VAAGDEVI COLLEGE OF ENGINEERING

Autonomous

Bollikunta, Khila Warangal (Mandal), Warangal Urban-506 005 (T.S),

www.vaagdevi.edu.in

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Minutes of the meeting of the Board of Studies (BoS) held on: 25/01/2024

S. No	Members Present	Designation	Signature
1.	Dr. M. Shashidhar, Professor & HOD, ECE Dept., VCE Warangal. sasi47004@gmail.com	Chairman	
2.	Dr. Y. Raghavendra Rao, Head of the Department JNTU , Sulthanpur yraghavenderrao@gmail.com	JNTUH Nominee	
3.	Dr. S. Anuradha , Professor, NIT Warangal anuradha@nitw.ac.in	Subject Expert	
4.	Prof. P. Prasad Rao, Principal, VEC Warangal principal.vec@gmail.com	Subject Expert	
5.	Dr. V. Sudheer Raja, Assoc. Prof, ECE Dept, VCE, Warangal sudheerraja_v@vaagdevi.edu.in	Member	
6.	Dr. G. Koteswara Rao , Asst. Prof, ECE Dept, VCE, Warangal koteswarrao_g@vaagdevi.edu.in	Member	
7.	Mr. Bala Krishna Islavath, Scientist, R&D Laboratory center for Electromagnetic, Ministry of Electronics and Information Technology, Government of India islavath32@gmail.com	Alumni	
8.	Mr. P. Mahesh, Senior Silicon Design Engineer at AMD goud.mahesh058@live.com	Alumni	

The following decisions are taken:

1. Course Structure and Syllabi of B.Tech III and IV Year under R22 regulation are finalized and approved.

2. B.Tech EEE III and IV Year Subjects syllabi are approved
   (Subjects: Basics of Signals and Systems, Digital Signal Possessing, Microprocessor & Microcontrollers, Microprocessor & Microcontrollers laboratory, VLSI Design, Embedded Systems Applications).

3. Open source Softwares are used in all Labs.

(Chairman- BoS)

MICROCONTROLLERS LABORATORY

B.Tech. III Year I Semester

L	T	P	C
0	0	2	1

Cycle 1: Using 8086 Processor Kits and/or Assembler

- Assembly Language Programs to 8086 to Perform
  1. Arithmetic, Logical, String Operations on 16 Bit and 32-Bit Data.
  2. Bit level Logical Operations, Rotate, Shift, Swap and Branch Operations.

Cycle 2: Using 8051 Microcontroller Kit

- Introduction to IDE
  1. Assembly Language Programs to Perform Arithmetic (Both Signed and Unsigned) 16 Bit Data Operations, Logical Operations (Byte and Bit Level Operations), Rotate, Shift, Swapand Branch Instructions
  2. Time delay Generation Using Timers of 8051.
  3. Serial Communication from / to 8051 to / from I/O devices.
  4. Program Using Interrupts to Generate Square Wave 10 KHZ Frequency on P2.1 Using Timer 0 8051 in 8 bit Auto reload Mode and Connect a 1 HZ Pulse to INT1 pin and Displayon Port 0. Assume Crystal Frequency as 11.0592 MHZ

Cycle 3: Interfacing I/O Devices to 8051

1. 7 Segment Display to 8051.
2. Matrix Keypad to 8051.
3. 8-bit ADC Interface to 8051.
4. Triangular Wave Generator through DAC interfaces to 8051.

Cycle 4: Experiments to be carried out on Cortex-M3 development boards and using GNU tool-chain

1. Blink an LED with software delay, delay generated using the SysTick timer.
2. System clock real time alteration using the PLL modules.
3. Control intensity of an LED using PWM implemented in software and hardware.
4. Control an LED using switch by polling method, by interrupt method and flash the LED onceevery five switch presses.

