



S.R.R. & C.V.R. GOVT. DEGREE COLLEGE (A)

VIJAYAWADA, N.T.R. DT.

(NAAC Accredited with 'A' Grade-IV Cycle)

AFFILIATED TO KRISHNA UNIVERSITY, MACHILIPATNAM

DEPARTMENT OF PHYSICS & ELECTRONICS

ACADEMIC YEAR 2025-26

Composition of the Board Of Studies (BoS) of ELECTRONICS as Per UGC Guidelines

Members of Board of studies

Members of the Board of Studies of Department of Electronics met on 18 -09-2025 at 2.00 PM in the Department of Physics & Electronics staff room.

S.No	Name of the faculty	Designation
1	Smt.P.Sailaja, In- Charge, Department of Physics & Electronics SRR & CVR GDC (A), Vijayawada	Board of studies chairperson
2	Dr.Ch.Srinivasa Rao, Andhra Loyola College (A), Vijayawada	University Nominee
3	Sri T.V.Rambabu, Lecturer in Physics SCIM GDC, Jangareddygudem, Eluru Dist. Mob:9490823654	Subject Expert
4	Dr.P. Gopi Krishna, Asst. Professor, Dept of ECM K.L. Education Foundation, Vaddeswaram, Guntur Ph:9963696066	Subject Expert
5	N. Vara Prasad, CEO, ARETE IT Services Pvt. Ltd Mob:8885591199	Industrialist
6	T.Pujitha, M.Sc Mob:7799467493	Alumni
7	1. Smt. T.V.Vakula Priya, Lecturer in Physics& Electronics 2. Dr. J.Nageswara Rao , Lecturer in Physics& Electronics 3. Dr. A. Asirvadam, Lecturer in Physics& Electronics 4. Sri.T.Devender Reddy, Lecturer in Physics& Electronics 5. Sri G.V.Gangadhara Rao, Lecturer in Physics& Electronics 6. Smt. Sk.Jubeda, Lecturer in Physics& Electronics 7. Smt.S.Kiranmayi, Lecturer in Physics& Electronics	Members of the Department
8	1. Ch. Keerthesh III B.Sc Electronics (Honours) 2. I. Harshitha Sri II B.Sc Electronics (Honours)	Students



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DEPARTMENT OF PHYSICS & ELECTRONICS

ACADEMIC YEAR 2025-26

Members of the Board of Studies of Department of Electronics met on 18 -09-2025 at 2.00 PM in the Department of Physics & Electronics staff room Under chairmanship of Smt. P.Sailaja, In-charge of the Department, with the following agenda.

AGENDA:

1. Review of minutes of BOS.
2. To apprise and approve Departmental Vision and mission.
3. To discuss and approve curriculum structure suggested by APSCHE and from feedback of students and different stakeholders with modifications not exceeding 20% on demand of local needs and to be implemented from the year 2025-26.
4. To approve blue print and Model Question paper for theory and practical examinations.
5. Review of evaluation of Internal and External Examinations.
6. To Suggest Methodologies and innovative teaching practices.
7. To discuss and approve panel of Examiners.
8. To suggest and approve student study projects, Extension activities curricular, co-curricular activities and to discuss about certificate course.
9. Any other with the permission of the chairperson.

Programme: B.Sc. Honours in Electronics (Major)

**w.e.f. AY 2023-24
COURSE STRUCTURE**

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
III	V	12	Cellular Mobile Communication	3	3
			Cellular Mobile Communication Practical Course	2	1
		13	Computer Network	3	3
			Computer Network Practical Course	2	1
		14 A	Industrial Electronics	3	3
			Industrial Electronics Practical Course	2	1
		14 B	Embedded system Design	3	3
			Embedded system Design Practical Course	2	1
		OR			
		15 A	Digital system Design	3	3
			Digital system Design Practical Course	2	1
		15 B	Consumer Electronics	3	3
			Consumer Electronics Practical Course	2	1
	VI	Internship			

Note: Select 14 A and 14B or 15A and 15B. It means select either series 14 or 15 in Semester V.



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DEPARTMENT OF PHYSICS & ELECTRONICS

ACADEMIC YEAR 2025-26

SEMESTER-V

COURSE 12: CELLULAR MOBILE COMMUNICATION

<u>Theory</u>	<u>Credits: 3</u>	<u>3 hrs/week</u>
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The students will learn:

- a) Basics of digital cellular system, cordless telephony and cell structure
- b) GSM wireless protocol and markup language fundamentals
- c) Basics of WLL and Bluetooth technology

UNIT-I

Advanced mobile phone service - Global system for mobile communication – Digital cellular system - Cordless telephony - Third generation wireless systems.

UNIT-II

Cell structure - Hand off - roaming management - Hand off detection - Channel assignment techniques - Interference - ACI, CCI - Intersystem hand off and authentication - Network signaling - Cellular digital packet data

UNIT-III

GSM - Network signaling, mobility management, short message service - International roaming, administration and operation.

UNIT-IV

Wireless application protocol - Architecture - Datagram - Transport layer securities - Transaction protocol - Session protocol application environment, wireless markup language, WML - Script wireless telephony applications.

UNIT-V

Third generation mobile services - Wireless local loop-Architecture, wireless access methods, Wireless Local Loop technologies - Bluetooth technology.

Text Books

1. Mobile Communications - *Jochen Schiller*, 7/e, Pearson Education, 2003.
2. Principles of Wireless Networks - *Kaushal Pahalavan & Prahmanet Krishnamoorthy*, 2/e, Pearson Education, 2004.

Reference Books

1. Wireless and Mobile Networks Architecture - *Yi-Bing Lin & Imnch Chlantee*, John Wiley, 2001.
2. Wireless and Mobile Communication - *Rappaport*, Pearson Education, 2001.

