

B.Sc.ELECTRONICS

Syllabus

AFFILIATED COLLEGES

Program Code :
22M

2023-2024

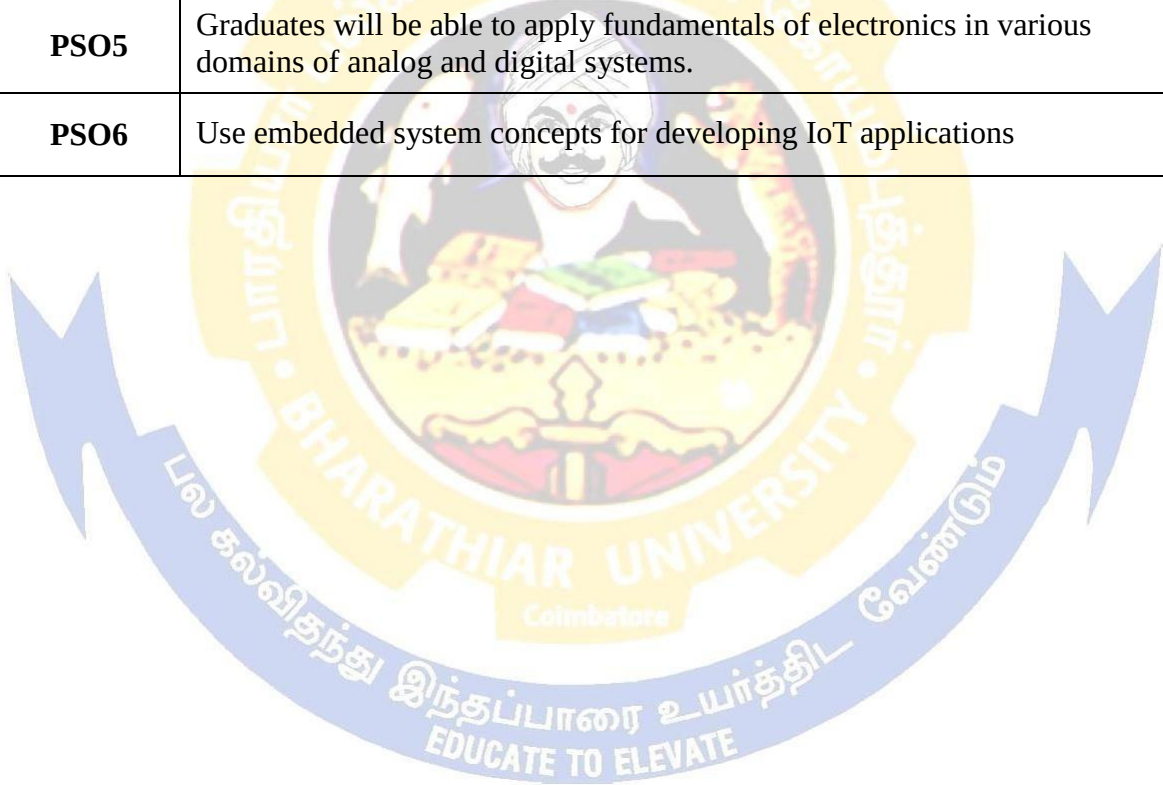


BHARATHIAR UNIVERSITY

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 Analyzes 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 Analyzes 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	AlliedI 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 Digital Skills	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**/Advanced 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: 8051 Microcontroller Lab	-	-	3	-	-	-
--	Core Practical VII: Internet of Things System Design Lab	-	-	3	-	-	-
--	Core Practical VIII: Industrial and Power Electronics Lab	-	-	3	-	-	-
5NM	NAAN MUDHALVAN Advanced Data Analytics & Visualization	2	2	-	25	25	50#
5ZC	Skill based subject – III Visual Programming	3	3		20	55	75
Total		19	Theor y 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: 8051 Microcontroller Lab	4	-	3	25	75	100
63Q	Core Practical VII: Internet of Things System Design Lab	4	-	3	25	75	100
63R	Core Practical VIII: Industrial and Power Electronics 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).

\$ Swachh Bharat – Summer Internship. Extra 2 Credits would be given. It is mandatory.