Course Outcomes: Upon completing this course, the students will be able to:

1. Write assembly language programs and implement on 8086.
2. Write assembly language programs and implement on 8051
3. Interface the I/O devices with 8051 micro controllers
4. Perform experiments on Cortex-M3 development boards using GNU tool-chain

CO-PO/PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	-	-	-	-	-	1	-	2	2
CO2	3	3	3	3	3	-	-	-	-	-	-	1	-	3	2
CO3	3	3	3	3	3	-	-	-	-	-	-	1	-	3	2
CO4	3	3	3	3	3	-	-	-	-	-	-	1	-	2	3

IOT ARCHITECTURE AND PROTOCOLS LABORATORY

B.Tech. III Year I Semester

L	T	P	C
0	0	2	1

List of Experiments:

1. Demonstrate blinking of an LED at every 5 seconds and to control the brightness of an LED.
2. Read Humidity and Room Temperature using DHT sensor and display the readings.
3. Send the recorded values of Temperature/Humidity to the Internet via GSM module usingArduino/NodeMCU/Raspberry Pi.
4. Demonstrate Interfacing NodeMCU/Raspberry Pi with the Cloud using REST API and MQTTprotocol.
5. Demonstrate Switching lights on /off remotely using Arduino/NodeMCU/Raspberry Pi.
6. Voice-based Home Automation for switching lights on/off using Google Assistant, IFTTT andMQTT.
7. Interfacing DHT11 sensor with Raspberry pi/equivalent and upload temperature and humidityvalues to the cloud.
8. Design an obstacle detection unit using ultrasonic sensor.
9. Capture images from web camera using Raspberry Pi/equivalent and apply filters in increaseimage quality.
10. Access a remote computer from Raspberry Pi and display the remote screen.
11. Design an automatic water sprinkler based on soil moisture using Arduino/NodeMCU/Raspberry Pi.
12. Design an RFID based attendance system using Arduino/NodeMCU/Raspberry Pi.
13. Write an arduino program to demonstrate interrupts
14. Write an arduino program to demonstrate UART communication protocol
15. Write an arduino program to demonstrate I2C communication protocol
16. Write an arduino program to demonstrate SPI communication protocol

Course Outcomes: Upon completing this course the students will be able to:

1. Utilize the different sensors like room temperature, DHT, Humidity etc.,
2. Interface the sensors and processor for transmission of data.
3. Capture the images and process it on Arduino/NodeMCU/Raspberry Pi.
4. know the utilization of various protocols like I2c, UART communication etc.,

CO-PO/PSO Mapping:

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	3	3	3	1	1	-	-	-	-	1	-	2	3
CO2	3	2	3	3	3	1	1	-	-	-	-	1	-	2	3
CO3	3	2	3	3	3	1	1	-	-	-	-	1	-	2	3
CO4	3	2	3	3	3	1	1	-	-	-	-	1	-	2	3

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DIGITAL SIGNAL PROCESSING LABORATORY

B.Tech. III Year II Semester

L	T	P	C
0	0	2	1

The Programs shall be implemented using MATLAB Software.

Note: - Minimum of 12 experiments has to be conducted.

List of Experiments:

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations
2. To find DFT / IDFT of given DT Signal
3. To find Frequency Response of a given System given in Transfer Function/ Differential equationform.
4. Implementation of FFT of given Sequence
5. Determination of Power Spectrum of a given Signal(s).
6. Implementation of LP FIR Filter for a given Sequence.
7. Implementation of HP FIR Filter for a given Sequence.
8. Implementation of LP IIR Filter for a given Sequence.
9. Implementation of HP IIR Filter for a given Sequence.
10. Generation of Narrow Band Signal through Filtering
11. Generation of DTMF Signals
12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D Sampling Rate Converters
15. Impulse Response of First order and Second Order Systems.

Course Outcomes: Upon completion of this Lab, the student will be able to
1: Analyze signals using the discrete Fourier transform (DFT).
2: Understand FFT algorithm for efficient computation of DFT.
3: Design IIR & FIR filters.
4: Design multi rate signal processing of signals through systems.