SEMESTER-V

COURSE 12: CELLULAR MOBILE COMMUNICATION

Practicals

Credits:1

2 Hours/Week

ANY SIX EXPERIMENTS SHOULD BE DONE

1. Study of GSM Architecture
2. Modulation Techniques in Cellular Communication
3. CDMA/FDMA/TDMA Channelization
4. Study of Mobile Antenna Radiation Pattern
5. Design and Simulation of a Simple Cellular Network
6. Performance Analysis of LTE/5G Systems
7. SMS & Call Functionality Testing on GSM Trainer
8. Cell Search and Synchronization in LTE
9. Measurement of Signal Strength (RSSI) and BER
10. CDMA vs. GSM Simulation
11. Call Establishment Procedure in GSM Network

Add-on - Optional Mini-Projects

1. Mobile Tower Signal Strength Logger (using Arduino + GSM module)
2. Simulation of VoLTE call setup
3. SMS-based home automation
4. Interference analysis in a multi-cell environment
5. Mobile Signal Strength Mapping App
6. Smart SIM Toolkit Application
7. Real-time GPS Tracker with GSM
8. SMS-controlled Device (e.g., lights, fan)

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B.Sc (ELECTRONICS) Honours
SEMESTER-5
COURSE 12: CELLULAR MOBILE COMMUNICATION

Time:3 hours

Max marks: 60M

COURSE 2: BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problems
Unit I	2 (with internal choice)	2	0
Unit II	2 (with internal choice)	2	0
Unit III	2 (with internal choice)	2	0
Unit IV	2 (with internal choice)	2	0
Unit V	2 (with internal choice)	2	0

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B.Sc (ELECTRONICS) Honours
SEMESTER-5
MODEL QUESTION PAPER
COURSE 12: CELLULAR MOBILE COMMUNICATION

Time: 3 hours

Max marks: 60M

SECTION-A

Answer any Five of the following questions

5x 4M = 20M

1. Short answer type question from Unit-I
2. Short answer type question from Unit-I
3. Short answer type question from Unit-II
4. Short answer type question from Unit-II
5. Short answer type question from Unit-III
6. Short answer type question from Unit-III
7. Short answer type question from Unit-IV
8. Short answer type question from Unit-IV
9. Short answer type question from Unit-V
10. Short answer type question from Unit-V

SECTION-B

Answer all the following questions.

5x8M = 40M

11 Essay type question from Unit-I

Or

12) Essay type question from Unit-I

13) Essay type question from Unit-II

Or

14) Essay type question from Unit-II

15) Essay type question from Unit-III

Or

16) Essay type question from Unit-III

17) Essay type question from Unit-IV

Or

18) Essay type question from Unit-IV

19) Essay type question from Unit-V

Or

20) Essay type question from Unit-V

SEM V- CELLULAR MOBILE COMMUNICATION QUESTION BANK

UNIT- I

ESSAY QUESTIONS

1. Explain the working principle of Advanced Mobile Phone Service (AMPS)?
2. Describe the architecture of the Global System for Mobile Communication (GSM)?
3. Explain Third Generation (3G) wireless systems. Highlight the improvements in speed, multimedia support, and internet access provided by 3G?

SHORT ANSWER QUESTIONS

1. What are the main advantages of GSM that made it the most widely used mobile communication system?
2. What is meant by cordless telephony?
3. What is the main difference between analog and digital cellular systems?

UNIT- II

ESSAY QUESTIONS

1. Explain the concept of cell structure in mobile communication. What is handoff in cellular systems?
2. What are Adjacent Channel Interference (ACI) and Co-Channel Interference (CCI)? Explain their causes and methods to reduce them.
3. Discuss Cellular Digital Packet Data (CDPD)?

SHORT ANSWER QUESTIONS

1. What is handoff detection and why is it important in mobile communication?
2. What is roaming management in mobile communication?
3. What is network signaling in mobile communication and why is it needed?

UNIT- III

ESSAY QUESTIONS

1. Explain the function of network signaling in GSM. How does it support call setup and termination?
2. Describe the process of mobility management in GSM?
3. Discuss GSM administration and operation. How are subscribers authenticated and billed?

SHORT ANSWER QUESTIONS

1. Write a short note on Short Message Service (SMS)?
2. What is meant by international roaming?

3. What is mobility management in GSM?

UNIT- IV

ESSAY QUESTIONS

- 1.Explain the architecture of WAP. How do its layers support mobile communication?
2. What is the role of the Transaction Protocol in WAP? Explain its working?
3. Write a short note on Wireless Telephony Applications (WTA)?

SHORT ANSWER QUESTIONS

1. What is Transport Layer Security (TLS) used for in WAP?
2. Explain the working of Session Protocol in WAP?
3. Explain the purpose of wireless markup language (WML)?

UNIT- V

ESSAY QUESTIONS

1. What are Third Generation (3G) mobile services? Write their main features?
- 2.Explain in detail the architecture of Wireless Local Loop (WLL) and how it supports voice and data communication.
3. Explain the working principle of Bluetooth technology and how devices connect?

SHORT ANSWER QUESTIONS

1. Describe one wireless access method used in WLL?
2. What is Bluetooth technology used for?
3. Discuss the different WLL technologies?

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA

B.Sc (ELECTRONICS) Honours

SEMESTER-5

COURSE 13: COMPUTER NETWORK

Time:3 hours

Max marks: 60M

Theory

Credits: 3

3 hrs/week

Objectives:

The students will learn:

- a. provides a general introduction to computer networking that would be useful to all personnel who deal with distributed systems,
- b. encompassing both technical and managerial aspects.
- c. to help students better understand the challenges and opportunities faced by modern business,
- d. topics include LAN and WAN implementations, the Internet and internet applications.

UNIT-I

Network structure Point to Point, Broadcast, Multicast - Horizontal and vertical distribution - Star, Mesh, tree, bus structures - OSI 7 layer model - Architecture - Functions of layers - Packet switches, circuit switching and message switching.

