, 2007					

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.youtube.com/watch?v=nLIBssKCN2w
2	https://www.youtube.com/watch?v=VEAYB1A9SiA
3	https://www.youtube.com/watch?v=aSsnLyKtIAU
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.	

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	63P	Internet of Things System Design Lab	L	T	P	C
Core/Elective/ Supportive		Core –Practical- VI			3	4
Pre-requisite		Basic knowledge of Electronic Circuits or permission of instructor	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To make the students to design IoT based circuits ❖ To understand the characteristics of Arduino & sensors . 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Interfacing the system and IoT					K4
2	Understand the characteristics of Internet of Things .					K6
3	Design the smart works					K5
4	Design Various Applications using IoT					K5
5	Understand the Sensors methods					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
(ANY 8 EXPERIMENTS)						
1. Installation and Library Management						
2. LED interfacing.						
[i] Blinking						
[ii] Running Light						
3. Switch Interfacing						
[i] Without Interrupt						
[ii] With Interrupt						
4. Serial Communication & Plotter						
5. ADC Interfacing						
6. Buzzer interfacing						
7. Tone Generation						
8. LCD interfacing						

- 9. Servo Motor interfacing
- 10. Joystick interfacing
- 11. Tilt Sensor interfacing
- 12. Reed Switch interfacing
- 13. Thyristor protection circuit

Course Designed By:
 Dr.T.Siva Kumar , Principal ,RVS College Of Arts and Science,Coimbatore&
 Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur .

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	63Q	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		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To make the students to design triggering circuits of SCR. ❖ To understand the characteristics of power electronic devices. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Design triggering circuits of SCR					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
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit I	INDUSTRIAL AND POWER ELECTRONICS				90 Hours	
(ANY 16 EXPERIMENTS)						
<ol style="list-style-type: none"> 1. Triggering of SCR by R, C and Diac. 2. Design of snubber circuit. 3. Fan regulator using Triac. 4. Thyristor chopper. 5. TRIAC Flasher. 6. Commutation Techniques. 7. Speed control of DC motor using SCR. 8. Automatic street light controller 9. Burglar Alarm 10. Sequencer Circuit. 11. Power Inverter 12. Switching Regulators 13. Automatic Battery Charger 14. Fire alarm 15. ON / OFF relay control using opto – coupler 16. Servo stabilizer 17. Layout and Art Work preparation for PCB 18. Etching Drilling and Component mounting of PCB 19. Temperature controller using AD 590/ LM 35. 20. Construction of Emergency Lamp. 21. Phase Control Circuit 22. Cycloconverter 23. Thyristor protection circuit 						
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.						

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

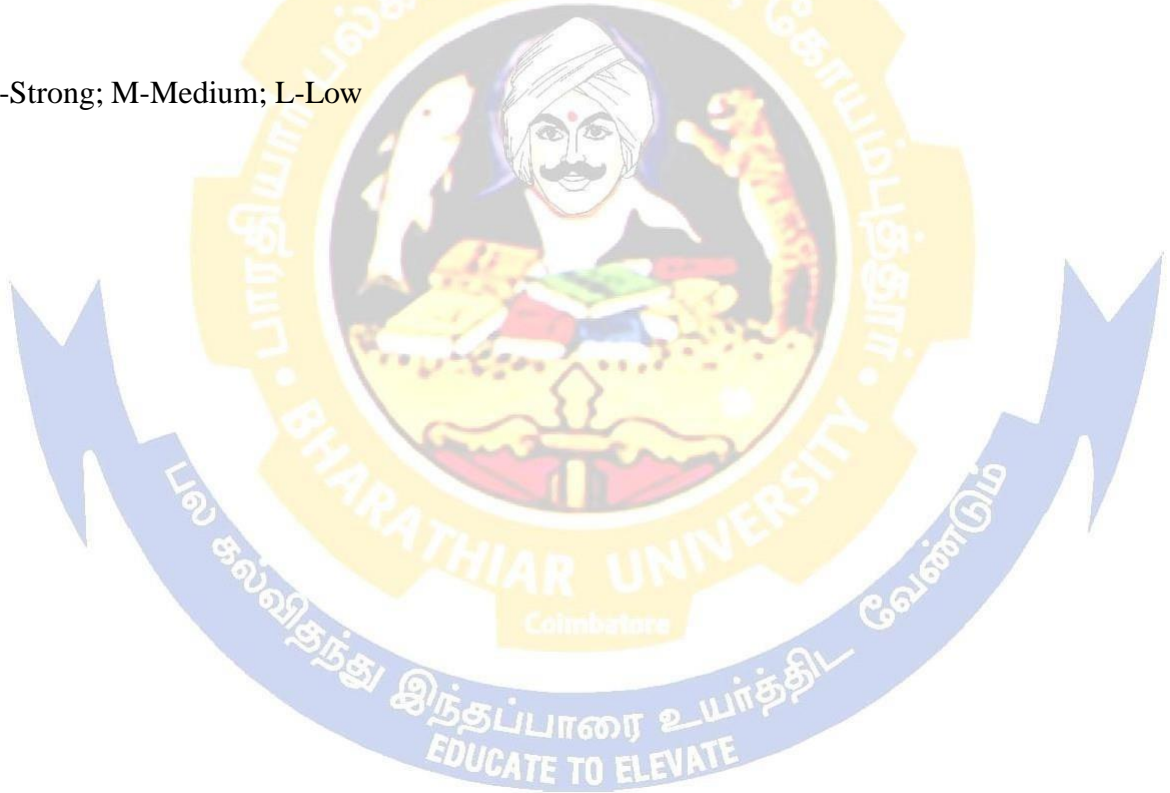
*S-Strong; M-Medium; L-Low



Course code	63R	8051 MICROCONTROLLER LAB	L	T	P	C
Core/Elective/ Supportive:		Core –Practical – VIII			3	4
Pre-requisite		DigitalElectronics8085 Microprocessor	Syllabus Version		2023-24	
Course Objectives:						
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						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Apply the fundamentals of assembly level programming of microcontroller					K3
2	Design and Develop program for real time interface					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
8051/ PIC PROGRAMMING (ANY 16EXPERIMENTS)						
<ol style="list-style-type: none"> 1. Addition / Subtraction of 8 / 16bitData 2. Multiplication / division 8bitData 3. BlockDataTransfer 4. Smallest / Largest ofNNumbers 5. To Arrange in Ascending /DescendingOrder 6. Sum of N 8 bitNumbers 7. 1’s and 2’s Compliment of an Array (8 /16bit) 8. UP/DOWN Counter using 7SegmentDisplay 9. Traffic Light ControlInterface 10. WaveFormGeneration 11. ADCInterface 12. DACInterface 13. StepperMotorInterface 14. Solid StateRelayInterface 15. DCMotorInterface 16. TemperatureController 17. Rolling and Blinking ofaMessage 18. LCDInterface 19. Frequency Counter 20. WaterLevelIndicator 						
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode..						