CO-PO/PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	-	2	2	2	1	-	2	2	3	-
CO2	2	1	-	-	3	-	2	2	2	1	-	2	2	3	-
CO3	3	3	3	3	3	-	2	2	2	1	-	2	2	3	-
CO4	3	3	3	3	3	-	2	2	2	1	-	2	2	3	-

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CMOS VLSI DESIGN LABORATORY

B.Tech. III Year II Semester

L	T	P	C
0	0	2	1

Note: Any **SIX of** the following experiments from each part are to be conducted (Total 12)

Part - I

All the following experiments have to be implemented using HDL

1. Realize all the logic gates
2. Design of 8-to-3 encoder (without and with priority) and 2-to-4 decoder
3. Design of 8-to-1 multiplexer and 1-to-8 demultiplexer
4. Design of 4 bit binary to gray code converter
5. Design of 4 bit comparator
6. Design of Full adder using 3 modeling styles
7. Design of flip flops: SR, D, JK, T
8. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset) or any sequence counter
9. Finite State Machine Design

Part - II

Layout, physical verification, placement & route for complex design, static timing analysis, IR drop analysis and crosstalk analysis for the following:

1. Basic logic gates
2. CMOS inverter
3. CMOS NOR/ NAND gates
4. CMOS XOR and MUX gates
5. Static / Dynamic logic circuit (register cell)
6. Latch
7. Pass transistor
8. Layout of any combinational circuit (complex CMOS logic gate).

Course Outcomes:

1. Acquire knowledge on High end Simulation tools like Mentor Graphics, Tanner EDA etc.
2. Design digital circuits at different levels using programming concepts.
3. Implement any type of digital systems.
4. Program any available FPGA and CPLD using implementation tool.

CO-PO/PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	3	-	2	2	2	1	-	2	2	3	-
CO2	3	2	1	1	3	-	2	2	2	1	-	2	2	3	-
CO3	3	2	1	1	3	-	2	2	2	1	-	2	2	3	-
CO4	2	1	-	-	3	-	2	2	2	1	-	2	2	3	-

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B.Tech-ECE

R22 Regulation

ADVANCED COMMUNICATIONS LABORATORY

B.Tech. III Year II Semester

L	T	P	C
0	0	2	1

Note: Minimum of Ten experiments should be conducted using MATLAB / Any Open Source Software:

1. Determination of the convolution Encoder's output for a given sequence.
2. Determination of the convolution Decoder's output for a given sequence.
3. Implementation of Matched Filters.
4. Optimum receiver for the AWGN channel
5. Simulation of ASK system
6. BPSK Modulation and Demodulation techniques
7. QPSK Modulation and Demodulation techniques
8. Simulation of DPSK system
9. DQPSK Modulation and Demodulation techniques
10. Simulation of MSK.
11. QAM Modulation and Demodulation techniques
12. Simulation of OFDM generation and detection

Course Outcomes:

1. Understand the features of Spectrum Analyzer.
2. Analyze to select coding techniques for efficient transmission & reception.
3. Demonstrate and simulate various modulation and demodulation techniques.
4. Simulate the Multiplexing technique.

CO-PO/PSO Mapping:

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	1	-	-	-	-	-	-	1	2	2	-
CO2	3	3	2	2	2	-	-	-	-	-	-	1	2	2	-
CO3	3	2	1	1	2	-	-	-	-	-	-	1	2	2	-
CO4	3	2	1	1	1	-	-	-	-	-	-	1	2	2	-

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R22 Regulation

MICROWAVE AND OPTICAL COMMUNICATIONS LABORATORY

B.Tech IV Year I Semester

L	T	P	C
0	0	4	2

Note: Any **ten** of the following experiments

List of Experiments:

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation measurement
4. Directional coupler Characteristics.
5. Scattering parameters of wave guide components
6. Frequency measurement.
7. Impedance measurement
8. VSWR measurement
9. Characterization of LED.
10. Characterization of Laser Diode.
11. Measurement of losses for Optical link
12. Study of fiber optic communication link.

