Mrs. A V N COLLEGE

21-1-17, I Town

Visakhapatnam 530001

Estd: 1860

157 Years Old Premier Institute of Higher Learning, Permanently Affiliated to Andhra University – Visakhapatnam, Government of Andhra Pradesh Grant in Aid Institution, Recognized Under UGC Act Section 12(b) and 2(f), NAAC Reaccredited with CGPA 2.88 / 4.00 (B Grade) in 2013,
Chairman: Collector and District Magistrate of Visakhapatnam, Sri. PRAVIN KUMAR, I.A.S.,

Vision: QUALITY EDUCATION FOR ALL
Mission: TO CREATE A THRIVING COMMUNITY FOR THE DEVELOPMENT OF EDUCATION, CULTURE AND SOCIAL VALUES

Our Ref: B.Sc., Electronics / Semester VI / CBCS / Syllabus / 1507 / dated 15th July 2017

From
Prof. Dr. T. L. Rambabu
Chairman – AU UG Board of Studies in Electronics
Head of the Department of Physics, Electronics and Computer Sconce
Vice Principal

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To
The Registrar
Andhra University
Visakhapatnam 530003

Kind Attention:
The Dean of Academic Affairs
(Legal Section)

Dear Sir

Greetings and Best Wishes

Sub: Submission of B Sc Electronics CBCS Syllabus for Semester VI for 2017 – 2018 – Regarding

Ref:
- Chairmen BOS meeting at Andhra University Physics Department dated 01st July 2017.
- UG BOS in Electronics meeting at Mrs. A V N College dated 03rd July 2017
- Submission of Semester V Syllabus and Model Papers for Semester I, II, III, IV, and V, dated 04th July 2017

As per our discussion and direction, please find the attached structure and syllabus for B.Sc Electronics Semester VI. Total Twelve documents enclosed (Three Electives and Three Clusters, Each Cluster three papers). Thanking You.

Yours Sincerely

(Dr T L Rambabu)

Encl: As mentioned in text (Twelve Papers)

ANDHRA UNIVERSITY – VISAKHAPATNAM

B.Sc., THIRD YEAR ELECTRONICS SYLLABUS FROM 2017 - 2018

SEMESTER VI

Paper VII A (Elective)	ELECTRONIC INSTRUMENTATION	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VII A	ELECTRONIC INSTRUMENTATION LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks
Or		
Paper VII B (Elective)	MICROCONTROLLER AND INTERFACE	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VII B	MICROCONTROLLER AND INTERFACE LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks
Or		
Paper VII C	MODERN COMMUNICATION SYSTEMS	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VII C	MODERN COMMUNICATION SYSTEMS LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks

Cluster 1 (For Elective VII A)		
Paper VIII A 1	ELECTRONIC CIRCUITS AND PCB DESIGNING	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII A 1	ELECTRONIC CIRCUITS AND PCB DESIGNING LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks
Paper VIII A 2	BIO MEDICAL INSTRUMENTATION	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII A 2	BIO MEDICAL INSTRUMENTATION LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks
Paper VIII A 3	CONSUMER ELECTRONICS	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII A 3	CONSUMER ELECTRONICS LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks

Or Cluster 2 (For Elective VII B)		
Paper VIII B 1	EMBEDDED SYSTEMS	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII B 1	EMBEDDED SYSTEMS LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks
Paper VIII B 2	BASIC VLSI DESIGN	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII B 2	BASIC VLSI DESIGN LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks
Paper VIII B 3	COMPUTER NETWORKS	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII B 3	COMPUTER NETWORKS LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks

Or Cluster 3 (For Elective VII C)		
Paper VIII C 1	DIGITAL SIGNAL PROCESSING	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII C 1	DIGITAL SIGNAL PROCESSING LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks
Paper VIII C 2	TRANSMISSION LINES, ANTENNA AND WAVE PROPAGATION	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII C 2	TRANSIMISSION LINES , ANTENNA AND WAVE PROPAGATION LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks
Paper VIII C 3	MOBILE APPLICATION PRGRAMMING	4 HOURS PER WEEK Internal Assessment 25 Marks and External Semester End Examination 75 Marks
Practical VIII C 3	MOBILE APPLICATION PROGRAMMING LABORATORY	3 HOURS PER WEEK External Semester End Examination 50 Marks