UNIT-II

Physical layer - Transmission media - Channel allocation methods - ALOHA, S-ALOHA, - LAN Protocols IEEE 802.3, 802.4, 802.5, 802.6 and 802.11.

UNIT-III

Data link layer - Framing - Error detection - CRC - Error correction –Hamming code, Stop and wait - Sliding window Protocol -Go back N and Selective repeat.

UNIT-IV

Network layer - Routing algorithms and congestion control algorithms - Repeaters, Bridges, Routers and Gateways, Internetworking - Introduction to transport layer and session layer.

UNIT-V

Presentation layer - coding, compression and cryptography - Introduction to Application layer
- High performance networks - ATM, Fast Ethernet, FDDI, SONET and SDH.

Text Books 1. Computer Networks - Andrew S. Tanenbaum, 4/e, Pearson Education, 2005.

2. Data and Computer Communication - W. Stallings, 7/e, Pearson Education, 2006.

Reference Books 1. Introduction to Data Communications and Networking - Behrouz & Forouzan, 4/e, McGraw Hill Book Company, 2004.

2. Telecommunication Networks - Protocols Modeling and Analysis - Misha Stewart, 2/e, Pearson Education, 2002.

SEMESTER-V		
COURSE 13: COMPUTER NETWORK PRACTICAL COURSE		
Practical	Credits: 1	2 hrs/week

At least any six of the following experiments

1. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
2. Study of Network Devices in Detail.
3. Study of network IP.
4. Connect the computers in Local Area Network.
5. Study of basic network command and Network configuration commands.
6. Performing an Initial Switch Configuration
7. Performing an Initial Router Configuration
8. Configuring and Troubleshooting a Switched Network
9. Packet, Circuit and Message switching simulation using Packet Tracer
10. Configuring WEP on a Wireless Router

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B.Sc (ELECTRONICS) Honours
SEMESTER-5
COURSE 13 A: COMPUTER NETWORK

COURSE 2: BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problems
Unit I	2 (with internal choice)	2	0
Unit II	2 (with internal choice)	2	0
Unit III	2 (with internal choice)	2	0
Unit IV	2 (with internal choice)	2	0
Unit V	2 (with internal choice)	2	0

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA

B.Sc (ELECTRONICS) Honours

SEMESTER-5

MODEL QUESTION PAPER

COURSE 13 A: COMPUTER NETWORK

Time:3 hours

Max marks: 60M

SECTION-A

Answer any five of the following

5X4=20M

1. Explain Mesh structure in computer networks.
2. Explain Tree structure in computer networks.
3. Explain IEEE 802.11 architecture.
4. Explain Token ring format (IEEE 802.5).
5. Explain about framing in data link layer.
6. Explain Selective repeat ARQ.
7. Explain about bridge.
8. Explain the introduction to transport layer.
9. Explain the functions of application layer.
10. Write a short note on SDH.

SECTION-B

Answer ALL the following

5X8=40M

11. Draw the architecture of OSI 7-layer method and explain the functions of layers.

or

12. Explain the different types of switching techniques in computer networks.
13. Explain the channel allocation methods ALOHA and Slotted ALOHA.

or

14. Explain IEEE 802.6 (DQDB) standard.
15. Explain error correction Hamming code.

or

16. Explain Go back N protocol.
17. Explain the routing algorithms in network layer.

or

18. Explain token bucket algorithm.
19. Explain briefly about SONET.

or

20. Explain the asynchronous transfer mode (ATM) in computer network.

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SUBJECT: ELECTRONICS MAJOR- SEMESTER-V
COURSE 13: COMPUTER NETWORK
QUESTION BANK
UNIT-I

Long answer questions.

1. Explain the different types of network structures.
2. Draw the architecture of OSI 7 layer method and explain the functions of layers.
3. Explain the different types of switching techniques in computer networks.

UNIT-I

Short answer questions

1. Explain Star structure in computer networks.
2. Explain Mesh structure in computer networks.
3. Explain Tree structure in computer networks.
4. Explain Bus structure in computer networks.

UNIT-II

Long answer questions.

1. Explain the types of transmission media in computer networks.
2. Explain the channel allocation methods ALOHA and Slotted ALOHA.
3. Explain IEEE 802.6 (DQDB) standard.
4. Explain Token Bus (IEEE 802.4) standard.

UNIT-II

Short answer questions

1. Explain Ethernet frame format IEEE 802.3.
2. Explain IEEE 802.11 architecture.
3. Explain Token ring format (IEEE 802.5).

UNIT-III

Long answer questions.

1. Explain error detection code Cyclic Redundancy Check.
2. Explain error correction Hamming code.
3. Explain stop and wait protocol.
4. Explain Go back N protocol.

UNIT-III

Short answer questions.

1. Explain about framing in data link layer.
2. Explain Selective repeat ARQ.

UNIT-IV

Long answer questions.

1. Explain the routing algorithms in network layer.
2. Explain leaky bucket algorithm.
3. Explain token bucket algorithm.

UNIT-IV

Short answer questions.

1. Explain router.
2. Explain about bridge.
3. Explain about repeater.
4. Explain about Gateway.
5. Explain internetworking.
6. Explain the introduction to transport layer.
7. Explain the introduction to session layer.

UNIT-V

Long answer questions.

1. Explain the functions of presentation layer.
2. Explain briefly about SONET.
3. Explain the asynchronous transfer mode (ATM) in computer network.
4. Explain in detail about the fast ethernet.

UNIT-V

Short answer questions.

1. Explain the functions of application layer.
2. Write a short note on SDH.
3. Explain FDDI.

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA
B.Sc (ELECTRONICS) Honours
SEMESTER-5
COURSE 14 A: INDUSTRIAL ELECTRONICS

Time: 3 hours

Max marks: 60M

Theory	Credits: 3	3 hrs/week
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Learning Outcomes:

Students after successful completion of the course will be able to:

1. Identify various facilities required to set up a basic Instrumentation Laboratory.
2. Acquire a critical knowledge of various Electrical Instruments used in the Laboratory.
3. Demonstrate skills of using instruments like Rectifiers, Multimeters, Power supplies, Voltage Regulators etc. through hands on experience.
4. Understand the Principle and operation of different Electronic Heating devices.