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

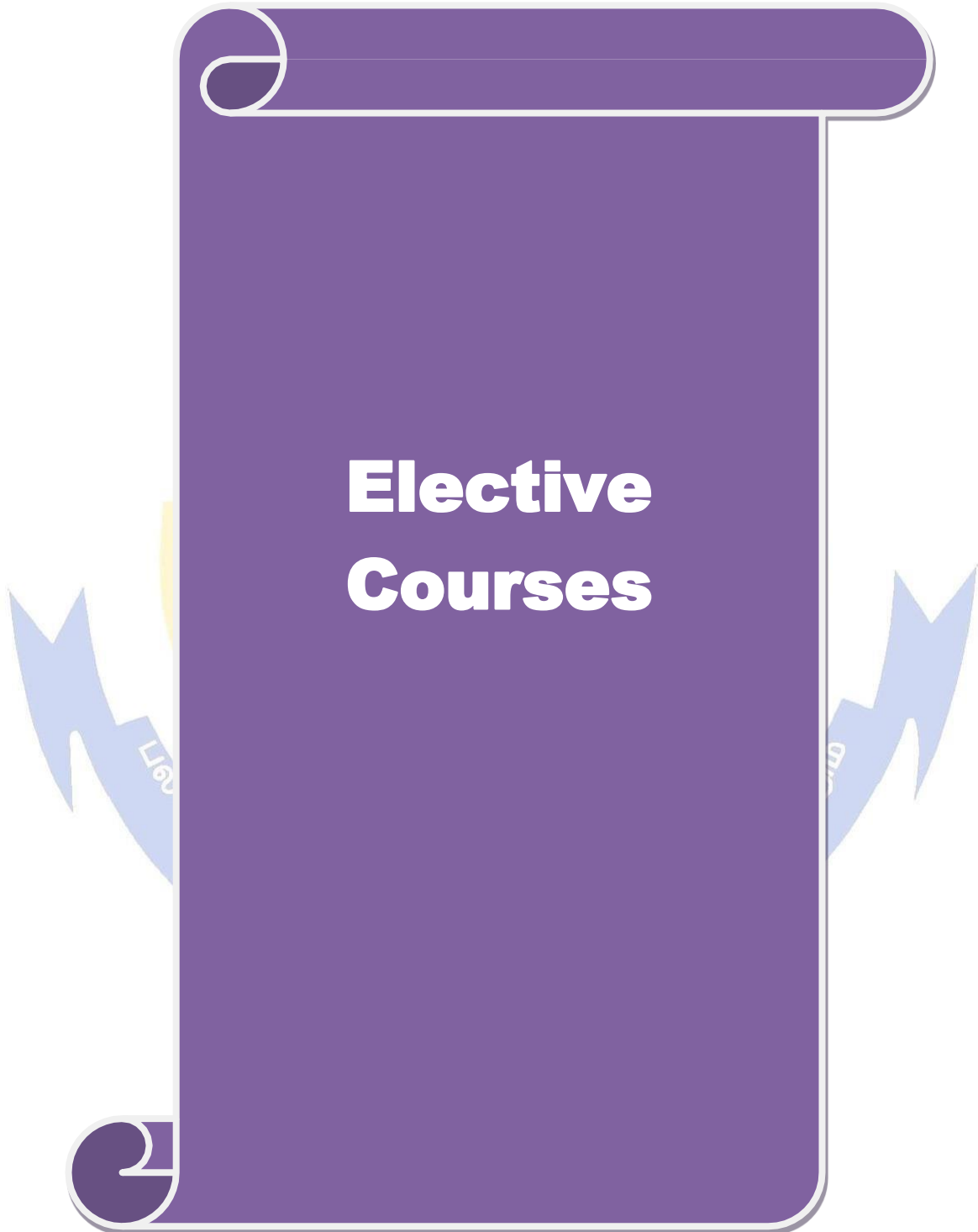


Course code	6ZP	VISUAL PROGRAMMING LAB	L	T	P	C
Core/Elective/ Supportive		Skill Based Subject Practical-IV			3	2
Pre-requisite		Basic computer skills and familiarity with Microsoft Windows.	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to: ❖ Learn to design and develop Windows-based business applications using Visual Basic Emphasis on the fundamentals of structured design, development, implementation, and documentation						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Implement syntax rules in Visual Basic programs					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
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
<p align="center">VISUAL PROGRAMMING (ANY 8 EXPERIMENTS)</p> <ol style="list-style-type: none"> 1. Building Simple Applications using Basic Tools 2. Working with Intrinsic Control and ActiveX controls 3. Create an Application with Multiple Forms and Dialogs 4. Write a VB Program to Design an e-mail Registration Form 5. Create an Application with Menu Editor 6. Create an Application with DAO Controls 7. Create an Application using Common Dialogs 8. Write a program for Drag and Drop Events 9. Create a Database for library management using ADD Controls 10. Creating an Application using ActiveX control 11. Create a Scientific Calculator in VB 12. Develop a VB application to either link or Embed MS Word Document to an OLE Control 13. Display Student Information using Grid Control 14. Create an Application using RDO Controls 15. Develop an Application to perform the following operation in the Employee Table using DAO <ol style="list-style-type: none"> i) Add a new Record. ii) Delete a Record. iii) Modify a Record. 						
<p align="center">Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.</p>						