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VII A -- Electronic Instrumentation (Elective)

Unit-1

Qualities of Measurement: Specifications of instruments, their static and dynamic characteristics, Error (Gross error, systematic error, absolute error and relative error) and uncertainty analysis. Statistical analysis of data and curve fitting.

Unit -2

Basic Measurement Instruments: PMMC instrument, galvanometer, DC measurement - ammeter, voltmeter, ohm meter, AC measurement, Digital voltmeter systems (integrating and non-integrating types), digital multimeters, digital frequency meter system (different modes and universal counter). Connectors and Probes: low capacitance probes, high voltage probes, current probes, identifying electronic connectors - audio and video, RF/Coaxial, USB etc.

Unit-3

Measurement of Resistance and Impedance: Low Resistance: Kelvin's double bridge method, Medium Resistance by Voltmeter Ammeter method, Wheatstone bridge method, High Resistance by Megger, A.C. bridges, Measurement of Self Inductance, Maxwell's bridge, Hay's bridge, and Anderson's bridge, Measurement of Capacitance, Schering's bridge, DeSauty's bridge, Measurement of frequency, Wien's bridge. A-D and D-A Conversion: 4 bit binary weighted resistor type D-A conversion, circuit and working. Circuit of R-2R ladder. A-D conversion characteristics, successive approximation ADC. (Mention of relevant ICs for all).

Unit-4

Oscilloscopes: CRT, wave form display and electrostatic focusing, time base and sweep synchronization, measurement of voltage, frequency and phase by CRO, Oscilloscope probes, Dual trace oscilloscope, Sampling Oscilloscope, DSO and Powerscope: Block diagram, principle and working, Advantages and applications, CRO specifications (bandwidth, sensitivity, rise time). Signal Generators: Audio oscillator, Pulse Generator, Function generators.

Unit-5

Transducers and sensors: Classification of transducers, Basic requirement/characteristics of transducers, active & passive transducers, Resistive (Potentiometer, Strain gauge - Theory, types, temperature compensation and applications), Capacitive (Variable Area Type - Variable Air Gap type - Variable Permittivity type), Inductive (LVDT) and piezoelectric transducers. Measurement of displacement, velocity and acceleration (translational and rotational). Measurement of pressure (manometers, diaphragm, bellows), Measurement of temperature (RTD, thermistor, thermocouple, semiconductor IC sensors), Light transducers (photoresistors, photovoltaic cells, photodiodes).

Suggested Books:

1. H. S. Kalsi, Electronic Instrumentaion, TMH(2006)
2. W.D. Cooper and A. D. Helfrick, Electronic Instrumentation and Measurement Techniques, Prentice-Hall (2005).
3. Instrumentation Measurement and analysis: Nakra B C, Chaudry K, TMH
4. E.O.Doebelin, Measurement Systems: Application and Design, McGraw Hill Book - fifth Edition (2003).
5. Joseph J Carr, Elements of Electronic Instrumentation and Measurement, Pearson Education (2005)
6. David A. Bell, Electronic Instrumentation and Measurements, Prentice Hall (2013).
7. Oliver and Cage, "Electronic Measurements and Instrumentation", TMH (2009).
8. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier (Buterworth Heinmann-2008).
9. A. K Sawhney, Electrical and Electronics Measurements and Instrumentation, DhanpatRai and Sons (2007).
10. C. S. Rangan, G. R. Sarma and V. S. Mani, Instrumentation Devices and Systems, Tata Mcgraw Hill (1998).