Syllabus:

UNIT-I (20 hours)

Rectifiers and filters: Rectifiers—full wave and bridge rectifiers- Efficiency- Ripple factor- Regulation – Types of filters- Choke input (inductor) filter- Shunt capacitor filter- L- Section and π –Section filters. Voltage Regulators: Transistor Series voltage regulator - Transistor Shunt voltage regulator – Three terminal Voltage regulators (78XX and 79XX).

UNIT-II (10 hours)

Power Supplies: Block diagram of regulated power supply – A simple regulated transistorized power supply (circuit and working) – Principle and working of switch mode power supply (SMPS), Adjustable voltage regulators, Dual- Tracking Voltage Regulators.

UNIT-III (10 hours)

Voltage Multipliers: Half wave voltage doubler, Full wave

Voltage doubler, Voltage Tripler, Voltage Quadrupler - circuit diagram and working. Mention the applications of voltage multipliers.

UNIT-IV (10 hours)

Controlled rectifiers: SCR Half wave rectifier circuit and working with wave forms, mathematical analysis for resistive load - SCR Full wave rectifier circuit and working with wave forms, mathematical analysis for resistive load – SCR as series and parallel inverter circuits.

UNIT-V (10 hours)

Heat effects: Resistance heating–direct and indirect methods, Applications of resistance heating. Inductance heating- Principle of operation and its applications, Dielectric heating - Principle of operation and its applications

Reference Books:

1. Unified Electronics Volume II by J.P Agarwal and Amit Agarwal.
2. Industrial Electronics, S.B. Biswas, Dhanapur Rai & Sons.
3. Industrial Electronics, G.K. Mithal, Khanna Publishers.
4. Electronic Devices and Circuits – G.K. Mithal.
5. Electronic Devices and Circuits-Millman and Halkias- Tata Mc Graw Hill (TMH)
6. Microelectronics- J. Millman and A. Grabel – TMH

SEMESTER-V
COURSE 14 A: INDUSTRIAL ELECTRONICS

Practical

Credits: 1

2 hrs/week

ANY SIX EXPERIMENTS SHOULD BE DONE

1. D.C Power supply and filters.
2. Transistor series regulator
3. Transistor as a shunt regulator
4. Voltage regulator using IC-7805 and IC-7905.
5. Voltage doubler using diodes
6. Voltage Tripler using diodes
7. Voltage Tripler using diodes
8. SCR VI characteristics.
9. SCR Series inverter
10. SCR parallel inverter.

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA
B.Sc (ELECTRONICS) Honours
SEMESTER-5
MODEL QUESTION PAPER
COURSE 14 A: INDUSTRIAL ELECTRONICS

Time:3 hours

Max marks: 60M

COURSE 2: BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problems
Unit I	2 (with internal choice)	2	0
Unit II	2 (with internal choice)	2	0
Unit III	2 (with internal choice)	2	0
Unit IV	2 (with internal choice)	2	0
Unit V	2 (with internal choice)	2	0

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B.Sc (ELECTRONICS) Honours
SEMESTER-5
MODEL QUESTION PAPER
COURSE 14 A: INDUSTRIAL ELECTRONICS

Time: 3 hours

Max marks: 60M

SECTION-A

Answer any five of the following

5X4=20M

1. What is rectifier? Draw its input and output wave forms.
2. What is filter? Explain L-section filter.
3. Draw the block diagram of regulated power supply.
4. Compare linear power supply and switched mode power supply.
5. What are voltage multipliers?
6. Explain the working of half wave voltage doubler with neat circuit diagram.
7. Explain the working of SCR parallel inverter.
8. Compare controlled rectifiers and linear diode rectifiers
9. Mention the applications and advantages of inductance heating.
10. Mention the applications and advantages of Dielectric heating.

SECTION-B

Answer ALL the following

5X8=40M

11. Explain the working of bridge rectifier with neat circuit diagram and waveforms.

Or

Explain the working of transistor shunt voltage regulator.

12. Draw the block diagram of switch mode power supply and explain its working.

or

Explain the working of regulated transistorized power supply with neat circuit diagram.

13. Explain the working of voltage Tripler with neat circuit diagram.

or

Explain the working of voltage Quadrupler with neat circuit diagram.

14. Explain the working of SCR full wave rectifier and draw its wave forms.

or

Explain the mathematical analysis of SCR half wave rectifier with resistive load.

15. Explain the working of indirect resistance heating.

or

Explain the working of inductance heating.

CORE: 14 A- INDUSTRIAL ELECTRONICS
QUESTION BANK

UNIT-I

Long answer questions.

1. Explain the working of bridge rectifier with neat circuit diagram and waveforms.
2. Explain the working of transistor series voltage regulator.
3. Derive the expression for efficiency of full wave bridge rectifier.
4. Explain the working of transistor shunt voltage regulator.

UNIT-I

Short answer questions

1. What is rectifier? Draw its input and output wave forms.
2. What is filter? Explain series inductor filter.
3. What is filter? Explain shunt capacitor filter.
4. What is filter? Explain L-section filter.
5. What is filter? Explain Π -section filter.

UNIT-II

1. Draw the block diagram of transistorized power supply and explain its each block.
2. Draw the block diagram of switch mode power supply and explain its working.
3. Explain the working of regulated transistorized power supply with neat circuit diagram.

UNIT-II

Short answer questions

1. Explain the working of adjustable voltage regulator.
2. Draw the block diagram of regulated power supply.
3. Compare linear power supply and switched mode power supply.

UNIT-III

Long answer questions.

1. Explain the working of full wave voltage doubler with neat circuit diagram.
2. Explain the working of voltage Tripler with neat circuit diagram.
3. Explain the working of voltage Quadrupler with neat circuit diagram.

