Syllabus for

B.E. I & II – Semester for academic year 2023 – 2024

(For students admitted to I year in 2023-24)

I Semester Syllabus

SUBJECT CODE: 22UEC113C		Credits: 03
L:T:P - 3-0-0	Basic Electronics	CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

UNIT-I	10 Hrs.								
Semiconductor Diodes: Introduction, PN junction diode, characteristics and parameter	eters, diode								
approximations, DC load line analysis									
Diode Applications: Introduction, half wave rectification, full wave rectification, full wave rectifier									
power supply: Capacitor filter circuit, voltage multiplier, diode logic gates									
Zener Diodes: Junction breakdown, circuit symbol and package, characteristics and parameters,									
equivalent circuit, Zener diode voltage regulator.									
Self-study component: ESAKI diode and its working									
UNIT–II	10 Hrs.								
Bipolar Junction Transistors: Introduction, BJT voltages and currents, common base cha	racteristics,								
common emitter characteristics, common collector characteristics,									
BJT Biasing: Introduction, DC load line and bias point, BJT amplification, voltage divide	er bias.								
Amplifier and Oscillator: Single stage CE-amplifier, RC-phase shift oscillator, LC oscill	lator								
Self -study component: BJT as a switch									
UNIT–III	10 Hrs.								
Operational Amplifiers: Introduction, the operational amplifier, block diagram repres	sentation of								
typical op-amp, schematic symbol, op-amp parameters - gain, input resistance, output	resistance,								
CMRR, slew rate, bandwidth, input offset voltage, input bias current and input offset current, the ideal									
op-amp, equivalent circuit of op-amp, open loop op-amp configurations, differential	l amplifier,								
inverting & non inverting amplifier									
Op-Amp Applications: Inverting configuration, non-inverting configuration, differential									
configuration, voltage follower, integrator, differentiator									
Self-study component: Op-Amp as zero crossing detector									
UNIT–IV	10 Hrs.								
Boolean Algebra and Logic Circuits: Binary numbers, number base conversion, octal & h	exadecimal								
numbers, complements, basic definitions, axiomatic definition of Boolean algebra, basic th	eorems and								
properties of Boolean algebra, Boolean functions, canonical and standard forms,	other logic								
operations, digital logic gates									
Combinational logic: Introduction, design procedure, adders- half adder, full adder									
Communications: Introduction to communication, communication system, modulation									
Self-study component: Half subtractor and full subtractor									
Reference Books *									
1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsev	ier, 2015.								

2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-

0417-84.

 D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, McGraw Hill Education (India), Private Limited, 2018

Course Outcomes**

After completion of the course student will be able to

- **1.** Understand and analyze the applications of semiconductor diodes.
- **2.** Analyze the operation of BJT and its applications.
- **3.** Identify and analyze the different configurations of operational amplifier.
- **4.** Design simple logic circuits using logic gates and understand the need for modulation for communication.

Course Outcomes			I	Prog	Program Specific Outcomes (PSOs)										
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	2	1	-	-	1	-	-	-	3	-	-
CO2	3	3	2	-	2	1	-	-	1	-	-	-	3	-	-
CO3	3	3	2	-	2	1	-	-	1	-	-	1	3	-	-
CO4	3	3	2	-	2	1	-	-	1	-	-	1	3	-	-

