

Karnataka State Akkamahadevi Women's University Vijayapura

Department of Electronics

M.Sc. Electronics

Program Outcomes, Program Specific Outcomes and Course Outcomes

Department of Electronics

	M. Sc. Electronics: Program Outcomes				
PO1	Knowledge	Capable of demonstrating comprehensive knowledge in Electronics			
		gained during course of study			
PO2	Research-related	Capability to ask relevant/appropriate questions for identifying,			
	Skills	formulating and analyzing the research problems and to draw conclusion			
		from the analysis			
PO3	Communication	Ability to communicate effectively on general and scientific topics with			
	Skills	the scientific community and with society at large			
PO4	Problem Analysis	Analyze the problem, identify and formulate the computing requirements			
		appropriate to solve real time problems			
PO5	Individual and	Capable to learn and work effectively as an individual, and as a member			
	Team Work	or leader in diverse teams, in multidisciplinary environment.			
PO6	Scientific	Ability of critical thinking, analytical reasoning and research based			
	reasoning	knowledge including design of experiments, analysis and interpretation of			
		data to provide conclusions.			
PO7	Modern tool	Ability to use and learn techniques, skills and modern tools for scientific			
	usage	practices			
PO8	Science and	Professionally trained to apply reasoning to assess the different issues			
	Society	related to society and the consequent responsibilities relevant to the			
		professional scientific practices			
PO9	Environment and	Possess an adequate knowledge required for sustainable development			
	Sustainability	keeping in view of environmental impacts and contemporary issues.			
PO10	Life-Long	Aptitude to apply both analytical and computational			
	Learning	knowledge and skills, that are necessary for participating in learning			
		activities throughout life			

	M. Sc. Electronics: Program Specific Outcomes
PSO1	Acquire the knowledge in Electronic Devices and Circuits, Analog & Digital communication,
	Embedded systems, MEMS and other core areas of Electronics.
PSO2	Understand the principles and working of both hardware and software aspects of Electronic
	systems
PSO3	Gain theoretical and practical knowledge in developing areas of Electronics.
PSO4	To analyze, design and implement analog and digital electronic systems, information and
	communication systems.
PSO5	Assess the impact of new technologies and solve complex problems.
PSO6	Develop research oriented skills and to inculcate laboratory skills in students so that they can
	take up independent projects.

		Map	ping of (Courses	with Pr	ogrami	nme Ou	itcomes	(POs)		
Courses		Programme Outcomes									
Cours		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	l					nester					
ELH-1	.1	✓	✓		✓		✓		✓		✓
ELH-1	.2	✓	✓	✓	✓	✓		✓			✓
ELH-1	.3	✓	✓					✓			
ELP-1	-	✓	~	✓	✓	✓	✓	✓	✓	✓	✓
ELP-1	.5	✓	\checkmark	✓	 ✓ 	✓	✓	✓	✓	✓	✓
	(a)	✓			✓						
ELS-1.6	(b)	✓				✓					
	(c)	✓	✓		✓		✓				✓
ELO-1	.7	✓				✓	✓				
					II Ser	nester					
ELH-2		✓	✓		✓	✓	✓	✓		✓	✓
ELH-2		✓	~		✓	✓	✓	✓	✓	✓	✓
ELH-2	2.3	✓	\checkmark			✓	✓		✓	✓	✓
ELP-2	2.4	✓	~	✓	✓	✓	✓	✓		✓	✓
ELP-2	2.5	✓	~		✓	✓			✓	✓	✓
	(a)	✓	~			✓	✓		✓		
ELS-2.6	(b)	✓	~		✓	✓	✓	✓		✓	✓
	(c)	✓	\checkmark								
ELO-2	2.7	✓			✓	✓					✓
					III Sei	mester					
ELH-3	3.1	✓	~		✓	✓		✓	✓	✓	✓
ELH-3		✓	~		✓	✓	✓		✓	✓	✓
ELH-3		✓	~	✓	✓	✓	✓	✓	✓	✓	✓
ELP-3	3.4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(a)	✓	✓		 ✓ 	✓		✓	✓	 ✓ 	 ✓
ELS-3.5	(b)	✓	✓		✓	✓				✓	 ✓
	(c)	✓	~	✓	✓	 ✓ 		✓		✓	✓
ELO-3.6		✓				✓					
IV Semester											
ELH-4	4.1	~	\checkmark	✓	✓	✓	✓	~	~	✓	✓
ELH-4	4.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(a)	✓				✓			✓		
ELS-4.3	(b)	✓	✓					✓	✓	✓	✓
	(c)	✓			✓						
ELO-4	1.4	✓				✓			✓	Ī	✓