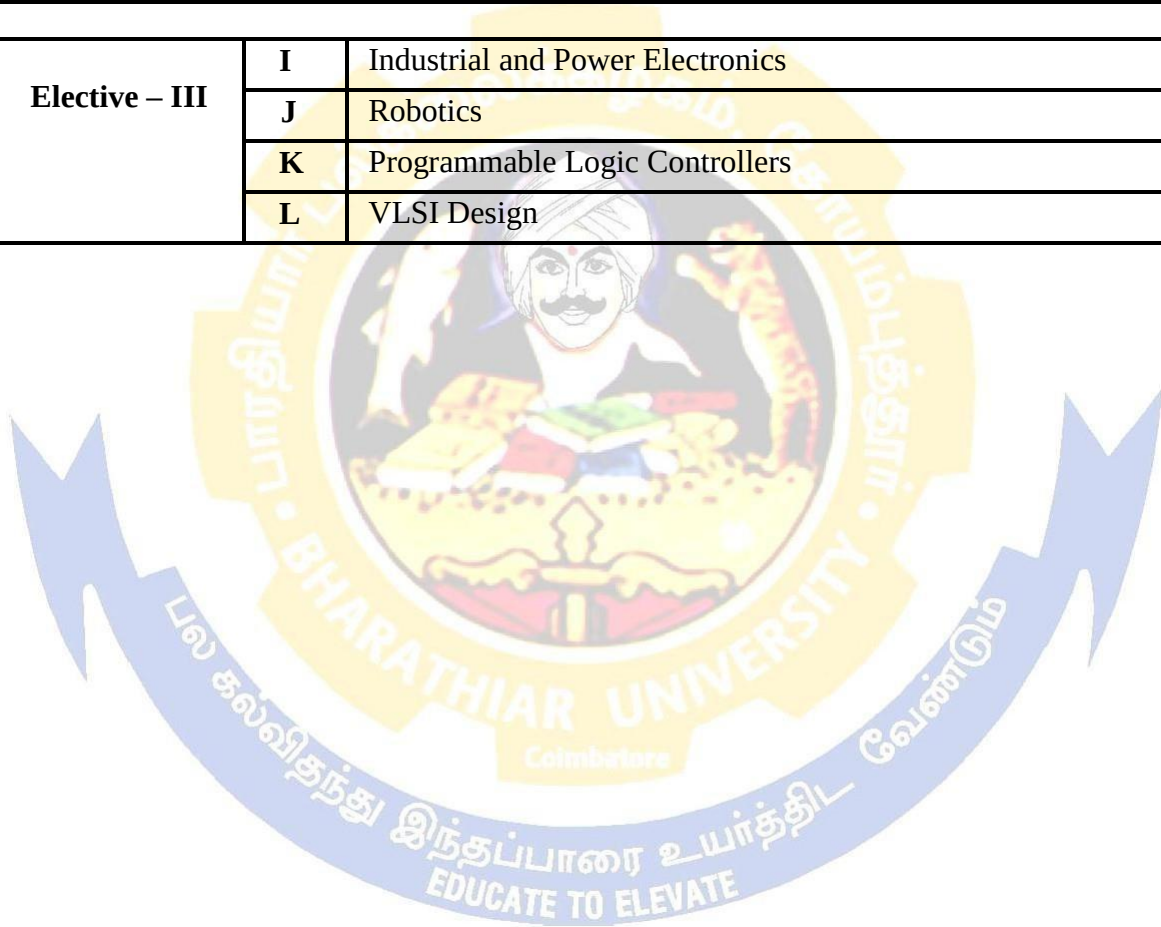
@ University semester examination will be conducted for 50 marks (As per the existing pattern of examination) and the marks will be converted to 25 marks

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

@ 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.