UNIT-III

Short answer questions

1. What are voltage multipliers?
2. Mention the applications of voltage multipliers.
3. Explain the working of half wave voltage doubler with neat circuit diagram.

UNIT-IV

Long answer questions

1. Explain the working of SCR half wave rectifier and draw its wave forms.
2. Explain the working of SCR full wave rectifier and draw its wave forms.
3. Explain the mathematical analysis of SCR half wave rectifier with resistive load.
4. Explain the mathematical analysis of SCR full wave rectifier with resistive load.

UNIT-IV

Short answer questions

1. Explain the working of SCR series inverter.
2. Explain the working of SCR parallel inverter.
3. Compare controlled rectifiers and linear diode rectifiers

UNIT-V

Long answer questions.

1. Explain the working of direct resistance heating.
2. Explain the working of indirect resistance heating.
3. Explain the working of inductance heating.
4. Explain the working of Dielectric heating.

UNIT-V

Short answer questions

1. Mention the applications and advantages of resistance heating.
2. Mention the applications and advantages of inductance heating.
3. Mention the applications and advantages of Dielectric heating.

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA

B.Sc (ELECTRONICS) Honours

SEMESTER-5

COURSE 14 B: EMBEDDED SYSTEMS DESIGN

Time:3 hours		Max marks: 60M
Theory	Credits: 3	3 Hours/Week

UNIT 1: (15Hrs)

Introduction to Embedded Systems:

Embedded systems overview- definition and characteristics, Design Challenge-Common Design matrices, the time to market design matrix, Processor Technology: Single purpose processors-Hardware, IC Technology –Full custom VLSI, Semicustom ASIC and PLD, Design Technology.

UNIT 2: (15Hrs)

Custom Single Purpose Processor – Hardware Development:

Introduction, Combinational logic-Basic combinational logic design, Sequential logic - Sequential logic design, Custom Single Purpose Processor Design, RT-Level Custom Single Purpose Processor.

UNIT 3: (15Hrs)

General Purpose Processor – Software Development:

Introduction, Basic Architecture, Operation- Instruction execution and pipe lining, Development Environment-Design Flow and tools, Host and Target Machines, Linker / Locators for Embedded Software, Getting Embedded Software into the target system. Debugging Techniques: Testing on your Host Machine, and Instruction Set Simulators.

UNIT 4: (10Hrs)

RTWA for Embedded Systems:

Introduction, Timers, Counters and Watchdog Timers,UART, Pulse Width Modulators, LCD Controllers, Keypad Controllers, Stepper Motor Controllers,

UNIT 5: (10Hrs)

Advanced Communication Principles:

Parallel Communication, Serial Communication, Wireless Communication, Serial Protocols: I²C, CAN, FireWire, and USB. Parallel Protocols: PCI BUS and ARM BUS. Wireless Protocols: IrDA, Bluetooth.

TEXT BOOKS:

1. Embedded System Design – A Unified Hardware / Software Introduction By FrankVahid /Tony Givargis – WILEY EDITION.
2. Embedded Systems Architecture, Programming and Design – 2nd Edition By RajKamal –Tata McGraw-Hill Education.

REFERENCES:

1. An Embedded Software Premier - David E- Siman, PEARSON
2. Education Embedded / real - time systems - DR. K.V.K.K.Prasad, dreamtech
3. The art of programming Embedded systems, Jack G. Ganssle,academic press
4. Intelligent Embedded systems, Louis L. Odette, Adison Wesly, 1991

SEMESTER-V

COURSE 14 B: EMBEDDED SYSTEMS DESIGN PRACTICALS

Practical

Credits: 1

2 Hours/Week

ANY SIX EXPERIMENTS SHOULD BE DONE

1. LED Blinking and Pattern Generation
2. Interfacing Push Buttons and Buzzer
3. Seven Segment Display Interfacing
4. LCD (16x2) Display Interfacing
5. Sensor Interfacing (Temperature, IR, Ultrasonic, etc.)
6. PWM Generation for Motor Speed Control
7. Real-Time Clock (RTC) Interfacing
8. Interrupt Handling and Timers
9. UART Communication (Serial Communication)

Add-On- Mini-Projects Ideas (Optional)

1. Smart Energy Meter
Monitors energy usage and transmits data via GSM.
2. Line Follower Robot
Uses IR sensors to follow a black line.
3. Home Automation via Bluetooth/Wi-Fi
Control appliances using smartphone app.
4. Smart Door Lock System
Keypad + RFID + Servo + LCD-based door lock.
5. Weather Station
Displays temperature, humidity, and air quality data on an LCD.

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA
B.Sc (ELECTRONICS) Honours
SEMESTER-5
MODEL QUESTION PAPER
COURSE 14 B: EMBEDDED SYSTEMS DESIGN

Time:3 hours

Max marks: 60M

COURSE 2: BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problems
Unit I	2 (with internal choice)	2	0
Unit II	2 (with internal choice)	2	0
Unit III	2 (with internal choice)	2	0
Unit IV	2 (with internal choice)	2	0
Unit V	2 (with internal choice)	2	0

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B.Sc (ELECTRONICS) Honours
SEMESTER-5
MODEL QUESTION PAPER
COURSE 14 B: EMBEDDED SYSTEMS DESIGN

Time: 3 hours

Max marks: 60M

SECTION-A

Answer any Five of the following questions

5x 4M = 20M

1. Briefly explain the NRE and Unit Cost Design Metrics.
2. Write a short note on Single-Purpose Processors — Hardware.
3. Briefly explain RT-Level Sequential Components.
4. What are the benefits of custom single-purpose processor.
5. PROM Programmers
6. Describe the role of linker and locator tools in embedded software development.
7. Write a short note on UART
8. Explain LCD Controllers
9. Briefly discuss on FireWire.
10. Explain Parallel Protocols- PCI BUS

SECTION-B

Answer all the following questions.