	Semester I					
Course Code	Course Title	Course Objectives	Course Learning Outcomes			
ELH-1.1	Solid State Semiconductor Devices	To enable the students to understand about the crystal structure and properties, formation of bands in semiconductors, charge carrier concentration and transport phenomenon and fabrication of p-n junctions and to study various semiconductor devices	CO1: Learn the basic knowledge and concepts of Semiconductor materials and devices. CO2: Understand the various crystal properties, crystal growth processes. CO3: Gain insight into the charge carrier concentrations and carrier transport phenomena. CO4: Understand the fabrication process of p-n junctions and the associated phenomenon. CO5: Study the construction, operation and characteristics of semiconductor devices.			
ELH-1.2	Programming in C++	To understand the various concepts of object oriented programming and to enable students to apply programming skill to solve real world problems.	CO1: Learn the basics of programming language CO2: Understand the concepts of tokens, decision making statements and functions. CO3: To learn object oriented programming language CO4: Study about templates. CO5: To handle abnormal termination of a program using exception handling CO6: Gain insight into the STL			
ELH-1.3	Digital Electronics and Verilog HDL	To understand the digital circuits and to develop the skills to model a digital system using Verilog HDL	CO1: Review of Boolean algebra and simplification techniques CO2: Study the combinational and sequential logic circuits. CO3: Learn a hardware description language that can be used to model a digital system			

Course Objectives and Learning Outcomes: M. Sc Electronics

			CO4: Understand the level of
			abstraction ranging from the
			00
			behavioral level to gate level
ELP-1.4	C++Programming lab	Understand the	CO1: Write programs to solve
	140	programming constructs	real world problems.
		to write C++ programs	
ELP-1.5	Digital	Focus on hardware and	CO1: Design and implement
	Electronics and	software techniques of	various digital circuits
	Verilog HDL Lab	designing and	CO2: Gain insight into
		implementing various	hardware and software
		digital systems.	techniques.
			CO3: To write programs to
			implement digital circuits.
ELS-1.6	a) Analog	To empower students to	CO1: Understand the
	Devices and	understand the design and	construction, operating
	Circuits	working of diodes, BJT /	principle, characteristics and
		FET and Operational	applications of pn junction
		Amplifier.	diodes and zener diode
			CO2: Study the construction
			and operation of BJT and
			compute different parameters
			for characterizing different
			circuits
			CO3: Analyze the performance
			of CE, CB and CC modes of
			transistor and design biasing
			circuits
			CO4: Learn the construction,
			working, characteristics and
			types of FET. Classify different
			types of FETs and demonstrate
			feedback amplifiers, OP-AMPs,
			and oscillator circuits.
			CO5: Understand the
			characteristics and parameters
			of op-amp.
			CO6: Study the op-amp
			configurations and applications.
	b) Signals and	The concepts and theories	CO1: To understand
	Systems	of signals and systems	mathematical description and
		form the foundation for	representation of both
		further studies in areas	continuous-time and discrete-

		such as analog and digital	time signals and systems and
		communication, analog	their properties.
		and digital signal	CO2: Study about Linear-Time
		processing, control	Invariant systems.
		systems and circuit	CO3: Learn about the concept
		analysis and synthesis	of frequency domain
			representations and how to
			decompose periodic signals
			into their frequency
			components
			CO4: Analyze a signal using
			Fourier series and Fourier
			transform.
	c) Network	To equip the students with	CO1: Apply the knowledge of
	Analysis	rigorous theoretical and	basic circuital law and simplify
		practical knowledge to	the network using reduction
		analyze and synthesize	technique.
		networks.	CO2: Analyze the circuit using
			Kirchoff's law and network
			theorem.
			CO3: Infer and evaluate
			transient response, steady state
			response, network functions.
ELO-1.7	Concepts of	To make the students	CO1: Understand the basic
	Electronics	focus on the basic	electronic components and
		concepts of electronic	circuits.
		devices and circuits and to	CO2: Understand operation of
		introduce the basic	diodes, transistors in order to
		functional elements of	design basic circuits
		instrumentation and the	CO3: Learn about integrated
		fundamentals of electronic	circuits and basic fabrication
		instruments.	process. CO4: Study the basics of
			electronic instrumentation.
			CO5: Understand the
			application of the electronic
			systems in biological and
			medical applications.