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	5EA	PCB DESIGN AND FABRICATION	L	T	P	C
Core/Elective/Sup portive	Elective-I-A		4			3
Pre-requisite	Basic knowledge of circuits familiar with the functions and performance of various components and have a good logical thinking ability.		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: <ul style="list-style-type: none"> ❖ To inculcate the knowledge ofPCBdesign ❖ To impart knowledge on various methods of laying outaPCB ❖ To learn how to etchandsolder ❖ To develop various techniques used for PCB designandfabrication 						
Expected Course Outcomes:						
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	sign (schematic and layout) PCB for analog circuits, digital circuits and mixed circuits					K5
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create						
Unit:1	TYPES OFPCB					18 hours
Single sided board – double sided – Multilayer boards – Plated through holes technology – Benefits of Surface Mount Technology (SMT) – Limitation of SMT – Surface mount components: Resistors, Capacitor, Inductor, Diode and IC's						
Unit:2	LAYOUT AND ARTWORK					18 hours
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						
Unit:3	LAMINATES AND PHOTO PRINTING					18 hours
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						
Unit:4	ETCHING AND SOLDERING					18 hours
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						
Unit:5	DESIGN RULES AND AUTOMATION					18 hours
Reflection – Crosstalk – Ground and Supply Line Noise – Electromagnetic Interference from Pulse Type EM Fields and Automation – Automated Artwork Drafting – CAD						
	Total Lecture hours					90 hours

Text Book(s)	
1	Walter C. Bosshart, —PCB Design and Technology, Tata McGraw Hill Publications, Delhi 1983
2	RS Khandpur, —Printed Circuit Board, Tata McGraw Hill Education Pvt Ltd., New Delhi
Reference Books	
1	S D Mehta , —Electronic Product Design Volume-I, S Chand Publications
Related Online Contents [MOOC, SWAYAM, NPEL, Website etc.]	
1	https://www.wikihow.com/Create-Printed-Circuit-Boards
2	http://www.siongboon.com/projects/2005-09-07_home_pcb_fabrication/
3	https://reprap.org/wiki/MakePCBInstructions#Making_PCBs_yourself
4	https://www.youtube.com/watch?v=mv7Y0A9YeUc
4	https://www.youtube.com/watch?v=imQTCW1yWkg
<p>Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.</p>	

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	5EB	ADVANCED COMMUNICATION SYSTEMS	L	T	P	C
Core/ Elective/ Supportive:	Elective I B		4			3
Pre-requisite	Principles of Communication Systems		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To analyze various data communicationsystems ❖ To make the students understand the basic concept in the field of pulse communications and cellular communicationsystems ❖ To know basis of satellite communication and expose the learners to the basics of signal propagation through opticalfibers 						
Expected Course Outcomes:						
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
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	DATA COMMUNICATION				18hours	
Introduction – Data Forms – Transmission Modes – Simplex, Half Duplex – Full Duplex – Point to Point Network – Star Network – Ring Network – Bus Network – Telephone Lines – Dial- upLines – Dedicated Lines – Data Communication System – Asynchronous and Synchronous Transmission – USART’s and ACIA’s – RS 232 Inter Connect Cable – Modems –Protocols						
Unit:2	PULSE COMMUNICATION				18hours	
Basic Concepts of Pulse Modulation – Sampling Theorem – PAM – PTM – PFM – PPM – PCM – Differential PCM– Delta Modulation–Adaptive Delta Modulation–TDM– FDM– ASK–FSK– PSK						
Unit:3	SATELLITE COMMUNICATION				18 hours	
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						
Unit:4	CELLULAR COMMUNICATION SYSTEM				18hours	
Introduction Cellular Mobile System – Basic Cellular System – Operational Cellular System – Maximum number of Calls per Cell – Maximum Number of Frequency Channel - Concept of Frequency Channel Cell Splitting – Permanent Splitting – Real Time Splitting – Frequency Management – Channel Assignment						
Unit:5	OPTICAL COMMUNICATION				18hours	
Introduction to Optical Fibers – Optical Fiber Structure – Numerical aperture – Propagation of LightRaysthroughit–ApplicationsofOpticalFiber(Videolink,Satellitelink,Computerlink, Communicating Antenna Televisionlink)						
Total Lecture hours					90hours	

Text Book(s)	
1	Robert J. Shoernbeck, - Electronic Communications Modulation and Transmission , PHI, 1999
2	. Anok Singh, - Principles of Communication Engineering , S.Chand and Company, 2 nd Edition
3	Sanjeev Gupta, - Electronic Communication System , Kanna Publishing Company
Reference Books	
1	Data communications and networking (sie) By behrouz a. Forouzan (author)
2	Electronic Communications 4th Edition by Dennis Roddy and J Coolen, Pearson Education
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/courses/108/101/108101113/
2	https://nptel.ac.in/courses/117/105/117105143/
3	https://nptel.ac.in/courses/106/106/106106167/
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.	

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	SEC	Introduction of Artificial Intelligence	L	T	C
Core/Elective /Supportive:		Elective I -C	4		3
Pre-Requisite:		New Technology Introduction	Syllabus Version		2023-24
Course Objectives:					
The Main Objectives of this course are to:					
<ul style="list-style-type: none"> ❖ To presents various bio-potentials and working principles of medical instruments ❖ To enable the students to learn about bio-potentials and medical instruments 					
Expected Course Outcomes:					
On the successful completion of the course, student will be able to:					
1	Understand the evolution in microcontroller technology				K2
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				K2
5	Apply the concept for I/O port expansion				K4
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create					
Unit:1	Introduction				18 hours
Introduction – Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents – Typical Intelligent Agents – Problem Solving Approach to Typical AI Problems.					
Unit:2	Problem Solving Methods				18 hours
Problem Solving Methods – Search Strategies – Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems – Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games.					
Unit:3	Knowledge Representation				18 hours
Knowledge Representation – First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining – Backward – Chaining – Resolution – Knowledge Representation – Ontological Engineering – Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems					
Unit:4	Software Agents				18 hours

Software Agents – Architecture for Intelligent Agents – Agent Communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent Systems.		
Unit:5	AI Applications	18 hours
AI Applications – Language Models – Information Retrieval – Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving.		
Total Lecture hours		90 Hours

Text Book(s)	
1	S. Russell and P. Norvig, —Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.
2	I. Bratko, - Prolog: Programming for Artificial Intelligence, Fourth Edition, Addison-Wesley Educational Publishers Inc., 2011.