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



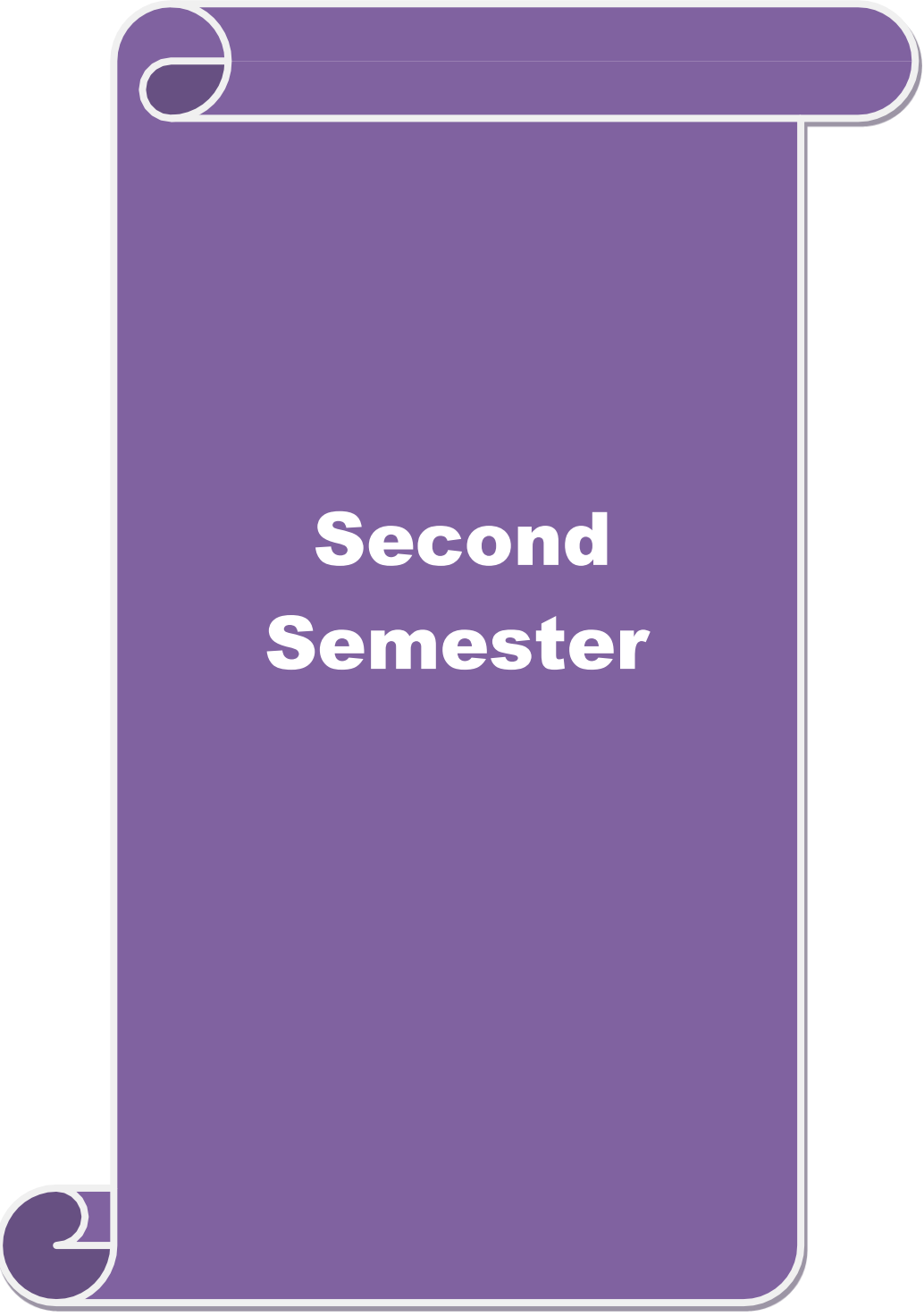


First Semester

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.Narayana Rao—PRINCIPLES OF ELECTRONICS, Wiley Eastern Limited, 1992	
Reference Books		
1	B.L.Theraja, “BASIC ELECTRONICS-SOLID STATE DEVICES”,S.Chand Company	
2	Bernard Grob “BASIC ELECTRONICS”-Tata McGraw-Hill Publishing Company Limited, 9th Edition.	
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



Second Semester

Course code	23A	SEMICONDUCTOR DEVICES	L	T	P	C
Core /Elective / Supportive:	Core Paper II:		6	T		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 - Analyze; 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-Shockley 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 - HeatSink						
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— A TEXTBOOK OF ELECTRONICS
2	Bernard Grob “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

Course code	23P	BASIC ELECTRONICS LAB	L	T	P	C
Core /Elective / Supportive:		Core Practical I	4		P	4
Pre-requisite		Basic Electronics theory	Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: ❖ 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)						
- Study of Multimeter – Checking of Components - Measurement of Amplitude, Frequency & Phase Difference using CRO - Verification of Ohm's Law - Voltage sources in Series, Parallel and Series-Parallel - Resistance in Series, Parallel and Series-Parallel - Voltage and Current Dividers - Verification of Kirchhoff's Law - Wheatstone Bridge - Verification of Norton's Theorem - Verification of Thevenin's Theorem - Verification of Millman's Theorem - Verification of Superposition Theorem - LCR Bridge - Series Resonance Circuit - Parallel Resonance Circuit - Transient Response of RC Circuit - Transient Response of RL Circuit - Capacitors & Inductors in Series & Parallel - Frequency Response of R, L&C - Low Pass Filter & High Pass Filter - Band pass and Band Rejection Filter - Verification of Maximum Power Transfer Theorem - 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	4		P	4
Pre-requisite:		Higher secondary physics	Syllabus Version		2023-24	

Course Objectives:

The main objectives of this course are to:

- ❖ 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
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(Any 16 Experiments)

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 7Segment 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





Third Semester

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 McGraw Hill 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	T		4
Pre-Requisite:	Basic 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 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	Analyze the functions of power amplifiers					K4
4	Analyze 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, ElectronicPrinciples ”,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 ofElectronics ” 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	T		3
Pre-Requisite:	Computer Fundamentals		Syllabus Version		2023-24	
Course Objectives:						
The Main Objectives of this course are to;						
❖ 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

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	T		4
Pre-requisite		Basic Electronics	Syllabus Version	2023-24		
Course Objectives:						
❖ 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 K2 Study the construction and working of frequently used equipment's like CRO					K4
5	Digital Voltmeter etc.					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	IC FABRICATIONTECHNOLOGY					12hours
Fundamentals of Monolithic IC Technology – Basic Planar Process- Wafer Preparation EpitaxialGrowth–Oxidation–Photolithography–DiffusionofImpurities–Isolation Techniques– Metallization–Monolithic Transistors–Integrated Resistors- Thin and Thick Film Technology.						
Unit:2	TIMERANDPLL					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	OPERATIONALAMPLIFIER					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 Khanna Publishers , 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	5	T		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:						
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-List parameters. TUPLES: Tuple assignment, Tuple as return value-Sets– Dictionaries						
Unit:3						
FUNCTIONS			10hours			
FUNCTIONS: Definition - Passing parameters to a Function - Built-in functions- Variable Number of Arguments. Libraries in Python: Tensor Flow, Matplotlib, Open CV,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. Data Streams -Access Modes Writing-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		Contemporary Issues	3hours
Expert lectures, online seminars -webinars			
		Total Lecture hours	55hours
TextBook(s)			
1	Mark Summer field, 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, Network Theory 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