Electronic Instrumentation Laboratory: (Any Six)

1. Design of multi range ammeter and voltmeter using galvanometer.
2. Measurement of resistance by Wheatstone bridge and measurement of bridge sensitivity.
3. Measurement of Capacitance by de' Sautys.
4. Measure of low resistance by Kelvin's double bridge.
5. To determine the Characteristics of resistance transducer - Strain Gauge (Measurement of Strain using half and full bridge.)
6. To determine the Characteristics of LVDT.
7. To determine the Characteristics of Thermistors and RTD.
8. Measurement of temperature by Thermocouples and study of transducers like AD590 (two terminal temperature sensor), PT-100, J- type, K-type.
9. To study the Characteristics of LDR, Photodiode, and Phototransistor: (i) Variable Illumination.
   (ii) Linear Displacement.
10. Characteristics of one Solid State sensor/ Fiber optic sensor

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VII B – MICROCONTROLLER AND INTERFACING (Elective)

Unit-1

Introduction, comparison of Microprocessor and micro controller, Evolution of microcontrollers from 4-bit to 32 bit, Development tools for micro controllers, Assembler-Compiler-Simulator/Debugger.

Unit -2

Microcontroller Architecture:

Overview and block diagram of 8051, Architecture of 8051, program counter and memory organization, Data types and directives, PSW register, Register banks and stack, pin diagram of 8051, Port organization, Interrupts and timers.

Unit-3

Addressing modes, instruction set of 8051: Addressing modes and accessing memory using various addressing modes, instruction set: Arithmetic, Logical, Simple bit, jump, loop and call instructions and their usage. Time delay generation and calculation, Timer/Counter Programming,

Unit -4

Assemble language programming Examples: Addition, Multiplication, Subtraction, division, arranging a given set of numbers in largest/smallest order.

Unit-5

Interfacing and Application of Microcontroller:

Interfacing of – PPI 8255, DAC (0804), Temperature measurement (LM35), interfacing seven segment displays, displaying information on a LCD, control of a stepper Motor (Uni-Polar), Interfacing a 4*3 matrix keypad. Generation of different types of waveforms using DAC.

Text Books:

1. The 8051 microcontroller and embedded systems using assembly and c-kennet j.Ayalam, Dhananjay V.gadre, cengage publishers
2.The 8051 microcontrollers and Embedded systems - By Muhammad Ali Mazidi and Janice Gillispie Mazidi – Pearson Education Asia, 4th Reprint, 2002.

Reference Books:

1. Microcontrollers Architecture Programming, Interfacing and System Design – Raj kamal.
2. The 8051 Microcontroller Architecture, Programming and Application - Kenneth J.Ajala , west publishing company (ST PAUL, NEW YORK, LOS ANGELES, SAN FRANCISCO).
3. Microcontroller theory and application-Ajay V.Deshmukh

Microcontroller and Interfacing Laboratory: (Any Six)

1. Addition and Subtraction of Two 8-Bit numbers.
2. Multiplication and Division of Two 8 Bit numbers.
3. Exchange of Higher and Lower Nibbles in Accumulator.
4. BCD Operation and Reverse and X-OR of given numbers.
5. Addition of Two 8-Bit Numbers (KEIL Software).
6. Addition of Two 16-Bit Numbers (KEIL Software)
7. Subtraction of Two 8-Bit Numbers (KEIL Software).
8. Subtraction of Two 16-Bit Numbers (KEIL Software).
9. Multiplication of Two 8-Bit Numbers (KEIL Software).
10. Program for Swapping and Compliment of 8-Bit Numbers (KEIL Software).
11. Program to find the Largest Number in given Array (KEIL Software).
12. Program to find the Smallest Number in given Array (KEIL Software).
13. Interfacing LED to 8051 Microcontroller (KEIL Software).
14. Interfacing Buzzer to 8051 Microcontroller (KEIL Software).
15. Interfacing Relay to 8051 Microcontroller (KEIL Software).
16. Interfacing Seven Segments to 8051 Microcontroller (KEIL Software).