Reference Books	
1	M. Tim Jones, - Artificial Intelligence: A Systems Approach (Computer Science), Jones and Bartlett Publishers Inc.; First Edition, 2008.
2	Nils J. Nilsson, - The Quest for Artificial Intelligence, Cambridge University Press, 2009.

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

1	https://www.youtube.com/watch?v=i2mZylgP1Fk
2	https://www.youtube.com/watch?v=4ldv98F7Zng
3	https://nptel.ac.in/courses/108/105/108105101/
4	https://nptel.ac.in/courses/108/105/108105091/

Course Designed By:
 Dr.T.Siva Kumar , Principal ,RVS College Of Arts and Science,Coimbatore &
 Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur .

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

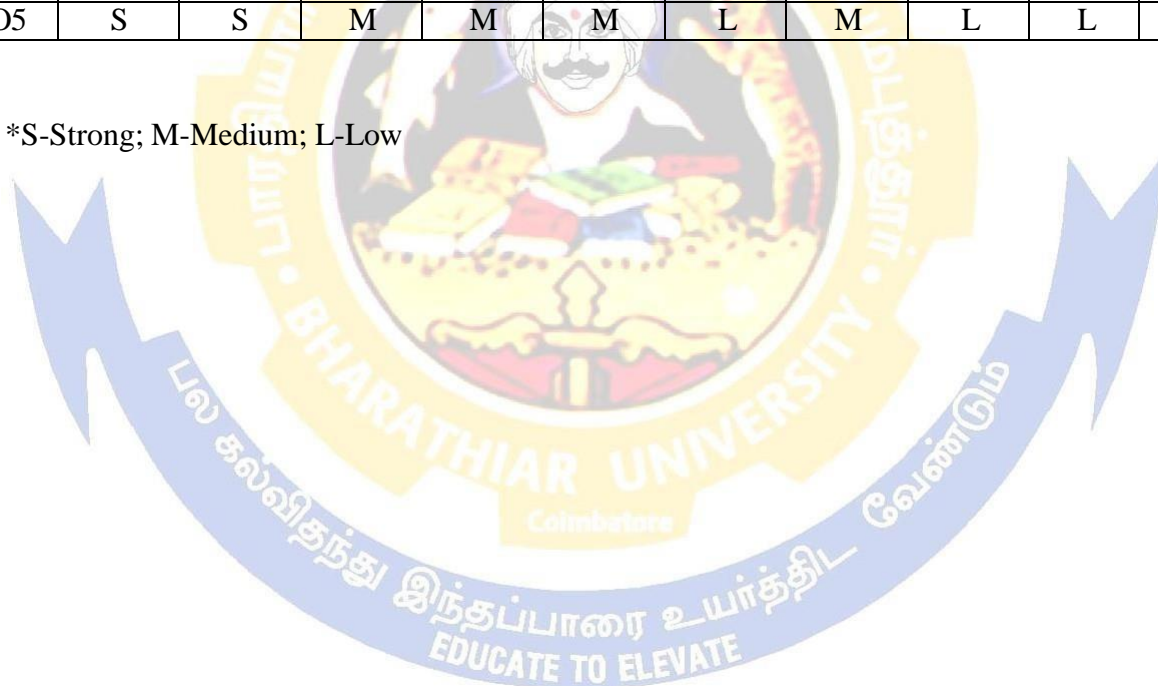
*S-Strong; M-Medium; L-Low

Course Code	5ED	ADVANCED COMPUTER ARCHITECTURE	L	T	P	C
Core/Elective/Supportive:		ELECTIVE I-D	4	0	0	3
Pre-requisite:		Basic Computer Architecture	Syllabus version			2023-24
Course Objectives:						
The objectives of this course are:						
❖ To provide knowledge on fundamentals of Advanced Computer design.						
❖ To understand the concept of instruction level parallelism, pipelining and memory hierarchy associated with it.						
❖ To enhance the knowledge on advanced processors.						
Expected Course Outcomes:						
On successful completion of the course, student will be able to:						
1	Gain the knowledge on advanced computer design principles.					K1
2	Able to analyze the parallel computer model with instruction level parallelism.					K4
3	Gain the knowledge on pipelining.					K2
4	Understand the memory hierarchy in developing an advanced computer.					K2
5	Apply the multiprocessor concepts in advanced processors.					K3
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create						
Unit: 1		PRINCIPLES OF COMPUTER DESIGN			18 Hours	
Introduction-Quantitative principles of computer design - Control Units-Hardwired and Micro Programmed Design Concept – Microprogramming - Bus architectures: Uni-bus and multi-bus architectures.						
Unit: 2		INSTRUCTION LEVEL PARALLELISM			18 Hours	
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.						
Unit: 3		PIPELINING			18 Hours	
Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.						
Unit: 4		MEMORY HIERARCHY			18 Hours	
Introduction- the Fundamentals of Caches-Reducing Cache Misses and Miss Penalty - Reducing Hit Time-Main Memory-Virtual Memory-Issues in Memory Hierarchy design.						
Unit: 5		PRINCIPLES OF ADVANCED PROCESSOR			18 Hours	
Advanced processor technology, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors						
					Total Lecture Hours	90 Hours
Text Books						
1	Kai Hwang, —Advanced computer architecture, Tata Mc.Graw Hill Science/Engineering/Math 1 st Edition, 1992.					
2	D.A.Patterson and J.L.Hennessey, —Computer organization and design, Morgan Kaufmann, ARM Edition, 2010.					
Reference Books						
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	https://nptel.ac.in/courses/106/103/106103206/
2	https://www.youtube.com/watch?v=v7iefsovo9M
3	https://www.youtube.com/watch?v=L9X7XXfHYdU&list=PLxCzCOWd7aiHMonh3G6QNKq53C6oNXGrX
<p>Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.</p>	