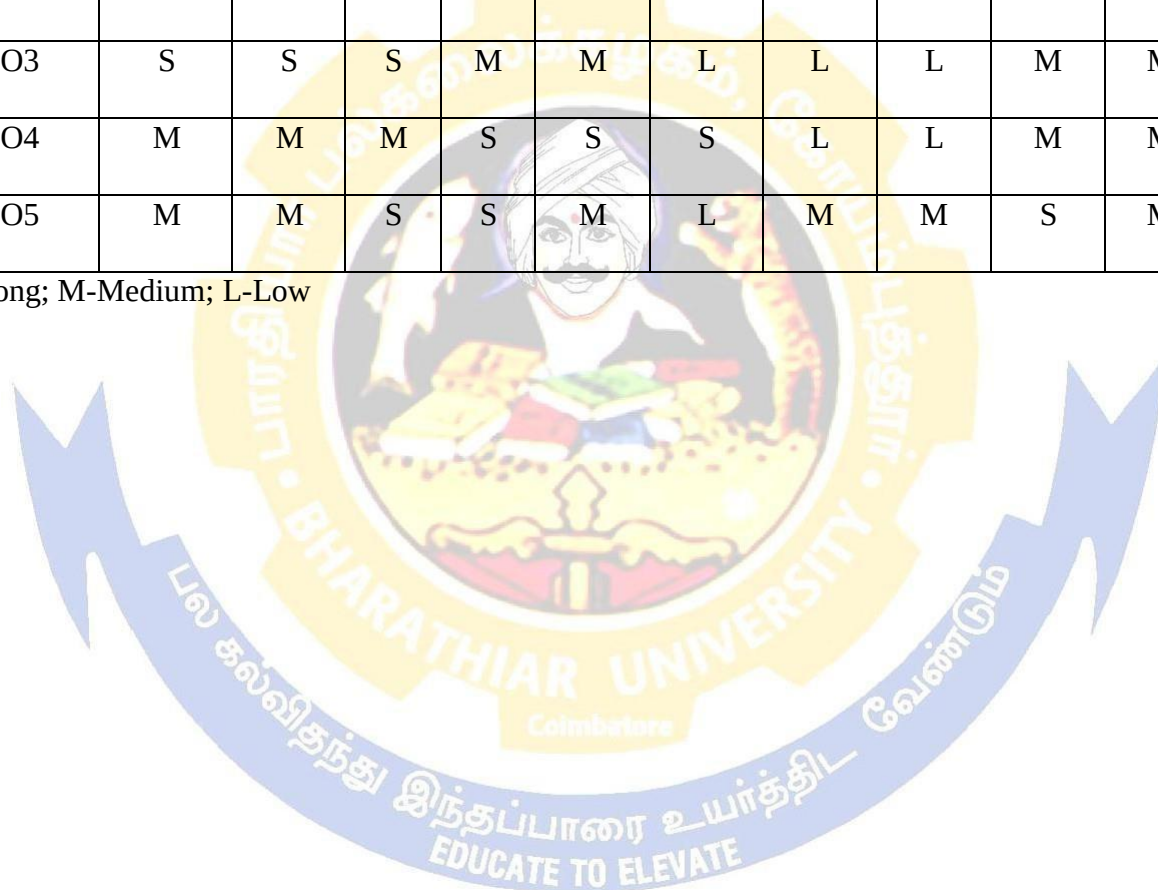
*S-Strong; M-Medium; L-Low



	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



	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	OBJECT ORIENTED PROGRAMMING USING C++ & PYTHON PROGRAMMING LAB	L	T	P	C
Core/Elective/Supportive	Allied Lab V		2		P	2
Pre-requisite	Basics of any Programming Language		Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
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)						
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

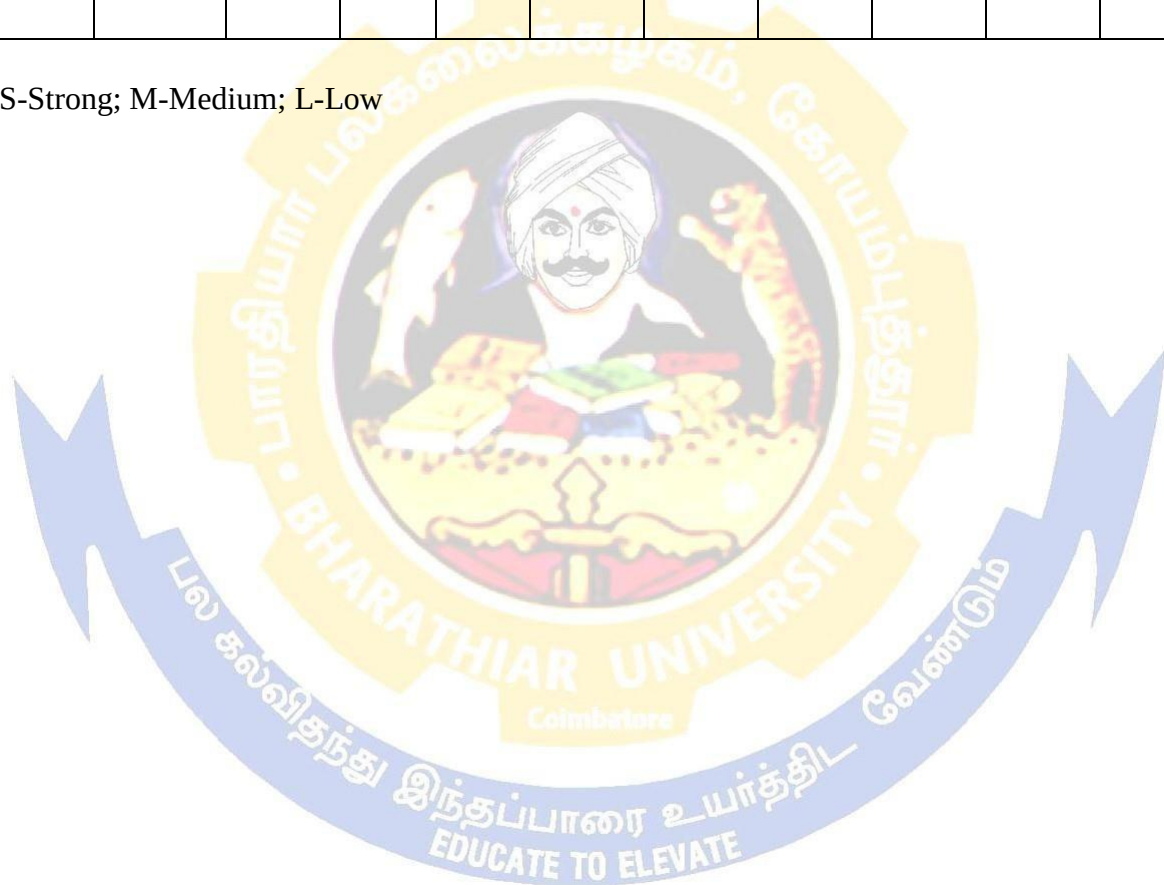
- | | |
|---|---|
| 1 | Bill Lubanovic, “Introducing Python”, O’Reilly, First Edition - Second Release, 2014. |
| 2 | Mark Lutz, “Learning Python”, O’ Reilly, Fifth Edition, 2013. |