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VII C -- Modern Communication Systems (Elective)

Unit-1

Advanced Digital Modulation Technique: DPCM, DM, ADM. Binary Line Coding Technique, Multi level coding, QAM (Modulation and Demodulation)

Unit-2

Optical Communication: Introduction of Optical Fiber, Types of Fiber, Guidance in Optical Fiber, Attenuation and Dispersion in Fiber, Optical Sources and Detectors, Block Diagram of optical communication system, optical power budgeting

Unit-3

Cellular Communication: Concept of cellular mobile communication - cell and cell splitting, frequency bands used in cellular communication, absolute RF channel numbers (ARFCN), frequency reuse, roaming and hand off, authentication of the SIM card of the subscribers, IMEI number, concept of data encryption, architecture (block diagram) of cellular mobile communication network, CDMA technology, CDMA overview, simplified block diagram of cellular phone handset, Comparative study of GSM and CDMA, 2G, 3G and 4G concepts.

Unit-4

Satellite communication: Introduction, need, satellite orbits, advantages and disadvantages of geostationary satellites. Satellite visibility, satellite system - space segment, block diagrams of satellite sub systems, up link, down link, cross link, transponders (C- Band), effect of solar eclipse, path loss, ground station, simplified block diagram of earth station.

Unit-5

Satellite access, TDMA, FDMA, CDMA concepts, comparison of TDMA and FDMA, Satellite antenna (parabolic dish antenna), GPS-services like SPS & PPS. Local area networks (LAN): Primary characteristics of Ethernet-mobile IP, OSI model, wireless LAN requirements-concept of Bluetooth, Wi-Fi and WiMAX.

Suggested Books:

1. W. Tomasi, Electronic Communication Systems: Fundamentals through Advanced, Pearson Education, 3rd Edition
2. Martin S. Roden, Analog & Digital Communication Systems, Prentice Hall, Englewood Cliffs, 3 Edition
3. Modern digital and analog Communication systems- B. P. Lathi, 4 Edition 2009 Oxford University press.
4. ThiagarajanVishwanathan, Telecommunication Switching Systems and Networks, Prentice Hall of India.
5. Theodore S. Rappaport, Wireless Communications Principles and Practice, 2 Edition, Pearson Education Asia.

Modern Communication Systems Laboratory
(Any Six):

1. Modulation of LED and detection through Photo detector.
2. Calculation of the transmission losses in an optical communication system.
3. Study of 16 QAM modulation and Detection with generation of Constellation Diagram
4. Study of DPCM and demodulation.
5. Study of DM, ADM
6. Study of architecture of Mobile phone.
7. Study of Satellite Communication System.
8. Study of Optical Fiber Communication System

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII A 1 -- Electronic Circuits and PCB Designing (Cluster 1)

Unit-1

Network theorems (DC analysis only): Review of Ohms law, KirchhofPs laws, voltage divider and current divider theorems, open and short circuits. Thevenin's theorem, Norton's theorem and interconversion, superposition theorem, maximum power transfer theorem.

Unit-2

Semiconductor Diode and its applications: PN junction diode and characteristics, ideal diode and diode approximations. Block diagram of a Regulated Power Supply, Rectifiers: HWR, FWR-center tapped and bridge FWRs. Circuit diagrams, working and waveforms, ripple factor & efficiency (no derivations). Filters: circuit diagram and explanation of shunt capacitor filter with waveforms. Zener diode regulator: circuit diagram and explanation for load and line regulation, disadvantages of Zener diode regulator.

Unit-3

BJT and Small Signal amplifier: Bipolar Junction Transistor: Construction, principle & working of NPN transistor, terminology. Configuration: CE, CB, CC. Definition of a, p and y and their interrelations, leakage currents. Study of CE Characteristics, Hybrid parameters. Transistor biasing: need for biasing, DC load line, operating point, thermal runaway, stability and stability factor. Voltage divider bias: circuit diagrams and their working, Q point expressions for voltage divider biasing. Small signal CE amplifier: circuit, working, frequency response, re model for CE configuration, derivation for Av, Zin and Zout.