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	5EE	Arduino and Sensors	L	T	P	C
Core/Elective/Supportive:		ELECTIVE II-E	4	0	0	3
Pre-requisite:		Basic Computer Architecture	Syllabus version		2023-24	
Course Objectives:						
The objectives of this course are:						
❖ To provide knowledge on fundamentals of Advanced Computer design.						
❖ To understand the concept of instruction level parallelism, pipelining and memory hierarchy associated with it.						
❖ To enhance the knowledge on advanced processors.						
Expected Course Outcomes:						
On successful completion of the course, student will be able to:						
1	Gain the knowledge on advanced computer design principles.					K1
2	Able to analyze the parallel computer model with instruction level parallelism.					K4
3	Gain the knowledge on pipelining.					K2
4	Understand the memory hierarchy in developing an advanced computer.					K2
5	Apply the multiprocessor concepts in advanced processors.					K3
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create						
Unit: 1	Arduino and Sensors				18 Hours	
Microcontroller - Install the Software - The Integrated Development Environment (IDE) - Our first circuit-Updated Circuit-Our First Program-Comments- Gotchas						
Unit: 2	Embedded "C":				18 Hours	
“Blinky” - IF Statements - ELSE Statements- WHILE statements - What is truth(true) - Combinations - FOR statements - Our New Circuit - Introducing Arrays						
Unit: 3	Input and Output:				18 Hours	
Input - Pushbuttons- Potentiometers - RGB LEDs- Sound Circuit - Simple note - Music - Music with functions – Making a digital thermometer - Serial Monitor - Measuring the temperature - Hooking up the LCD - Talking to the LCD - Bringing it all together						
Unit: 4	Sensors-1 :				18 Hours	
Introduction - Photo Cell (Light Sensor) - Tilt Sensor Reed Switch (Magnetic Field Detector) - Piezo Element (Vibration sensor)						
Unit: 5	Sensors-2:				18 Hours	
One Servo - Joystick Pan/Tilt bracket - Adding a firing mechanism						

	Total Lecture Hours	90 Hours
Text Books		
1	“Introduction to Arduino”, Alan G. Smith, 2011, ISBN: 1463698348 and ISBN-13: 978-1463698348.	
Reference Books		
1	“Exploring Arduino: Tools and Techniques for Engineering Wizardry” by Jeremy Blum, ISBN-10 1118549368, Publisher Wiley 2013.	

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/courses/106/103/106103206/
2	https://www.youtube.com/watch?v=v7iefsovo9M
3	https://www.youtube.com/watch?v=L9X7XXfHYdU&list=PLxCzCOWd7aiHMonh3G6QNKq53C6oNXGrX
<p align="center">Course Designed By: Dr.T.Siva Kumar , Principal ,RVS College Of Arts and Science,Coimbatore & Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur .</p>	

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	5EF	MICROWAVE AND FIBER OPTIC COMMUNICATION	L	T	P	C
Core/Elective/Supportive:	Elective II-F		4			3
Pre-Requisite:	Basic Electronics and Principles of Communication systems		Syllabus Version		2023-24	
Course Objectives:						
The Main Objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To inculcate the principle of microwave theory and working of waveguides ❖ To know the operation and applications of fibreoptic communication ❖ To impart knowledge on the working principle of microwave amplifiers and oscillators 						
Expected Course Outcomes:						
On the Successful completion of the course, student will be able to:						
1	Understand various parameters of waveguide and use of component as per applications.				K1	
2	Analyze and find applications and limitations of microwave Semiconductor devices.				K4	
3	Discriminate different Radars, find applications and use of its supporting systems				K5	
4	Understand The structures of Fiber Optics and types				K2	
5	Apply Fiber optics in Sensors Application and in Network Design				K3	
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create						
Unit:1	INTRODUCTION TO MICROWAVES				18 Hours	
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.						
Unit:2	MICROWAVE AMPLIFIERS AND OSCILLATORS				18 Hours	
Microwave Tubes: - Two Cavity Klystron – Multi cavity Klystron – Reflex Klystron – Traveling Wave Tube (TWT) – Backward Wave Oscillator (BWO) – Magnetron – Applications.						
Unit:3	MICROWAVE DEVICES & RADAR				18 Hours	
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.						
Unit:4	OPTICAL FIBER COMMUNICATION				18 Hours	
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.						

Unit:5	FIBER OPTICS SENSORS AND APPLICATIONS	18 Hours
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.		
	Total Lecture hours	90 Hours
Text Book(s)		
1	Kennedy; Davis, Electronic Communication Systems ”, Tata McGraw Hill Publishing Company Limited, III edition	
2	Gerd Keiser, — OpticalFiber Communication ”,McGrawHillPublication,IV th Edition, 2011.	
Reference Books		
1	Samuel Y. Liao ,“ Microwave Devices and Circuits ”, PHI, III Edition.	
2	Govind P. Agrawal, Fiber Optic Communication Systems ”, WileyPublications, IV th Edition, 2012.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]		
1	https://nptel.ac.in/courses/108/103/108103141/ Introduction to microwave Engineering	
2	https://www.classcentral.com/course/swayam-microwave-engineering-14199 Microwave engineering swayam course	
<p align="center">Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.</p>		