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.

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





Fifth Semester

B.Sc. Electronics 2023-24 onwards-Affiliated Colleges - AnnexureNo.30(a)(1)
SCAA DATED:18.06.2024 ,REVISED August 2025

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 VII		5	T		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.						
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Total Lecture hours					90 Hours	

B.Sc. Electronics 2023-24 onwards-Affiliated Colleges - AnnexureNo.30(a)(1)
SCAA DATED:18.06.2024 ,REVISED August 2025

Text Book(s)	
1	Arshdeep Bahga, Vijay Madisetti, — 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, NPTEL, 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
Course Designed By: R.Archana, Assistant professor , Nehru Arts and Science College, Coimbatore.& Dr.N Om Muruga , Assistant Professor, Government Arts College Ooty, C. N Omprakash Anand , Assistant Professor, Government Arts College ,Ooty.	

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

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

Course code	5ZC	VISUAL PROGRAMMING	L	T	P	C
Core /Elective / Supportive:		Skill Based Subject III:	3	T		3
Pre-requisite		Computer skills and familiarity with Microsoft Windows.	Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to:						
❖ 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 visual C++ programming						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Explore Visual Basic's					K1
2	Implement syntax rules in Visual Basic programs					K2
3	Explain variables and data types used in program development					K3
4	Write and apply visual C++ principles and programming techniques					K4
5	Write and apply procedures, sub-procedures, and functions to data transfer					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	VISUAL BASIC OVERVIEW					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	

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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	PapparaandMurray, 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
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



Sixth Semester

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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
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Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.youtube.com/watch?v=nLlBssKCN2w
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	63R	8051 MICROCONTROLLER LAB	L	T	P	C
Core/Elective/ Supportive:		Core –Practical – VI	3		p	4
Pre-requisite		Digital Electronics and 8085 Microprocessor	Syllabus Version		2023-24	

Course Objectives:

The main objectives of this course are to:

To introduces the assembly language programming of Microcontroller

To develop the student's Assembly language programming skills and gives practical training of interfacing the peripheral devices with the Microcontroller

Expected Course Outcomes:

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

1	Apply the fundamentals of assembly level programming of microcontroller	K3
2	Design and Develop program for real time interface	K6