Course Outcomes: After completion of the course the student is able to:

1. Demonstrate a microwave bench for measuring microwave parameters
2. Measure parameters like attenuation, VSWR etc.
3. Analyze the characteristics of all microwave engineering components
4. Demonstrate the mechanism of light propagation through optical fibres

CO-PO/PSO Mapping:

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	2	-	-	2	2	1	-	-	1	2	2	-
CO2	3	3	3	2	-	-	2	2	1	-	-	1	2	2	-
CO3	3	3	2	2	-	-	2	2	1	-	-	1	2	2	-
CO4	2	1	-	2	-	-	2	2	1	-	-	1	2	2	-

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MICROPROCESSORS & MICROCONTROLLERS LAB

III Year B.Tech. EEE II-Sem **L T P C**

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Prerequisites: Digital Electronics, Microprocessors and Microcontrollers

Course Objectives:

- To develop an understanding of the operations of microprocessors and micro controllers;
- To develop assembly language programming to perform various applications.
- To understand the interfacing of various external devices to the processor and controllers.

The following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051 kits.

List of Experiments:

1. Programs for 16-bit arithmetic operations 8086(using various addressing modes)
2. Programs for sorting an array for 8086.
3. Programs for searching for a number of characters in a string for 8086.
4. Programs for string manipulation for 8086.
5. Programs for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessor kits using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/Counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART operation in 8051.
14. Communication between 8051 kit and PC
15. Interfacing LCD to 8051
16. Interfacing Matrix/Keyboard to 8051
17. Data transfer from peripheral to memory through DMA controller 8237/8257

Course Outcomes: At the end of this course, students will be able to:

1. Understands the internal architecture and organization of 8086, 8051 and ARM processors/controllers.
2. Understands the interfacing techniques of 8086 and 8051.
3. Develop assembly language programming to design microprocessor/ micro controller-based systems.
4. Develop programs for interfacing various external devices,

CO-PO/PSO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	-	-	-	-	-	1	2	2	-
CO2	3	3	3	3	3	-	-	-	-	-	-	1	3	2	-
CO3	3	3	3	3	3	-	-	-	-	-	-	1	2	1	-
CO4	3	3	3	3	3	-	-	-	-	-	-	1	3	3	-

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ELECTRONICS & COMMUNICATION ENGINEERING
COURSE STRUCTURE
(R22 Regulations applicable for the batches admitted from Academic Year 2022-23)

I YEAR I SEMESTER

S.No.	Course Code	Title of the Course	L	T	P	Credits
1		Matrices and Calculus	3	1	0	4
2		Applied Physics	3	1	0	4
3		C Programming for Engineers	3	0	0	3
4		Engineering Workshop	0	1	3	2.5
5		English for Skill Enhancement	2	0	0	2
6		Elements of Electronics and Communication Engineering	0	0	2	1
7		Applied Physics Laboratory	0	0	3	1.5
8		English Language and Communication Skills Laboratory	0	0	2	1
9		C Programming for Engineers Laboratory	0	0	2	1
10		Environmental Science	3	0	0	0
11		Induction Programme				
		Total Credits	**14**	**3**	**12**	**20**

I YEAR II SEMESTER

S.No	Course Code	Title of the Course	L	T	P	Credits
1		Ordinary Differential Equations and Vector Calculus	3	1	0	4
2		Engineering Chemistry	3	1	0	4
3		Computer Aided Engineering Graphics	1	0	4	3
4		Basic Electrical Engineering	2	0	0	2
5		Electronic Devices and Circuits	2	0	0	2
6		Applied Python Programming Laboratory	0	1	2	2
7		Engineering Chemistry Laboratory	0	0	2	1
8		Basic Electrical Engineering Laboratory	0	0	2	1
9		Electronic Devices and Circuits Laboratory	0	0	2	1
		Total Credits	**11**	**3**	**12**	**20**

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II YEAR I SEMESTER

S. No.	Course Code	Title of the Course	L	T	P	Credits
1		Numerical Methods and Complex Variables	3	1	0	4
2		Analog Circuits	3	0	0	3
3		Network analysis and Synthesis	3	0	0	3
4		Digital Logic Design	3	0	0	3
5		Signals and Systems	3	1	0	4
6		Analog Circuits Laboratory	0	0	2	1
7		Digital logic Design Laboratory	0	0	2	1
8		Basic Simulation Laboratory	0	0	2	1
9		Logical Reasoning & Quantitative Aptitude	3	0	0	0
		Total Credits	**18**	**2**	**6**	**20**