Unit-4

Types of PCB: Single sided board, double sided, Multilayer boards, Plated through holes technology, Benefits of Surface Mount Technology (SMT), Limitation of SMT, Surface mount components: Resistors, Capacitor, Inductor, Diode and IC's.

Layout and Artwork: Layout Planning: General rules of Layout, Resistance, Capacitance and Inductance, Conductor Spacing, Supply and Ground Conductors, Component Placing and mounting, Cooling requirement and package density, Layout check. Basic artwork approaches, Artwork taping guidelines, General artwork rules: Artwork check and Inspection.

Unit–5

Laminates and Photo printing: Properties of laminates, Types of Laminates, Manual cleaning process, Basic printing process for double sided PCB's, Photo resists, wet film resists, Coating process for wet film resists, Exposure and further process for wet film resists, Dry film resists Etching and Soldering: Introduction, Etching machine, Etchant system. Principles of Solder connection, Solder joints, Solder alloys, Soldering fluxes. Soldering, Desoldering tools and Techniques.

Suggested Books:

1. Electronic Devices and circuit theory, Robert Boylstead and Louis Nashelsky, 9th Edition, 2013, PHI
2. Electronics text lab manual, Paul B. Zbar.
3. Electric circuits, Joeseph Edminister, Schaum series.
4. Basic Electronics and Linear circuits, N.N. Bhargava, D.C. Kulshresta and D.C Gupta - TMH.
5. Electronic devices, David A Bell, Reston Publishing Company/DB Tarapurwala Publ.
6. Walter C.Bosshart "PCB DESIGN AND TECHNOLOGY" Tata McGraw Hill Publications, Delhi. 1983
7. Clyde F.Coombs "Printed circuits Handbook" III Edition, McGraw Hill.

Electronic Circuits and PCB Designing Laboratory (Any Six):

(Hardware and Circuit Simulation Software)

1. Verification of Thevenin's theorem
2. Verification of Super position theorem
3. Verification of Maximum power transfer theorem.
4. Half wave Rectifier - without and with shunt capacitance filter.
5. Centre tapped full wave rectifier - without and with shunt capacitance filter.
6. Zener diode as voltage regulator - load regulation.
7. Transistor characteristics in CE mode - determination of ri, ro and J3.
8. Design and study of voltage divider biasing.
9. Designing of an CE based amplifier of given gain
10. Designing of PCB using artwork, its fabrication and testing.
11. Design, fabrication and testing of a 9 V power supply with zener regulator

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII A 2 – BIOMEDICAL INSTRUMETATION (Cluster 1)

Unit-1

Biomedical signals & Physiological transducers: Source of biomedical signal, Origin of bioelectric signals, recording electrodes, Electrodes for ECG, EMG & EEG .Physiological transducers: Pressure, Temperature, photoelectric & ultrasound Transducers. Measurement in Respiratory system: Physiology of respiratory system, Measurement of breathing mechanics Spiro meter, Respiratory therapy equipments Inhalators ventilators & Respirators , Humidifiers , Nebulizers Aspirators, Biomedical recorders: ECG, EEG & EMG. MEMS based biosensors

Unit-2

Patient Monitoring systems & Audiometers: Cardiac monitor, Bedside patient monitor, measurement of heart rate, blood pressure, temperature, respiration rate, Arrhythmia monitor, Methods of monitoring fatal heart rate, Monitoring labor activity. Audiometers: Audiometers, Blood cell counters, Oximeter, Blood flow meter, cardiac output measurement, Blood gas analyzers.

Unit-3

Modern Imaging systems: Introduction, Basic principle & Block diagram of x-ray machine, x-ray Computed Tomography (CT), Magnetic resonance imaging system (NMR), ultrasonic imaging system. Eco-Cardiograph, Eco Encephalography, Ophthalmic scans, MRI. Therapeutic Equipments: Cardiac pacemakers, cardiac defibrillators, Hemodialysis machine, surgical diathermy machine.