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

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

Course code	5EG	AUTOMOTIVE ELECTRONICS	L	T	P	C
Core/Elective/ Supportive		Elective-II –G	4			3
Pre-requisite		Basic Electronics	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To understand the concepts of Automotive Electronics and its evolution and Trends automotive systems & subsystems overview. ❖ To understand sensors and sensor monitoring mechanisms aligned to automotive Systems, different signal conditioning techniques, interfacing techniques and actuator ❖ To understand, design and model various automotive control systems using Model based development technique. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Obtain an overview of automotive components and subsystems.					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
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	INTRODUCTION				18hours	
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, Basic Starting Circuit						
Unit:2	IGNITION SYSTEMS				18hours	
Ignition Fundamental, Electronic Ignition Systems. 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 Fuel Injection						
Unit:3	INSTRUMENTATION SYSTEMS				18hours	
Introduction to Instrumentation Systems, Various Sensors Used for Different Parameters, Sensing Driver Instrumentation Systems, Vehicle Condition Monitoring Trip Computer, Different Types of Visual Display						
Unit:4	ELECTRONIC CONTROL OF BRAKING AND TRACTION				18 hours	
Introduction and Description Control Elements and Control Methodology, Electronic Control of Automatic Transmission: Introduction and Description Control Of Gear Shift and Torque Converter Lockup, Electric Power Steering, Electronic Clutch						

Unit:5	ENGINE MANAGEMENT SYSTEMS	18hours
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:SignallingCircuit,CentralLockingandElectricWindowsSecuritySystems, Airbags and Seat Belt Tensioners.		
Total Lecture hours		90hours
Text Book(s)		
1	TOM DENTON, Automobile Electrical and Electronic Systems , Edward Arnold pb., 1995	
Reference Books		
1	1.DON KNOWLES, Automotive Electronic and Computer controlled Ignition Systems, Don	
2	WILLIAM, T.M., Automotive Mechanics , McGraw Hill Book Co.,	
3	WILLIAM, T.M., Automotive Electronic Systems , Heiemann Ltd., London, 1978.	
4	Ronald K Jurgen, Automotive Electronics Handbook , McGraw Hill, Inc, 1999.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://nptel.ac.in/courses/107/103/107103084/	
2	https://nptel.ac.in/courses/107/106/107106088/	
3	https://www.youtube.com/watch?v=vJ4EfyGXehg	
4	https://www.youtube.com/watch?v=BG4N2dBgJrQ	
Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.		

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	5EH	SATELLITE COMMUNICATIONS	L	T	P	C
Core/Elective/Supportive:		ELECTIVE-II-H	4	0	0	3
Pre-requisite:		PRINCIPLES OF COMMUNICATION	Syllabus version		2023-24	
Course Objectives:						
The objectives of this course are:						
<ul style="list-style-type: none"> ❖ To provide knowledge on fundamentals of Advanced Computer design. ❖ To understand the concept of instruction level parallelism, pipelining and memory hierarchy associated with it. ❖ To enhance the knowledge on advanced processors. 						
Expected Course Outcomes:						
On successful completion of the course, student will be able to:						
1	Gain the knowledge on advanced computer design principles.					K1
2	Able to analyze the parallel computer model with instruction level parallelism.					K4
3	Gain the knowledge on pipelining.					K2
4	Understand the memory hierarchy in developing an advanced computer.					K2
5	Apply the multiprocessor concepts in advanced processors.					K3
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create						
Unit: 1	SATELLITE SYSTEMS – OVERVIEW				18 Hours	
Introduction- Basic concepts of Satellite communications- Frequency allocations for satellite systems. Advantages and applications of satellite communications over other communications						
Unit: 2	ORBITAL ASPECTS OF SATELLITE SYSTEMS				18 Hours	
Orbital Mechanics- look angle determination- orbit perturbations- Orbital determination- launches and launch vehicles- orbital effects in communication systems performance.						
Unit: 3	THE SPACE SEGMENT				18 Hours	
Introduction- spacecraft subsystems- attitude and orbit control systems- Telemetry- tracking and command- power systems- communication subsystems.						
Unit: 4	SATELLITE LINK DESIGN				18 Hours	
Basic transmission theory- system noise temperature and G/T ratio- Design of down links- up link design- design of satellite link for specified C/N.						
Unit: 5	APPLICATIONS OF SATELLITE SYSTEMS				18 Hours	
INTELSAT Series- INSAT- VSAT- GSM- GPS- INMARSAT-Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH)- Digital audio broadcast (DAB)- World space services- Business TV(BTV)- GRAMSAT.						
					Total Lecture Hours	90 Hours
Text Books						
1	Timothy Pratt, Charles Bostian, Jeremy Allnut, Satellite Communications, 2 nd edition, John Willey, 2006.					
2	W. L. Pritchard, H. G. Snyderhoud and R. A. Nelson, Satellite Communication systems Engineering, 2 nd edition, Pearson educational publishers, New Delhi, 2003.					
Reference Books						
1	Dennis Roddy, Satellite Communications, 3 rd edition, Mc Graw Hill, International, 2001.					
2	Dr D.C. Agrwal, Satellite Communications, 4 th edition, Khanna Publications, New Delhi, 2001.					

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

- 1 <https://nptel.ac.in/courses/117/105/117105131/>
- 2 <https://www.youtube.com/watch?v=hXa3bTcIGPU>
- 3 <https://www.youtube.com/watch?v=BvjIBpP4zU8>