	Semester II				
Course Code	Course Tilte	Course Objectives	Course Learning Outcomes		
ELH-2.1	8086 Architecture, Programming and Interfacing	To understand the architecture, programming of 8086 microprocessor, interfacing an external device with the processors.	CO1: Understand the 8086 architecture and addressing modes CO2: Learn to program 8086 microprocessor CO3: To understand various interrupts and hardware features of 8086 CO4: Gain insight about interfacing and coprocessors.		
ELH-2.2	Electronic Instrumentation and Microcontrollers	To understand the concepts of measurement, transducer and data acquisition systems. Gain insight about microcontrollers and study PIC16F887 microcontroller	CO1: Study about basic concepts of measurement. CO2: Understand various transducers and data acquisition systems. CO3: Gain knowledge about biomedical instrumentation CO4: Learn PIC16F887 microcontroller		
ELH-2.3	Electronic Communication	To acquire knowledge about analog communication systems.	 CO1: Describe basic components of communication system and concept of modulation. CO2: Understand different modulation techniques. CO3: Learn about optical fiber communication. CO4: Understand the concepts and applications of Satellite communication system. 		
ELP-2.4	8086 Programming and Interfacing with PIC Microcontroller Lab	To understand the assembly language programming and interfacing experiments using PIC Microcontroller.	CO1: Student will be able to write assembly language programs. CO2: Learn to interface various devices using PIC Microcontroller.		

ELP-2.5	Electronic	To gain practical	CO1: Construct and study
	Communication Lab	knowledge through laboratory experiments.	various modulation techniques. CO2: Construct and study about active filters. CO3: Analyze various analog modulation and demodulation schemes in time and frequency domains using communication kits
ELS-2.6	a) Computer Networks	Acquire knowledge of computer networking and enumerate the layers of OSI model and TCP/IP model	 CO1: Learn the basics of computer networking CO2: Understand the functions of each layer in OSI and TCP/IP model. CO3: Describe the functions of data link layer and explain the protocols. CO4: Study about the routing protocols and IP addresses for the given network.
	b) Power Electronics and Circuits	To understand the theory of power semiconductor devices, their principle of operation, design and synthesis in different power electronic circuits.	CO1: Learn about basic power semiconductor devices CO2: Design and analyze Phase controlled rectifiers and power converter circuits CO3: Design and understand AC voltage controller, Cycloconverter and chopper circuits
	c) Multimedia Communicatio ns	To understand the multimedia communications systems, application and basic principles.	CO1: Describe characteristics of multimedia communication system CO2: Analyze multimedia compression techniques and streaming
ELO-2.7	Fundamentals of Digital	To acquire the basic knowledge of digital logic	CO1: Review of number
	Electronics	levels in order to	systems and binary arithmetic operations.

understand digital	CO2: Review of Boolean
electronics circuits.	algebra and simplification
	techniques.
	CO3: Study the combinational
	logic circuits.
	CO4: Understand the design
	and working of sequential
	logic circuits.

	Semester III					
Course Code	Course Tilte	Course Objectives	Course Learning Outcomes			
ELH-3.1	Digital Signal Processing	To acquire knowledge design, implementation and analysis of DSP systems.	CO1: Learn about the basic concepts of signals and systems. CO2: Understand frequency domain analysis of discrete time signals. CO3: Design, implementation, analysis and comparison of digital filters for processing of discrete time signals CO4: Consider practical implementation issues in designing DSP systems.			
ELH-3.2	Advanced Digital Communication	To acquire knowledge about digital communication systems, data coding, multiplexing and multiple access techniques.	CO1: Understand the building blocks of digital communication system CO2: Implement optimization techniques, data coding, channel requirements, signal to noise ratio, bandwidth, error finding within the received information and information theory CO3:Study the concept of multiplexing to fulfil the demand of high speed digital transmission CO4: Gain insight into wireless communication			

			systems.
ELH-3.3	Control Engineering	To develop an understanding of the fundamentals of control theory, time and frequency response analysis and the concept of stability.	CO1: State open and closed loop control systems and their mathematical models. CO2: Understand the time response and frequency domain analysis of control systems. CO3: Gain insight about the stability analysis in terms of root-locus technique and bode plots.
ELP-3.4	Digital Signal Processing and Digital Communication Lab	To gain practical knowledge through laboratory experiments.	CO1: Classify discrete time signals/systems. CO2: Determine the convolution of discrete time signals using graphical and analytical methods. CO3: Apply Z-transform and Fourier transform for different type of signals and systems. CO4: Compute DFT/IDFT for discrete time signals and find circular convolution CO5: Develop FFT algorithms and design of analog/digital filters CO6: Compute the frequency response of digital filters CO7: Construct and study various digital modulation techniques.
ELS-3.5	a) Microwave Electronics	To enable students to gain knowledge of microwave technology essential for developing the systems for mobile communication, satellite and spacecraft communication, RADAR	CO1: Understand the laws of electrostatics and magnetostatics. CO2: Understand the basic concepts of microwaves and propagation through the transmission lines,