5x8M = 40M

11. Discuss Common Design Metrics.

Or

12. Discuss Design Technology of embedded system.
13. Explain the Construction of Basic Combinational Logic Design.

Or

14. Discuss the Custom Single-Purpose Processor Design with an example as BCD programme.

15. Discuss Basic Architecture of General Purpose Processor

Or

16. Discuss about Host and Target Machines
17. Explain Pulse Width Modulators with suitable example.

Or

18. Discuss about Stepper Motor Controllers
19. Discuss about parallel communication and Wireless Communication

Or

20. Explain about the Serial Protocols- I²C, CAN

COURSE 14 B: EMBEDDED SYSTEMS DESIGN

QUESTION BANK

UNIT-1

Essay questions

1. Discuss Common Design Metrics.
2. Explain The Time-to-Market Design Metric.
3. Discuss Design Technology of embedded system.

Short answer questions

1. Write Characteristics of an embedded system.
2. Briefly explain the NRE and Unit Cost Design Metrics.
3. Write a short note on General-Purpose Processors — Software.
4. Write a short note on Single-Purpose Processors — Hardware.

UNIT-2

Essay Questions

1. Explain the Construction of Basic Combinational Logic Design.
2. Explain the Construction of Sequential Logic Design.
3. Discuss the Custom Single-Purpose Processor Design with an example as BCD programme.

Short answer questions

1. Briefly explain RT-Level Sequential Components.
2. Discuss briefly about Sequential Logic Flip-Flops.
3. What are the benefits of custom single-purpose processor.

UNIT-3

Essay Questions

1. Discuss Basic Architecture of General Purpose Processor
2. Describe Pipelining and Instruction Execution in embedded systems.
3. Discuss about Host and Target Machines

Short answer questions

1. PROM Programmers
2. ROM Emulators
3. Describe the role of linker and locator tools in embedded software development.
4. Development Environment

Unit-IV

Essay Questions

1. Describe about Timers and Counters
2. Explain Pulse Width Modulators with suitable example.
3. Discuss about Stepper Motor Controllers

Short Answer Questions

1. Briefly discuss about Watchdog Timers
2. Write a short note on UART
3. Explain LCD Controllers
4. Write a short note on Keypad Controllers

Unit-V

Essay Questions

1. Discuss about parallel communication and Wireless Communication
2. Explain about the Serial Protocols- I²C, CAN
3. Describe about the Wireless Protocols

Short Answer Questions

1. Write a short note on Serial Communication.
2. Briefly discuss on FireWire.
3. What is Universal Serial Bus (USB) protocol? Explain.
4. Explain Parallel Protocols- PCI BUS
5. Explain Parallel Protocols- ARM BUS

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA
B.Sc (ELECTRONICS) Honours
SEMESTER-5

COURSE 15 A: DIGITAL SYSTEM DESIGN

Time:3 hours		Max marks: 60M
Theory	Credits: 3	3 Hours/Week

1. the fundamentals of Boolean algebra and simplification of Boolean functions
2. the combinational logic circuits and their design using HDL
3. the sequential logic circuits and their design using HDL

UNIT-I

Boolean Algebra and Logic Gates: Review of binary number systems - Binary arithmetic - Binary codes - Boolean Algebra and theorems - Boolean functions - Simplifications of Boolean functions using Karnaugh map and tabulation methods - Logic gates.

UNIT-II

Combinational Logic: Combinational circuits - Analysis and design procedures - Circuits for arithmetic operations - Code conversions - Introduction to Hardware Description Language (HDL).

UNIT-III

Design with MSI Devices: Decoders and Encoders - Multiplexers and Demultiplexers - Memory and programming logic - HDL for combinational circuits.

UNIT-IV

Synchronous Sequential Logic: Sequential circuits - Flip-flops - Analysis and design procedures - State reduction and state assignments - Shift registers - Counters - HDL for sequential logic circuits, shift registers and counters.

UNIT-V

Asynchronous Sequential Logic: Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables - Race free state assignment - Hazards.

Text Books

Digital Logic and Computer Design - *M. Morris Mano*,
Prentice Hall of India Private Limited

A Verilog HDL Premier - *J. Baskar*, Pearson Education.

Reference Books

1. Analysis and Modeling of Digital Systems - *Zain Allabedin Navab*, 2/e , McGrawHill Publishing Co. Ltd., New Delhi.
2. An Engineering Approach to Digital Design - *Fletcher*, Prentice Hall of India Private Limited.
3. Modern Digital Electronics - *R.P. Jain*, 2/e, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Digital Fundamentals - *T.L. Floyd*, 8/e, Pearson Education.

Co-Curricular Activities

(a) Mandatory: (*Training of students by teacher in field related skills: (lab:10 + field:05)*)

For Teacher: Training of students by the teacher in the in the laboratory/field for not less than 15 hours on the field techniques/skills of understanding the operation, Maintenance and utility of various electrical and electronic instruments both in the Laboratory as well as in daily life.

For Student: Students shall (individually) visit a local electrical and electronics shop or small firm to familiarize with the various electrical and electronic instruments available in the market and also to understand their functionality, principle of operation and applications as well as the troubleshooting of these instruments.

(Or)

Student shall visit a diagnostic centre and observe the ECG machine and the ECG pattern

(Or)

Student shall visit a diagnostic centre and observe the CT scan and MRI scan.

(Or)

Student shall visit a mobile smart phone repair shop and observe the different components on the PCB (Motherboard), different ICs (chips) used in the motherboard and trouble shooting of touch screen in smart phones.

Observations shall be recorded in a hand-written Fieldwork/Project work not exceeding 10 pages in the given format to be submitted to the teacher.

Max marks for Fieldwork/Project work: 05.

Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations, findings and acknowledgements.*

Unit tests (IE)

Suggested Co-Curricular Activities

1. Training of students by related industrial / technical experts.
2. Assignments (including technical assignments like identifying different measuring instruments and tools and their handling, operational techniques with safety and security.
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Making your own stethoscope at home.
5. Making seven segment display at home.
6. Preparation of videos on tools and techniques in various branches of instrumentation.
7. Collection of material/figures/photos related to products of Measuring Instruments, Display Modules and Biomedical Instruments and arrange them in a systematic way in a file.
8. Visits to Instrumentation Laboratories of local Universities or Industries like Cement, chemical or Sugar Plants etc. or any nearby research organizations, private firms, etc.
9. Invited lectures and presentations on related topics by Technical / industrial experts

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA
B.Sc (ELECTRONICS) Honours
SEMESTER-5
MODEL QUESTION PAPER
COURSE 15 A: DIGITAL SYSTEM DESIGN

Time:3 hours

Max marks: 60M

COURSE 2: BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problems
Unit I	2 (with internal choice)	2	0
Unit II	2 (with internal choice)	2	0
Unit III	2 (with internal choice)	2	0
Unit IV	2 (with internal choice)	2	0
Unit V	2 (with internal choice)	2	0

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA
B.Sc (ELECTRONICS) Honours
SEMESTER-5
MODEL QUESTION PAPER
COURSE 15 A: DIGITAL SYSTEM DESIGN

Time: 3 hours

Max marks: 60M

SECTION-A

Answer any Five of the following questions

5x 4M = 20M

1. Short answer type question from Unit-I
2. Short answer type question from Unit-I
3. Short answer type question from Unit-II
4. Short answer type question from Unit-II
5. Short answer type question from Unit-III
6. Short answer type question from Unit-III
7. Short answer type question from Unit-IV
8. Short answer type question from Unit-IV
9. Short answer type question from Unit-V
10. Short answer type question from Unit-V

SECTION-B

Answer all the following questions.

5x8M = 40M

- 11 Essay type question from Unit-I

Or

- 12) Essay type question from Unit-I

- 13) Essay type question from Unit-II

Or

- 14) Essay type question from Unit-II

- 15) Essay type question from Unit-III

Or

- 16) Essay type question from Unit-III

- 17) Essay type question from Unit-IV

Or

- 18) Essay type question from Unit-IV

- 19) Essay type question from Unit-V

Or

- 20) Essay type question from Unit-V

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA
B.Sc (ELECTRONICS) Honours
SEMESTER-5

COURSE 15 B: CONSUMER ELECTRONICS

Time:3 hours		Max marks: 60M
Theory	Credits: 3	3 Hours/Week

Learning Outcomes:

- To study Microwave ovens – block diagram - working - types – wiring and safety instructions. – care and cleaning
- To study washing machines – block diagram - working - types – wiring and safety instructions. – care and cleaning
- To study Air conditioners and refrigerators – block diagram - working - types – wiring and safety instructions. – care and cleaning
- To study Home/Office digital devices – block diagram - working - types – wiring and safety instructions. – care and cleaning
- To study Digital access devices like – block diagram - working - types – wiring and safety instructions. – care and cleaning

Unit – I

Microwave Ovens – Microwaves (Range used in Microwave ovens) – Microwave oven block diagram – LCD timer with alarm – Single-Chip Controllers – types of Microwave oven – Wiring and Safety instructions – care and Cleaning.

Unit – II

Washing Machines – Electronic controller for washing machines – Washing machine hardware and software – Types of washing machines – Fuzzy logic washing machines Features of washing machines.

Unit – III

Air Conditioners And Refrigerators - Air Conditioning – Components of air conditioning systems – All water air conditioning systems – All air conditioning systems – Unitary and central air conditioning systems – Split air conditioners.

Unit – IV

Home/Office Digital Devices – Facsimile machine – Xerographic copier – calculators – Structure of a calculator – Internal organization of a calculator – Servicing electronic calculators – Digital clocks – Block diagram of a digital clock.

Unit – V

Digital Access Devices – Digital computer – Internet access – online ticket reservation – functions and networks – barcode scanner and decoder – Electronic Fund Transfer – Automated Teller Machines (ATMs) – Set-Top boxes – Digital cable TV – Video on demand.

TEXTBOOKS:

1. S.P. Bali, Consumer Electronics – Pearson Education, New Delhi, 2005.
2. R.G. Gupta Audio and Video systems Tata McGraw Hill (2004)

Learning outcomes:

1. The Student can gain good knowledge on microwave ovens and implement in practical applications.
2. The Student can gain good knowledge on Washing Machines and implementing practical applications.
3. The Student can gain good knowledge on Air conditioners and Refrigerators and implement in practical applications.
4. The Student can gain good knowledge on Digital access devices and implementing practical applications.
5. Ability to measure strain, displacement, velocity, angular velocity, temperature, pressure Vacuum, and Flow.

COURSE 15 B: CONSUMER ELECTRONICS PRACTICAL

(At least two Activities should be done)

1. Study of PA systems for various situations – Public gathering , closed theatre/ Auditorium, Conference room, Prepare Bill of Material(Costing)
2. Installation of Audio/Video systems – site preparation , electrical requirements, cables and connectors
3. Market Survey of products (at least one from each module)
4. Identification of block and tracing the system.Assembly and Disassembly of system using Toolkit Assembly and Disassembly of system and printer.