Unit-4

Patients safety & Computer Applications in Biomedical field: Precaution, safety codes for electro medical equipment, Electric safety analyzer, Testing of biomedical equipment, Use of microprocessors in medical instruments, Microcontrollers, PC based medical instruments, Computerized Critical care units, Planning & designing a computerized critical care unit.

Unit-5

Physiotherapy: Software Diathermy, microwave diathermy, Ultrasound therapy unit. Electrotherapy Equipments, Ventilators.

Suggested Books:

1. Joseph J. Carr & John M. Brown, "Introduction to Biomedical Equipment Technology", Pearson.
2. Shakti Chatterjee, "Textbook of Biomedical Instrumentation System", Cengage Learning
3. Khandpur R. S. - Handbook of Biomedical Instrumentation, TMH
4. Bertil Jacobson & John G. Webster - Medicine and Clinical Engineering, PHI
5. Prof. S.K.VenkataRam-Bio-Medical Electronics and Instrumentation, Galgotia Publiations
6. John G.Webster- Medical Instrumentation-Application and Design Wiley Student Edition)
7. L.Cromwell et al- Biomedical Instrumentation and Measurements PHI

Biomedical Instrumentation Laboratory (Any Six):

1. Characterization of bio potential amplifier for ECG signals.
2. Study on ECG simulator
3. Measurement of heart sound using electronic stethoscope. Study on ECG heart rate monitor /simulator
4. Study of pulse rate monitor with alarm system
5. Determination pulmonary function using spirometer (using mechanical system).
6. Measurement of respiration rate using thermister /other electrodes.
7. Study of Respiration Rate monitor/ apnea monitor
8. Study on ultrasound transducers based on medical system
9. Study of a Pacemaker.
10. Measurement of pulse rate using photoelectric transducer & pulse counting for known period.

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII A 3 – CONSUMER ELECTRONICS (Cluster 1)

Unit-1

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–2

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-3

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-4

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-5

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.

Text Books:

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

Consumer Electronics Laboratory (Any One):

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
5. Assembly and Disassembly of system and printer.

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

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII B 1 – EMBEDDED SYSTEMS (Cluster 2)

Unit–1

Introduction to Embedded Systems: Overview of Embedded Systems, Features, Requirements and Applications, Recent Trends in the Embedded System Design, Common architectures for the Embedded System Design, Embedded Software design issues.

Unit-2

Introduction to microcontrollers, Overview of Harvard architecture and Von Neumann architecture, RISC and CISC microcontrollers

Unit–3

AVR RISC Microcontrollers: Introduction to AVR RISC Microcontrollers, Architecture overview, status register, general purpose register file, memories, Instruction set, Data Transfer Instructions, Arithmetic and Logic Instructions, Branch Instructions, Bit and Bit-test Instructions, MCU Control Instructions. Simple programs in Assembly Language / C Language

Unit– 4

Interrupts and Timer: Introduction to System Clock, Reset sources, Introduction to interrupts, External interrupts, IO Ports, 8-bit and 16-bit Timers, introduction to different modes, Input Capture and Compare Match.

Unit–5

Perpherals: Analog Comparator, Analog-to-Digital Converter, Serial Peripheral Interface (SPI), The Universal Synchronous and Asynchronous serial Receiver and Transmitter (USART), Two Wire Interface (TWI) / I^2C bus

Suggested Books:

1. AVR Microcontroller and Embedded Systems: Using Assembly and C by Muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi, PHI
2. Embedded system Design - Frank Vahid and Tony Givargis, John Wiley, 2002
3. Programming and Customizing the AVR Microcontroller by D V Gadre, McGraw-Hill
4. Atmel AVR Microcontroller Primer: Programming and Interfacing by Steven F. Barrett, Daniel J. Pack, Morgan & Claypool Publishers
5. An Embedded Software Primer by David E Simon, Addison Wesley
6. AVR Microcontroller Datasheet, Atmel Corporation, www.atmel.com