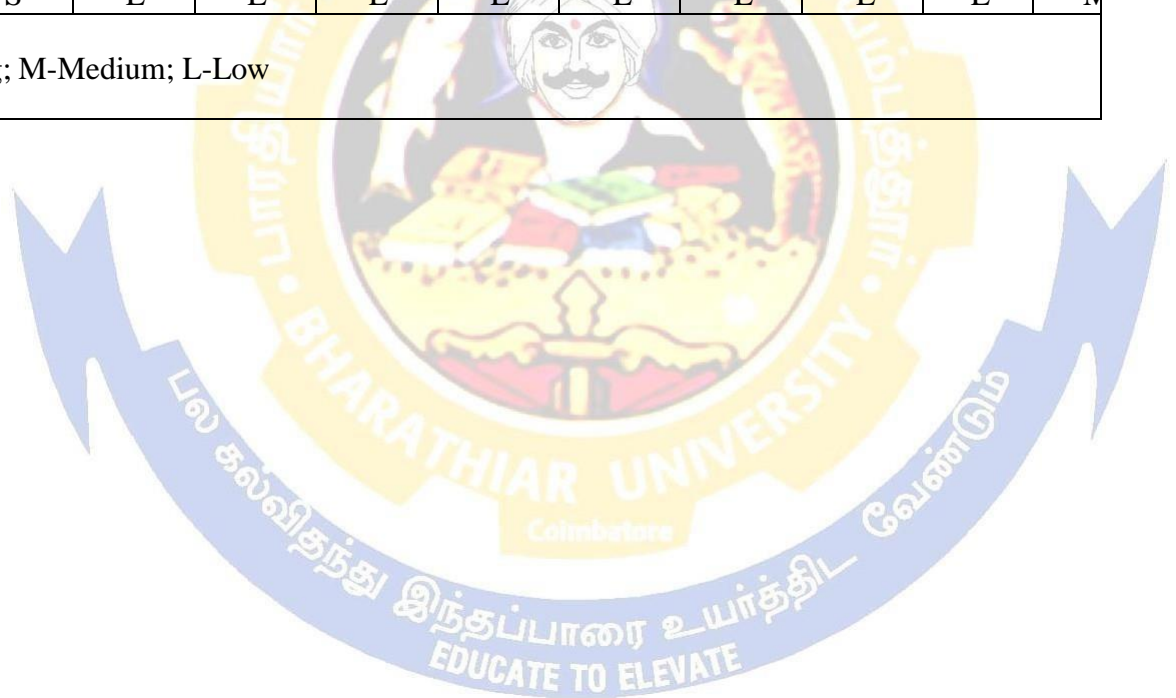
Course Designed By:

Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur &
Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.

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	6EI	INDUSTRIAL AND POWER ELECTRONICS	L	T	P	C
Core/Elective/ Supportive	Elective-III –I		6			3
Pre-requisite	Basic knowledge of Electronic Circuits or permission of instructor		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To presents the principles and applications of industrial and powerelectronics ❖ To enable the students to learn and design industrial and powerelectroniccircuits ❖ To develop the circuits designing skills related to the power electronics andunderstoodthe concept ofindustrialelectronics 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Developed the Circuit designing skills power electronics. Understood the concept industrial electronics system design.					K1
2	Acquire knowledge about fundamental concepts and techniques used in power electronics.					K2
3	Ability to analyze various single phase and three phase power converter circuits and understand their applications.					K3
4	Foster ability to identify basic requirements for power electronics based design application.					K4
5	To develop skills to build, and troubleshoot power electronics circuits.					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	THYRISTORS					15hours
Introduction– Principles, Construction, Operation and Characteristics of SCR – Two Transistor Model – GTO – SCS – SUS – SBS – LASCR .						
Unit:2	TURN ON/OFF MECHANISMS					15 hours
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 – External Pulse Commutation—Line Commutation – Thyristor Rating						
Unit:3	CONTROLLED RECTIFIERS & INVERTERS					15 hours
Introduction– Single phase Half Wave Controlled Rectifiers with Resistive Load – HWCR with Inductive Load –Single phase Full Wave Controlled RectifierswithResistive,InductiveLoads– INVERTERS:Single Phase of Voltage Inverters						
Unit:4	CYCLO CONVERTERS AND CHOPPERS					15hours
Introduction – Single Phase Centre Tapped Step-Up Cyclo Converter – Single Phase Centre Tapped Step- Down Cyclo Converter – Three Phase toSingle Phase Cyclo converter — Step-up and Step-downChoppers						
Unit:5	APPLICATIONS					15 hours
Introduction –Dielectric Heating – Induction Heating – SMPS – UPS – Static Circuit Breaker – Battery Charger –Emergency Lighting System – Time Delay Control – StaticSwitches						
Total Lecture hours					75 hours	

Text Book(s)	
1	MDSingh, - PowerElectronics , 2 nd Edition, Tata-McGrawHill, 2007.
2	M.Ramamoorthy, - ThyristorandtheirApplications ,2 nd Edition,EastWestPvt.Ltd,1999
Reference Books	
1	Harish C Rai, “ Industrial and Power Electronics ” 10th edition, Umesh publications 2002
2	Timothy J Maloni, “ Industrial Solid State Electronic Devices and Circuits ” 2nd edition 1986
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.youtube.com/watch?v=1Auay7ja2oY
2	https://www.youtube.com/watch?v=oqnLQVFaqYI
3	https://www.youtube.com/watch?v=naxnRkOfh2Q
<p align="center">Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr. S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.</p>	

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	6EJ	ROBOTICS	L	T	P	C
Core/Elective/ Supportive:	Elective III –J		6			3
Pre-Requisite:	Basic Electronics		Syllabus Version		2023-24	
Course Objectives:						
The Main Objectives of this course are to:						
<ul style="list-style-type: none"> ❖ To familiarize the students with the applications of Robots ❖ To know about the sensors, actuators used in Robots designing 						
Expected Course Outcomes:						
On the Successful completion of the course, student will be able to:						
1	scribe the working concept and types of Robots				K3	
2	ply 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	
K1:Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create						
Unit:1	FUNDAMENTALS OF ROBOTS				15 hours	
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.						
Unit:2	ROBOT END EFFECTORS				15hours	
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						
Unit:3	SENSORS IN ROBOTS				15 hours	
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.						
Unit:4	MOBILE ROBOTICS LOCOMOTION				15 hours	
Introduction Key Uses for Locomotion - Leg Mobile Robots - Leg Configuration and Assembly - Consideration for Dynamics - Types of Legged Robot Locomotion - One Leg; Two Legs Biped - Four Legs (Quadruped) - Six Legs (Hexapod) - Concept of Wheeled Mobile Robots						
Unit:5	ROBOTIC APPLICATIONS				15 hours	
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.						
Total Lecture hours					75 hours	

Text Book(s)	
1	M.P.Groover,Mitchellweiss,Roger.N.Nagel,NicholasG.Odrey, Industrial Robotics– Technology,programmingandApplication ,McGraw-Hill, 2008.
2	Ghosh,— Control in Roboticsand Automation:SensorBased Integration” , Allied Publishers, Chennai,1998.
Reference Books	
1	Deb. S.R., — Robotics Technology andflexible Automation , John Wiley,USA 1992.
2	KlafterR.D., ChimielewskiT.A., Negin M., — Robotic Engineering– Anintegrated approach , Prentice Hall of India, New Delhi, 1994.
Related Online Contents [MOOC, SWAYAM, NPTEL, Website etc.]	
1	https://nptel.ac.in/courses/112/105/112105249/ Introduction to Robots
2	https://nptel.ac.in/courses/112/101/112101098/ Robotics and Automation
Course Designed By:	
Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode..	