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L:T:P-3-0-0	introduction to Embedded System	CIE Mark	s: 50							
Total Hours/Week: 03		SEE Mark	as: 50							
	UNIT-I		10 Hrs.							
Introduction to embedded systems, Embedded system vs. general computing system, Classifications,										
Purpose of embedded system, Major application areas. The typical embedded system,										
Microcontrollers, Micropro	ocessors, RISC, CISC, Harvard and Von-Neur	nann, Big End	lian, Little							
Endian processors.										
	UNIT-II		10 Hrs.							
Memory, Sensors, Actuator	rs, Communication interface: Inter Integrated In	terface, Serial	Peripheral							
interface, UART, Parallel i	interface, RS232 and Bluetooth. Characteristics	and quality at	ttributes of							
embedded systems.										
	UNIT-III		10 Hrs.							
General purpose processor	s software: Introduction, Basic architecture, O	peration, Instr	ruction set,							
program and data memory space, registers, I/O, interrupts, Operating System, ASIP's,										
Microcontrollers, DSP, Selecting Microprocessor.										
Standard Single Purpose Processors peripherals: Introduction, Timers, Counters and watch dog timers,										
UART.										
	UNIT-IV		10 Hrs.							
8051 Microcontroller: Intro	oduction, Features of 8051 Microcontroller, Bl	lock diagram,	ALU, PC,							
ROM, RAM, Address line,	Data line, Special function registers, RAM organ	nization, Stack	, Basics of							
Serial Communication, Inte	errupts, Timers and counters, Input output ports,	simple pseudo	code.							
Reference Books *										
1. Shibu K V, "Introdu	ction to embedded systems", Tata McGraw Hill priva	ate limited, 2010	0.							
Frank Vahid, Tony (Givargis, "Embedded system design: A unified hardw	vare/software								
2. Introduction , John 3. Kenneth J Avala. "	The 8051 Microcontroller Architecture programm	ing and applica	tions". West							
publishing company	, college and school division, 1997.	ing and upprior	, , , , , , , , , , , , , , , , , , ,							
4. Rajkamal, "Embedd	led systems: architecture, programming and design"	', Tata McGraw	Hill private							
limited, second editi	on.									
Course Outcomes**										
After completion of the cou	rse student will be able to									
1. Gain comprehensive	e knowledge about embedded systems, major app	lication area of	embedded							
systems and process	or architectures.	400 of ore 1 - 3 1	d ana4							
2. Analyze communica 3. Identify general pur	nion mieriaces, characteristics and quanty attribution of the processors software and processor peripheral	les of embedde ls necessarv for	u systems.							
systems.	Pose Processors solution and Processor periphera		mouuuu							
4. Explore 8051 Micro	controller capabilities and able to write pseudo co	des.								

Credits: 03

SUBJECT CODE:

22UEC134B

Course			I	Prog	Program Specific										
Outcomes					Outcomes (PSOs)										
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1	1	-	1	1	1	1	1	1	-	1		3	
CO2	3	2	2	-	1	1	1	1	1	2	-	1		3	
CO3	3	2	2	-	1	2	1	1	2	1	-	2		3	
CO4	3	2	2	-	1	2	1	1	2	1	-	2		3	

SUBJECT CODE: 22UEC135B	Introduction to Communication Technology	Credits: 03
L:T:P - 2:-0-2-0	Technology	CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

UNIT-I

UNIT-II

Introduction to communication systems: Elements of communication systems,	Need for
modulation, Electromagnetic spectrum and applications, Terminologies in communication	systems
Introduction to wireless .communication systems: Evolution of mobile radio comm	unication,
Beginning of Radio, Wireless mobile communication, Applications of wireless comm	unication,
Disadvantages of wireless communication systems, Examples of wireless communication	n systems,
Difference between fixed telephone network and wireless telephone network, Development of	of wireless
communication, Fixed network transmission hierarchy, Comparison of wireless comm	nunication
systems	

Modern communication systems: Introduction, First generation (1G), Second generation (2G), Generation (2.5G), Third generation (3G), Evolution from 2G to 3Gt, Fourth generation (4G), Digital cellular parameters, Differences between analog cellular and digital cellular systems, wireless local loop (WLL), wireless local area networks (WLANs), Personal Area Networks (PANs), Bluetooth Introduction to cellular mobile systems: Introduction, Spectrum allocation, International telecommunication union (ITU), Wireless communication system, Basic components of cellular systems, Cellular system architecture, GSM: Most popular cellular system, type of channels, Cell concept in wireless communication, shape selection of the cell