Embedded Systems Laboratory (Experiments to be performed on AVR trainer kit (Any Six):

1. Flash LED at an observable rate.
2. Hello LED - Flash LED at a rate such that the LED appears always on. Estimate the onset of the rate when the LED appears to stay on
3. Controlling ON/OFF of an LED using switch.
4. Use LFSR based random number generator to generate a random number and display it.
5. Toggle the LED every second using Timer interrupt.
6. Use the potentiometer to change the red LED intensity from 0 to maximum in 256 steps.
7. Use the switch to select the LED (from RGB led) and then the potentiometer to set the intensity of that LED and thus create your own color from amongst 16million colors.
8. Read the ADC value of the voltage divider involving the LDR. Print the value on the serial monitor.
9. Use the LDR and estimate a threshold for the LDR value and use that to turn the RGB LED on, to simulate an 'automatic porch light'.
10. Use the thermistor to estimate the temperature and print the raw value on the serial monitor.
11. Connect the LCD I/O Board and print 'Hello World' on the LCD. Scroll display from left to right.
12. Use the on-board EEPROM to store the temperature min and max values together with a time stamp.
13. Speed control of d.c. motor.
14. Speed control of stepper motor.

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII B 2 – BASIC VLSI DESIGN (Cluster 2)

Unit-1

Metal Oxide Semiconductor (MOS): Introduction to basic principle of MOS transistor, large signal MOS models (long channel) for digital design. MOS SPICE model, MOS device layout: Transistor layout, Inverter layout, CMOS digital circuit layout.

Unit-2

MOS Inverter: Inverter principle, Depletion and enhancement load inverters, the basic CMOS inverter, transfer characteristics, logic threshold, Noise margins, Dynamic behavior, Propagation Delay and Power Consumption.

Unit-3

Combinational MOS Logic Design: Static MOS design, Pass Transistor logic, complex logic circuits. Sequential MOS Logic Design - Static latches,

Unit-4

Flip flops & Registers, Dynamic Latches & Registers, CMOS Schmitt trigger, Monostable sequential Circuits, Astable Circuits.

Unit-5

Memory Design: ROM & RAM cells design. Dynamic MOS design- Dynamic logic families and performances. Interconnect & Clock Distribution- Interconnect delays, Cross Talks, Clock Distribution.

Suggested Books:

1. Kang & Leblebigi "CMOS Digital IC Circuit Analysis & Design"- McGraw Hill, 2003.
2. Rabey, "Digital Integrated Circuits Design", Pearson Education, Second Edition, 2003.
3. Weste and Eshraghian, "Principles of CMOS VLSI design" Addison-Wesley, 2002.
4. Basic VLSI design: Douglas A Pucknell, Kamran Eshraghian, PHI, 3^{r} edition

Basic VLSI Design Laboratory

(Any Six):

1. To plot the (i) output characteristics & (ii) transfer characteristics of an n-channel and p-channel MOSFET.
2. To design and plot the static (VTC) and dynamic characteristics of a digital CMOS inverter.
3. To design and plot the output characteristics of a 3-inverter ring oscillator.
4. To design and plot the dynamic characteristics of 2-input NAND, NOR, XOR and XNOR logic gates using CMOS technology.
5. To design and plot the characteristics of a 4x1 digital multiplexer using pass transistor logic.
6. To design and plot the characteristics of a positive and negative latch based on multiplexers.
7. To design and plot the characteristics of a master-slave positive and negative edge triggered registers based on multiplexers.

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII B 3 – COMPUTER NETWORK (Cluster 2)

Unit-1
Introduction to OSI,TCP/IP and other Network models, Examples of Networks, NovelNetworks, Arpanet, Internet, Networktopologies, WAN, LAN, MAN.
Physical Layer: Transmitted media copper,Twistedparewireless,switching and Encoding asynchronuscommunications,Narrowband,Broadband,ISDN& ATM.