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

**8051/ PIC PROGRAMMING
(ANY 16 EXPERIMENTS)**

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

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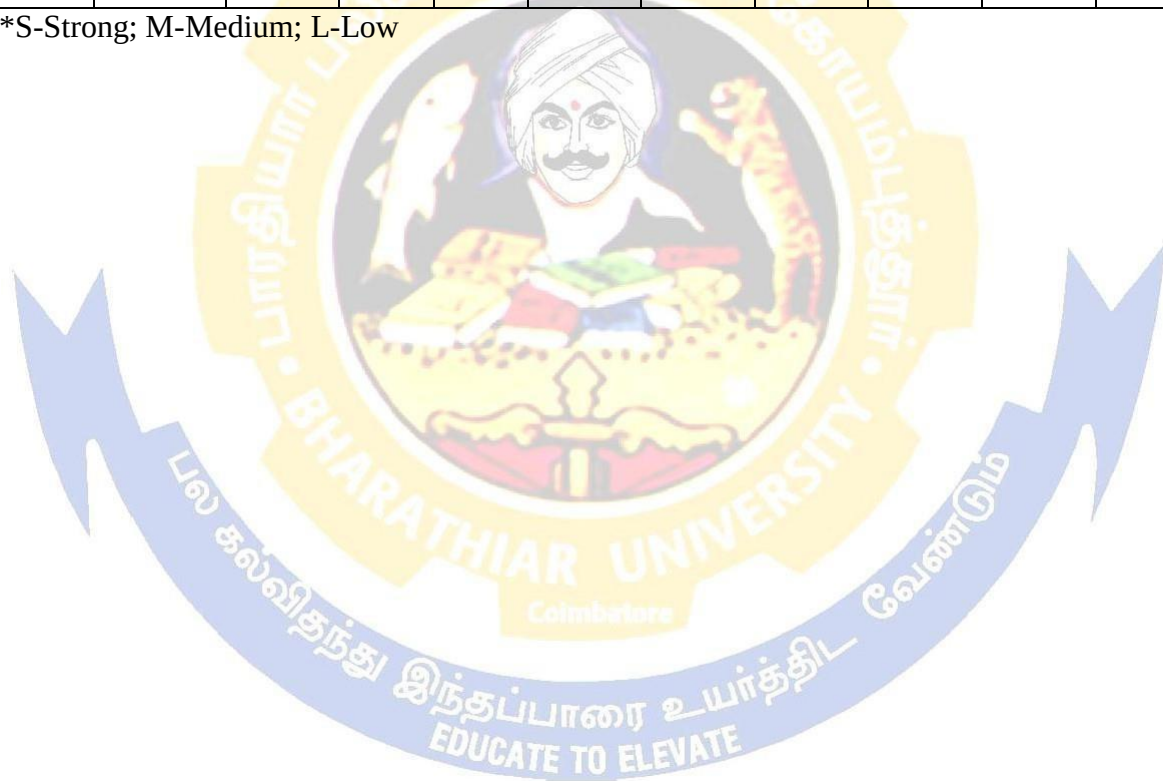
Course Designed By:

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	63P	Internet of Things System Design Lab	L	T	P	C
Core/Elective/Supportive		Core –Practical- VII	3		P	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:

- ❖ 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.
 - a. Blinking
 - b. Running Light
3. Switch Interfacing
 - a. Without Interrupt
 - b. 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 .

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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



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Course code	63Q	INDUSTRIAL AND POWER ELECTRONICS	L	T	P	C
Core/Elective/Supportive		Core –Practical- VIII	3		P	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:

- ❖ 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
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(ANY 16 EXPERIMENTS)

1. Triggering of SCR by R, C and Diac.
2. Design of snubber circuit.
3. Fan regulator using Triac.
4. Thyristor chopper.
5. TRIAC Flasher.
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. Cyclo converter
23. Thyristor protection circuit

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SCAA DATED:18.06.2024 ,REVISED August 2025

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.
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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		P	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
- 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

VISUAL PROGRAMMING (ANY 8 EXPERIMENTS)

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

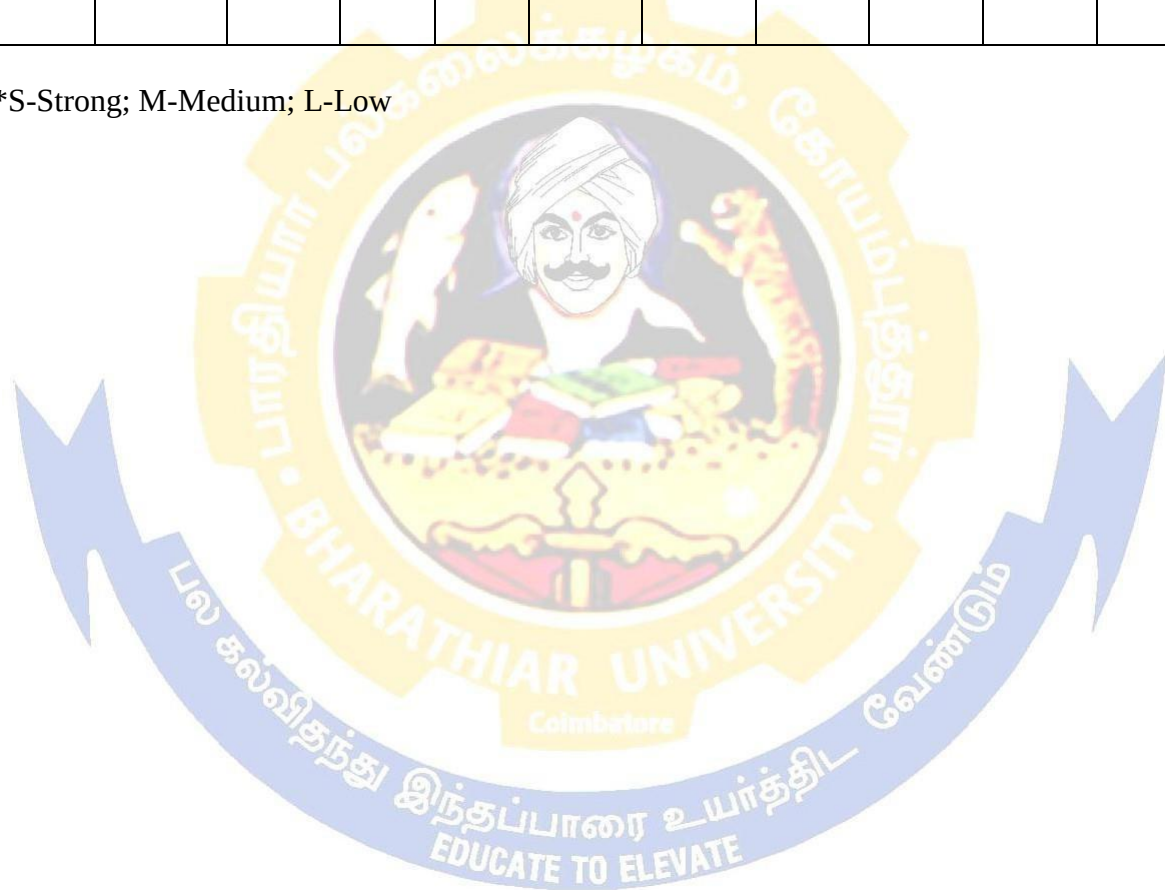
Course Designed By:

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.