Cellular system design fundamentals: Introduction, Frequency reuse, Cellular capacity increasing parameters, channel assignment strategies, Hand-off strategies, Hands-off Initiation, Type of handsoff on the basis of decision making process, channel assignment strategies for hands-off, Interference, Tracking, Trunking, Grade of service

UNIT-IV

UNIT-III

Multiple access techniques for wireless communication: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Advanced TDMA, Multipath interference, Comparison between TDMA & FDMA, Space Division Multiple Access (SDMA), Spread spectrum, types of spread spectrum, Code Division Multiple Access (CDMA)

Radio wave propagation: Introduction, Doppler shift, parameters of multipath channels, fading, diversity techniques, free space propagation model, Phenomenon of propagation, Propagation models **Reference Books ***

George Kennedy, Bernard Davis, S R M Prasanna, "Electronic Communication Systems", Tata McGraw 1. Hill Education Private Limited, New Delhi, 5th Edition

RajeshwarDass, "Wireless Communication Systems", I. K. international Publishing 2. House Pvt. Ltd.. New Delhi

10 Hrs.

10 Hrs.

10 Hrs.

10 Hrs.

Course Outcomes**

After completion of the course student will be able to

- 1. Analyze different communication systems with respect to operation and utility.
- 2. Choose suitable modulation technique for cellular mobile systems.
- 3. Decide specific channel multiple access techniques for a communication application.
- 4. Choose specific communication standards for a given communication application.

Course Outcomes			ł	Prog		Program Specific Outcomes (PSOs)									
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	-	2	2	-	-	-	-	-	-		3	
CO2	3	3	2	-	2	1	-	-	-	-	-	-		3	
CO3	3	2	3	-	3	I	1	-	I	-	-	-		3	
CO4	2	1	1	-	3	1	1	-	I	-	-	-		3	

IInd Semester Syllabus

SUBJECT CODE: 22UEC114N/22UEC214N		Credits: 03		
L:T:P-3-0-0	Introduction to Electronics Engineering	CIE Marks: 50		
Total Hours/Week: 03		SEE Marks: 50		
	UNIT-I	10 Hrs.		

Power Supplies –Block diagram, PN Junction Diode Characteristics, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers. **BJT Characteristics and Biasing-** Common Base and Common Emitter Configurations, Voltage Divider Biasing.

Self study component: Switched Mode Power Supply.

UNIT–II

10 Hrs.

Amplifier and Oscillators – Single Stage CE Amplifier, Barkhausen criterion, sinusoidal and nonsinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator, Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)

Operational amplifiers - Ideal op-amp; characteristics of ideal and practical op-amp; Practical opamp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, integrator, differentiator.(Text 1)

Self study component: Op-Amp as zero crossing detector

10 Hrs.

Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal &Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates

Combinational logic: Introduction, Design procedure, Adders- Half adder, Full adder, Parallel Adder **Self study component:** Half subtractor and full subtractor

UNIT-IV

UNIT-III

10 Hrs.

Analog Communication Schemes – Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM, FM.

Digital Modulation Schemes: Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.

Sensors and Interfacing – Instrumentation and control systems, Transducers, Sensors.

Self study component: Opto-couplers

Reference Books *

1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015.

 Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-0417-84. D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, McGraw Hill Education (India), Private Limited, 2018

Course Outcomes**

After completion of the course student will be able to

- **1.** Differentiate and analyze the applications of electronic devices and circuits.
- 2. Analyze the operation of oscillators, op amps and its applications.
- 3. Analyze different number systems and logic circuits built with basic gates.
- 4. Decide type of transducer, sensor and modulation technique for a given application.

Course Outcomes			ł	Prog	Program Specific Outcomes (PSOs)										
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	2	2	-	-	-	-	-	-	3	-	-
CO2	3	2	3	-	2	1	-	-	-	-	-	-	3	-	-
CO3	3	2	3	-	3	-	-	-	1	-	-	-	3	-	-
CO4	3	1	1	-	2	1	-	-	1	-	-	1	3	-	-