II YEAR II SEMESTER

S. No.	Course Code	Title of the Course	L	T	P	Credits
1		Probability Theory and Stochastic Processes	3	0	0	3
2		Electromagnetic Fields and Transmission Lines	3	0	0	3
3		Analog and Digital Communications	3	0	0	3
4		Linear and Digital IC Applications	3	0	0	3
5		Electronic Circuit Analysis	3	0	0	3
6		Analog and Digital Communications Laboratory	0	0	2	1
7		Linear and Digital IC Applications Laboratory	0	0	2	1
8		Electronic Circuit Analysis Laboratory	0	0	2	1
9		Real Time Project/ Field Based Project	0	0	4	2
10		Gender Sensitization Lab	0	0	2	0
		Total Credits	**15**	**0**	**12**	**20**

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III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Microcontrollers	3	1	0	4
2		IoT Architectures and Protocols	3	0	0	3
3		Control Systems	3	1	0	4
4		Business Economics & Financial Analysis	3	0	0	3
5		Professional Elective – I	3	0	0	3
6		Microcontrollers Laboratory	0	0	2	1
7		IoT Architectures and Protocols Laboratory	0	0	2	1
8		Advanced English Communication Skills Laboratory	0	0	2	1
9		Intellectual Property Rights	3	0	0	0
		Total Credits	**18**	**2**	**6**	**20**

III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Antennas and Wave Propagation	3	0	0	3
2		Digital Signal Processing	3	0	0	3
3		CMOS VLSI Design	3	0	0	3
4		Professional Elective - II	3	0	0	3
5		Open Elective – I	3	0	0	3
6		Digital Signal Processing Laboratory	0	0	2	1
7		CMOS VLSI Design Laboratory	0	0	2	1
8		Advanced Communication Laboratory	0	0	2	1
9		Industry Oriented Mini Project/ Internship	0	0	4	2
10		Environmental Science	3	0	0	0
		Total Credits	**18**	**0**	**10**	**20**

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IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Microwave and Optical Communications	3	1	0	4
2		Professional Elective – III	3	0	0	3
3		Professional Elective – IV	3	0	0	3
4		Open Elective – II	3	0	0	3
5		Professional Practice, Law & Ethics	2	0	0	2
6		Microwave and Optical Communications Laboratory	0	0	4	2
7		Project Stage – I	0	0	6	3
		Total Credits	**15**	**1**	**10**	**20**

IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Professional Elective – V	3	0	0	3
2		Professional Elective – VI	3	0	0	3
3		Open Elective – III	3	0	0	3
4		Project Stage – II including Seminar	0	0	22	11
		Total Credits	**9**	**0**	**22**	**20**

Professional Elective – I

	Computer Organization & Operating Systems
	Data Communications and Computer Networks
	Electronic Measurements and Instrumentation

Professional Elective – II

	Digital Image Processing
	Mobile Communications and Networks
	Embedded System Design

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Professional Elective – III

	Radar Systems
	CMOS Analog IC Design
	Artificial Neural Networks

Professional Elective – IV

	Network Security and Cryptography
	Satellite Communications
	Biomedical Instrumentation

Professional Elective – V

	Artificial Intelligence
	5G and beyond Communications
	Machine learning

Professional Elective – VI

	Multimedia Database Management Systems
	System on Chip Architecture
	Wireless sensor Networks

Open Electives

Open Elective (OE – I)	Open Elective (OE – II)	Open Elective (OE – III)
1. Fundamentals of Internet ofThings 2. Principles of SignalProcessing 3. Digital Electronics for Engineering	1. Electronic Sensors 2. Electronics for Health Care 3. Telecommunications for Society	1. Measuring Instruments 2. Communication Technologies 3. Fundamentals of Social Networks

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