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

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

Course code	6EK	PROGRAMMABLE LOGIC CONTROLLERS	I	T	P	C
Core/Elective/ Supportive:		Elective III – K	3			6
Pre-requisite		Digital Electronics and computer Architecture and Organization	Syllabus Version			2023-24
Course Objectives:						
<p>The main objectives of this course are to:</p> <ul style="list-style-type: none"> ❖ To provide knowledge levels needed for PLC programming and operating input and output modules. ❖ To train the students to create ladder diagrams from process control description and understand various types of PLC registers ❖ Apply PLC Timers and Counters for the control of industrial processes, PLC functions and Data Handling Functions. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Gain knowledge on Programmable Logic Controllers and will understand different types of Devices to which PLC input and output modules					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
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse; K5 - Evaluate; K6 - Create						
Unit:1	PROGRAMMABLE LOGIC					15hours
Programmable Logic – Introduction - Programmable Logic Structures - Programmable Logic Arrays (PLAS), Programmable Array Logic (Pals), Programmable Gate Arrays (PGAS), Field Programmable Gate Arrays (FPGAS) - Sequential Network Design With Programmable Logic Devices (PLDs) - Design of Sequential Networks Using ROMs and Flash - Traffic Light Controller Using PAL						
Unit:2	PROGRAMMABLE LOGIC CONTROLLERS					15hours
Programmable Logic Controllers (PLCS) - Introduction Parts Of PLC - Principles of Operation - PLC Sizes - PLC Hardware Components - I/O Section - Analog I/O Section						
Unit:3	BASICS OF PLC PROGRAMMING					15hours
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 - PLC Ladder Diagram - Converting Simple Relay Ladder Diagram into PLC Relay Ladder Diagram						
Unit:4	PLC INSTRUCTIONS					15 hours

Timer Instructions ON DELAY Timer and OFF DELAY Timer - Counter Instructions - Up/Down Counters -Timer and Counter Applications - Program Control Instructions - Data Manipulating Instructions - Math Instructions		
Unit:5	APPLICATIONS OF PLC	15hours
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		
		Total Lecture hours
		75 Hours
Text Book(s)		
1	Charles H. Roth, Jr “ Fundamentals of Logic Design ”, Fourth Edition, Jaico Publishing	
2	Frank D. Petruzella" Programmable Logic Controllers ", McGraw- Hill book, company,	
3	Siemens “PLC Handbook ”.	
Reference Books		
1	1. William I. Fletcher “ An Engineering Approach to Digital Design ”, Prentice, Hall of India Ltd., New Delhi, 1999.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://unitronicsplc.com/what-is-plc-programmable-logic-controller/	
<p align="center">Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.</p>		

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

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

Course Code	6EL	VLSI DESIGN	L	T	P	C
Core/Elective/Supportive:		ELECTIVE – III-L	6	0	0	3
Pre-requisite:		Digital Principles and Applications	Syllabus version		2023-24	
Course Objectives:						
The objectives of this course are: <ul style="list-style-type: none"> ❖ To provide knowledge on Fabrication Process of NMOS,PMOS ,CMOS AND BICMOS, Super integrationconcepts. ❖ To develop the skill to analyze the electrical properties of MOS transistor, design stick diagrams and layout diagrams for MOS transistors, contacts andwires. ❖ To investigate the effect of floor planning, placement, routing and power delay estimation in physical design of digital circuits and memorydesign. ❖ To apply the concept of Combinational and Sequential CircuitTesting. 						
Expected Course Outcomes:						
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
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create						
Unit: 1	VLSI TECHNOLOGY				15 Hours	
Fabrication sequence – process flow – Testing – Super integration concepts – Integrated Passive components – MOS Resistors and capacitors – Crossovers – NMOS – PMOS – CMOS – BICMOS fabrication processes – comparison.						
Unit: 2	ELECTRICAL PROPERTIES OF MOS DEVICES				15 Hours	
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 (ω_0) – pass transistor- pull – up to pull – down ratio.						
Unit: 3	DESIGN PROCESSES				15 Hours	
VLSI designflow- stick diagram design rules withexamples- Designrulesfor Layout diagrams of digital circuits – sheet resistance R_s – standard unit of capacitance – Inverter delays – Propagation delays- scaling of MOS circuits – limitations of scaling.						
Unit: 4	VLSI PHYSICAL DESIGN AND STYLES				15 Hours	
PHYSICAL DESIGN:						
Floor Planning – Placement – Routing – Power Delay Estimation – Clock Routing – Power Routing.						
VLSI DESIGN STYLES:						
Full Custom – Semi custom – Standard Cells – Gate Arrays – FPGAs – CPLDs.						
Unit: 5	TESTING OF VLSI CIRCUITS				15 Hours	
Test Principles-BIST-Test Bench- Combinational Circuit Testing, Sequential Circuit Testing, Test Bench Techniques.						
Total Lecture Hours					75 Hours	

Text Books	
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.
Reference Books	
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, Addison Wesley, 2nd Edition, NewDelhi.
3	Application Specific Integrated Circuits, Michel John Sebastian Smith, Addison Wesley, Indian Edition, 4th Indian Reprint 2001, New Delhi.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/courses/117/101/117101058/
2	https://www.youtube.com/watch?v=9SnR3M3CIm4
3	https://www.youtube.com/watch?v=Y8Fvzcoct4
<p align="center">Course Designed By: Dr.K.Venmathi ,Assistant professor,L.R.G.Govt Arts College for Women, Tirupur & Mr.S.Shankar , Assistant Professor, Sri Vasavi College, SF Wing, Erode.</p>	

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	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



Annexure

SCAADATED: 18.06.2024

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

MISSION

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