NOTE: one activity as directed in practical course is equivalent to 4 experiments

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B.Sc (ELECTRONICS) Honours
SEMESTER-5
MODEL QUESTION PAPER
COURSE 15 B: CONSUMER ELECTRONICS

Time:3 hours

Max marks: 60M

COURSE 2: BLUE PRINT

Unit	Essay answer questions	Short answer questions	Numerical problems
Unit I	2 (with internal choice)	2	0
Unit II	2 (with internal choice)	2	0
Unit III	2 (with internal choice)	2	0
Unit IV	2 (with internal choice)	2	0
Unit V	2 (with internal choice)	2	0

S.R.R & C.V.R. GOVERNMENT DEGREE COLLEGE (A) VIJAYAWADA

B.Sc (ELECTRONICS) Honours

SEMESTER-5

MODEL QUESTION PAPER

COURSE 15 B: CONSUMER ELECTRONICS

Time:3 hours

Max marks: 60M

SECTION-A

Answer any Five of the following questions

5x 4M = 20M

1. Short answer type question from Unit-I
2. Short answer type question from Unit-I
3. Short answer type question from Unit-II
4. Short answer type question from Unit-II
5. Short answer type question from Unit-III
6. Short answer type question from Unit-III
7. Short answer type question from Unit-IV
8. Short answer type question from Unit-IV
9. Short answer type question from Unit-V
10. Short answer type question from Unit-V

SECTION-B

Answer all the following questions.

5x8M = 40M

11 Essay type question from Unit-I

Or

12) Essay type question from Unit-I

13) Essay type question from Unit-II

Or

14) Essay type question from Unit-II

15) Essay type question from Unit-III

Or

16) Essay type question from Unit-III

17) Essay type question from Unit-IV

Or

18) Essay type question from Unit-IV

19) Essay type question from Unit-V

Or

20) Essay type question from Unit-V



S.R.R. & C.V.R. GOVT. DEGREE COLLEGE (A)

VIJAYAWADA, N.T.R. DT.

(NAAC Accredited with 'A' Grade-IV Cycle)

AFFILIATED TO KRISHNA UNIVERSITY, MACHILIPATNAM

DEPARTMENT OF PHYSICS & ELECTRONICS

ACADEMIC YEAR 2025-26

List of Examiners and Paper Setters:

S.NO	Name of the Lecturer	Address
1	Sri.K. Ajay Kumar , Lecturer in Physics Mob:9493474612	GDC, Eluru,W.G.Dt
2	Sri M. Aruna , Lecturer in Physics, Mob.no-9490881096	GDC, Kanchikacherla, Krishna Dt
3	Smt.Ch. Komala Lakshmi, Lecturer in Physics, Mob.no-9440151266	GDC(A), Rajamahendravaram, E.G.Dt
4	Kum.G.Sirisha, Lecturer in Physics Mob.no-8121925246	GDC(W),Guntur, Guntur Dt.
5	Sri. Ch.VenkatswaraRao, Lecturer in Physics	GDC(A), Rajamahendravaram, E.G.Dt
6	Dr.P. Gopi Krishna, Asst. Prof. of ECM	K. L. Education Foundation, Vaddeswaram, Guntur.
7	Dr. K.Jayadev, Lecturer in Physics	PR GDC(A), Kakinada
8	Sri. Sk.Basha, Lecturer in Physics Mob no.9705964213	GDC, Rajamahendravaram, E.G.Dt
9	Smt. V.Uma Lakshmi, Lecturer in physics Mob No. 7396849470	Dr.LHR GDC, Mylavaram



S.R.R. & C.V.R. GOVT. DEGREE COLLEGE (A)

VIJAYAWADA, N.T.R. DT.

(NAAC Accredited with 'A' Grade-IV Cycle)

AFFILIATED TO KRISHNA UNIVERSITY, MACHILIPATNAM

DEPARTMENT OF PHYSICS & ELECTRONICS

ACADEMIC YEAR 2025-26

After thorough Discussion the following Resolutions are made:

1. It is resolved to follow the same syllabus prescribed by the APSCHE, Andhra Pradesh for UG students of B.Sc (Electronics) honors in all semesters with effect from the Academic Year 2025-26 admitted from the academic year 2023-24 under single major programme with some additional inputs and some deletions.
2. It Is resolved to Approve the syllabus of Semester V and internship for semester VI.
3. It Is resolved to Approve the syllabus of Multi-Disciplinary Course “Basic Electronics” for the third Semester.
4. Resolved and approved the model question paper pattern for all semester examinations.
5. It is resolved to take 40%marks are eligible to treat as pass both in internal and external examinations.
6. It is resolved to take 60% of marks for external examinations and 40% for internal examinations as same as the BOS of last academic year 2024-25.
7. It is approved blueprint for theory and practical examinations.
8. It is resolved to consider 25 Marks for External evaluation and 25 marks for internal evaluation in Practical examination in all semesters from admitted batches 2023-24.
9. It is resolved to suggested student study projects, Extension activities, and Fieldtrips, curricular and co-curricular activities.

Signatures of the BOS members Attended:

1. Smt.P. Sailaja, In-Charge, Dept. Of Physics & Electronics :
(Board of studies chairperson)
2. Dr.Ch.Srinivasa Rao, (University Nominee) :
Professor, Andhra Loyola College (A), Vijayawada
3. Sri T.V.Rambabu, Lecturer in Physics (Subject Expert) :
GDC, Jangareddygudem, Eluru Dist., Adikavi Nannaya university,
4. Dr.P. Gopi Krishna, Asst. Professor, (Subject Expert) :
Dept. of ECM, KLUUniversity (Deemed to be)
5. Sri N.Vara Prasad (Industrialist) :
6. T.Pujitha, M.Sc (Alumni) :

Members of the Department:

1. Smt. T.V.Vakula Priya, Lecturer in Physics & Electronics :
2. Dr.J. Nageswara Rao, Lecturer in Physics & Electronics :
3. Dr. A. Asirvadam, Lecturer in Physics & Electronics :
4. Sri. T. Devender Reddy, Lecturer in Physics & Electronics :
5. Sri G.V. Gangadhara Rao, Lecturer in Physics & Electronics :
6. Smt. Sk.Jubeda, Lecturer in Physics & Electronics :
7. Smt.S.Kiranmayi, Lecturer in Electronics :

Student members:

1. Ch. Keerthesh III B.Sc Electronics (Honours) :
2. I. Harshitha Sri II B.Sc Electronics (Honours) :