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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



Elective Courses

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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 by 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, NPTEL, 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

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.	
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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	T		3
Pre-requisite	Principles of Communication Systems		Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
❖ To analyze various data communication systems ❖ To make the students understand the basic concept in the field of pulse communications and cellular communication systems ❖ To know basis of satellite communication and expose the learners to the basics of signal propagation through optical fibers						
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	Analyze the performance of modulation techniques					K4
3	Demonstrate the Satellite and cellular communication system					K4
4	Analyze 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- up Lines – 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 Light Ray through it – Applications of Optical Fiber (Video link, Satellite link, Computer link, Communicating Antenna Television link)						

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Total Lecture hours		90hours
Text Book(s)		
1	Robert J. Shoernbeck,— Electronic Communications Modulation and Transmission , PHI,1999	
2	. AnokSingh,— Principles of Communication Engineering , S.Chandand 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

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Course Code	5EC	Introduction of Artificial Intelligence	L	T	P	C
Core/Elective /Supportive:	Elective I -C		4	T		3
Pre-Requisite:	New Technology Introduction		Syllabus Version			2023-24
Course Objectives:						
The Main Objectives of this course are to:						
❖ 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 modeling 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	

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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 .	
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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

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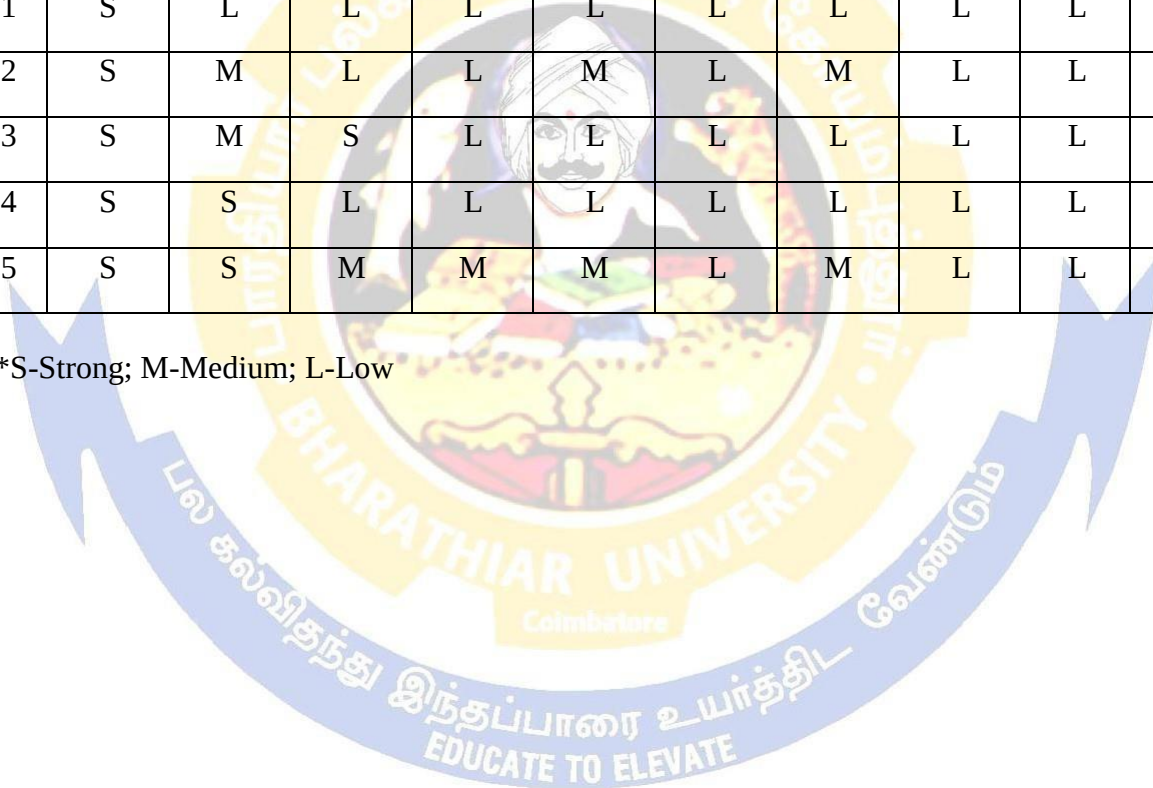
Course Code	5ED	ADVANCED COMPUTER ARCHITECTURE	L	T	P	C
Core/Elective/Supportive:		ELECTIVE I-D	4	T		3
Pre-requisite:		Basic Computer Architecture	Syllabus version			2023-24
Course Objectives:						
The objectives of this course are:						
❖ To provide knowledge on fundamentals of Advanced Computer design. ❖ 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.PattersonandJ.L.Hennessey,—Computerorganizationanddesign, MorganKaufmann, ARM Edition, 2010.					
Reference Books						
1	Hayes,J.P., —Computer Architecture and Organization , 3rdEdition, TataMc-GrawHill, 1998.					