	etc.	microwave components CO3: Understand the working of microwave active circuits and study of various microwave semiconductor devices. CO4: Learn about the generation of microwaves through the vacuum-based tubes
b) Image Processing	To learn image processing techniques focusing on theory and algorithms underlying a range of tasks including acquisition and formation, enhancement, segmentation and representation	CO1: Study the image fundamentals and mathematical transforms necessary for image processing CO2: Describe the basic concepts of signal acquisition, sampling and quantization. CO3: Understand the Fourier Transform concepts and special/frequency domain filtering using image enhancement algorithm. CO4: Understand the concepts of colour image processing and image restoration. CO5: Describe different morphological 'image- transformations' and the effects of morphological algorithm operations on images. CO6: Interpret image segmentation and representation techniques.
c) ARM	To gain knowledge	CO1: Study about current
Processors and Real-Time	regarding design and analysis pertaining to	technologies, integration methods and hardware and
Operating	design of an Embedded	software design concepts of

	Systems	System using ARM Processors.	embedded systems. CO2: Understand the fundamentals and instruction set of ARM Processors CO3: Learn thumb instruction set and programming CO4: Learn the fundamentals of operating systems and their importance in real time applications CO5: Describe how a real- time operating system designed and their importance in embedded system design
ELO-3.6	Introduction to Microprocessors	To gain knowledge about microprocessor, programming microprocessor and to learn the basics of microcontrollers.	CO1. Understand the architecture and programming model of 8085 microprocessor. CO2. Able to write simple programs on Programming of 8085 microprocessor CO3. Learn about the basics of microcontroller CO4. Understand the Interfacing of Arduino microcontroller for various applications.

Semester IV						
Course	Course Tilte	Course Objectives	Course Learning Outcomes			
Code						
ELH-4.1	Embedded Systems	To study about current	CO1: Understand the			
		technologies, integration	hardware considerations in			
		methods and hardware and	the design of embedded			
		software design concepts	systems.			
		associated with Embedded	CO2: Know about the			
		Systems.	fundamentals of operating			
			systems and their importance			
			in real time applications			
			CO3: Describe how a real-			
			time operating system			

			designed and their importance in embedded system design.
ELH-4.2	Project Work	To provide the best possible training in learning to apply classroom knowledge to real experiments and allow further development of the creative process that is necessary to being a researcher.	CO1: Understand the importance of experimental and theoretical analysis. CO2: Design and develop embedded systems for real- time applications. CO3: Learn to write scientific papers.
ELS-4.3	a) Introduction to VLSI Circuits	To understand the theories and techniques of digital VLSI design in MOS and CMOS technology	CO1: Implement the logic circuits using MOS and CMOS technology. CO2: Acquire the knowledge about various CMOS fabrication process and its modeling. CO3: Analyse various circuit configurations and their applications.
	b) MEMS and Microsystems Technology	To gain basic knowledge on overview of MEMS (Micro Electro Mechanical System) and Microsystems Technology.	CO1: Understand the overview of MEMS and Microsystems CO2: Understand the fundamental properties of materials used for MEMS devices CO3: Gain a comprehensive perspective of various physical mechanisms for MEMS design CO4: Understand the fundamental principle of piezoresistive sensing, piezoelectric sensing, magnetostatic actuation and methods for fabricating
	c) Wavelet	To understand the basics of	CO1: Understand wavelet

	Transforms	wavalat the area and to	havin and abarratari-
	Transforms	wavelet theory and to	basis and characterize
		illustrate the use of wavelet	continuous and discrete
		processing for data	wavelet transforms
		compression and noise	CO2: Understand MRA,
		suppression.	orthonormal wavelets and
			their relationship to filter
			banks
			CO3: Implement discrete
			wavelet transforms with
			multirate digital filters
			CO4: Design certain classes
			of wavelets to specification
			and justify the basis of the
			application of wavelet
			transforms to different fields
			CO5: Understand the
			concepts of data compression
			and noise suppression
ELO-4.4	Basics of	To acquire knowledge	CO1: Describe basic
	Communication	about analog and digital	components of
	Technology	communication systems	communication system and
		and to understand about	concept of modulation.
		cellular wireless networks.	CO2: Understand different
			modulation techniques.
			CO3: Implement
			optimization techniques, data
			coding, channel
			requirements, signal to noise.
			ratio, bandwidth, error
			finding within the received
			information and information
			theory.
			CO4: Understand the
			concepts and applications of
			Satellite communication
			system.
			CO5: Learn about optical
			fiber communication.
			CO6: Gain insight into
			wireless communication
			systems.
			5,500115.