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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
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	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	T		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 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						

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		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
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 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	T		3
Pre-Requisite:	Basic Electronics and Principles of Communication systems		Syllabus Version		2023-24	
Course Objectives:						
The Main Objectives of this course are to:						
❖ To inculcate the principle of microwave theory and working of waveguides ❖ To know the operation and applications of fibre optic 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 COMMUNICATIO N					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 Video Transmission.		
	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, — Optical Fiber Communication ”,McGraw Hill Publication,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	
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

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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

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Course Code	5EH	SATELLITE COMMUNICATIONS	L	T	P	C
Core/Elective/Supportive:		ELECTIVE-II-H	4	T		3
Pre-requisite:		PRINCIPLES OF COMMUNICATION	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		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 Allnutt, Satellite Communications, 2 nd edition, John willey, 2006.					
2	W. L. Pritchard, H. G. Suyderhoud 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.					

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2	Dr D.C. Agrwal, Satellite Communications, 4 th edition, Khanna Publications, New Delhi, 2001.
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Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
https://nptel.ac.in/courses/117/105/117105131/
https://www.youtube.com/watch?v=hXa3bTcIGPU
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	T		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:						
❖ To presents the principles and applications of industrial and power electronics ❖ To enable the students to learn and design industrial and power electronic circuits ❖ To develop the circuits designing skills related to the power electronics and understood the concept of industrial electronics						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Developed the Circuit designing skills power electronics. Understood the concept industrial electronics system design.					K1
2	Acquire knowledge about fundamental concepts and techniques used in power electronics.					K2
3	Ability to analyze various single phase and three phase power converter circuits and understand their applications.					K3
4	Foster ability to identify basic requirements for power electronics based design application.					K4
5	To develop skills to build, and troubleshoot power electronics circuits.					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	THYRISTORS					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 Rectifiers with Resistive, Inductive Loads– 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 – Static Switches						
Total Lecture hours					75 hours	

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Text Book(s)	
1	MDSingh,— Power Electronics l, 2 nd Edition, Tata-McGrawHill, 2007.
2	M.Ramamoorthy, — ThyristorandtheirApplications l,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
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

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Course Code	6EJ	ROBOTICS	L	T	P	C
Core/Elective/ Supportive:	Elective III –J		6	T		3
Pre-Requisite:	Basic Electronics		Syllabus Version		2023-24	
Course Objectives:						
The Main Objectives of this course are to:						
❖ 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	Describe the working concept and types of Robots				K3	
2	Apply the knowledge of types of sensors and actuators				K2	
3	Programming Languages for Robot design models				K6	
4	Understand 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

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Text Book(s)	
1	M.P.Groover,Mitchellweiss,Roger.N.Nagel,NicholasG.Odrey, Industrial Robotics– Technology, programming and Application , McGraw-Hill, 2008.
2	Ghosh,— Control in Robotics and Automation: Sensor Based Integration ”, Allied Publishers, Chennai,1998.
Reference Books	
1	Deb. S.R., — Robotics Technology and flexible Automation , John Wiley,USA 1992.
2	KlafterR.D., ChimielewskiT.A., Negin M., — Robotic Engineering– An integrated 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

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Course code	6EK	PROGRAMMABLE LOGIC CONTROLLERS	L	T	P	C
Core/Elective/Supportive:	Elective III – K		3	T		6
Pre-requisite	Digital Electronics and computer Architecture and Organization		Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
❖ 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 - Analyze; 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	

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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/	
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

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Course Code	6EL	VLSI DESIGN	L	T	P	C
Core/Elective/Supportive:		ELECTIVE – III-L	6	T		3
Pre-requisite:		Digital Principles and Applications	Syllabus version		2023-24	
Course Objectives:						
The objectives of this course are:						
❖ To provide knowledge on Fabrication Process of NMOS,PMOS ,CMOS AND BICMOS, Super integration concepts. ❖ To develop the skill to analyze the electrical properties of MOS transistor, design stick diagrams and layout diagrams for MOS transistors, contacts and wires. ❖ To investigate the effect of floor planning, placement, routing and power delay estimation in physical design of digital circuits and memory design. ❖ To apply the concept of Combinational and Sequential Circuit Testing.						
Expected Course Outcomes:						
On successful completion of the course, student will be able to:						
1	Gain the knowledge on fabrication principles.					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 design flow- stick diagram design rules with examples- Design rules for Layout Diagrams of digital circuits–sheet resistance R_s –standard unit of capacitance–Inverter delays– Propagation delays- scaling of MOS circuits – limitations of scaling.						
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	

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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, Adisson Wesley, 2nd Edition, New Delhi.
3	Application Specific Integrated Circuits, Michel John Sebastian Smith, Addison Wesley, Indian Edition, 4th Indian Reprint 2001, New Delhi.
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=Y8FvzccocT4
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	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

BHARATHIAR UNIVERSITY: COIMBATORE 6410 46.

DEPARTMENT OF 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