Unit-2
Data Link Layer: Design issues, framing, error detection & correction, CRC, elementary protocol-Stop and wait, Sliding window, slip, data link layer in HDLC,Internet,ATM

Unit-3
Medium Access Sub Layer: ALOHA, MAC, Address, Carrier sense multiple access, IEEE 802.X standard Ethernet, Wireless LAN, Bridges.

Unit-4
Network Layer: Virtual circuits and data gram sub nets-routing algorithm, shortest path routing, fooding, Hierarchicalrouting, broadcast, multicast, distance vector routing

Unit-5
Transport Layer: Transport services, Connection management, TCP & UDP protocols, ATM AAL layers protocol
Application Layer - Network security, domain name system, SNMP, Electronic mail, The world web, multimedia

Text Books:
Computer Networks - Andrew S. Tanenbaum,4th Edition,Pearson education

Data communications & Networking -Behrouz A.Forouzan.3rd EditionTMH

References:
An engineering approach to Computer Networks - S. Kesav 2nd Edition,Pearson education

Computer Network Laboratory (Any Six):
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 command
6. Configure a network topology using packet tracer software
7. Configure a network using link state vector routing protocol

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII C 1 DIGITAL SIGNAL PROCESSING (Cluster 3)

Unit-1

Discrete Time systems: Discrete sequences, linear coefficient difference equation, Representation of DTS, LSI Systems. Stability and causality, frequency domain representations and Fourier transform of DT sequences.

Unit-2

Z-Transform: Definition and properties, Inverse Z Transform and stability. Parsevals Theorem and applications.

System Function: signal flow graph, its use in representation and analysis of Discrete Time Systems. Techniques of representations. Matrix generation and solution for DTS evaluations.

Unit-3

Discrete Fourier Transform: DFT assumptions and Inverse DFT. Matrix relations, relationship with FT and its inverse, circular convolution, DFT theorems, DCT. Computation of DFT. FFT

Unit-4

Algorithms and processing gain, Discrimination, interpolation and extrapolation. Gibbs phenomena. FFT of real functions interleaving and resolution improvement. Word length effects.

Unit-5

Digital Filters: Analog filter review. System function for IIR and FIR filters, network representation. Canonical and decomposition networks. IIR filter realization methods and their limitations. FIR filter realization techniques. Discrete correlation and convolution; Properties and limitations.

Suggested Books:

1. A.V. Oppenheim and Schafer, Discrete Time Signal Processing, Prentice Hall, 1989.
2. John G. Proakis and D.G. Manolakis, Digital Signal Processing: Principles, Algorithms and Applications, Prentice Hall, 1997.

Digital Signal Processing Laboratory:

(Scilab/MATLAB/Other Mathematical Simulation software)

1. Generation of unit sample sequence, unit step, ramp function, discrete time sequence, real sinusoidal sequence.
2. Generate and plot sequences over an interval.
3. Given x[n], write program to find X[z].
4. Fourier Transform, Discrete Fourier Transform and Fast Fourier Transform
5. Design of a Butterworth analog filter for low pass and high pass.
6. Design of digital filters.

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII C 2 TRANSIMISSION LINES, ANTENNA AND WAVE PROPAGATION (Cluster 3)

Unit-1

Electromagnetic Wave Propagation: Propagation in Good Conductors, Skin Effect, Reflection of uniform Plane Waves at normal incidence, Plane Wave reflection at Oblique Incidence, Wave propagation in dispersive media, concept of phase velocity and group velocity.

Unit-2

Transmission Lines: Typical Transmission lines- Co-axial, Two Wire, Microstrip, Coplanar and Slot Lines, Transmission Line Parameters, Transmission Line Equations, Wave propagation in Transmission lines, lowloss, lossless line, Distortionless line, Input Impedence, Standing Wave Ratio ,Power. and lossy lines, Shorted Line, Open-Circuited Line, Matched Line, Smith Chart, Transmission Line Applications.

Unit-3

Waveguides and Waveguide Devices: Wave propagation in waveguides, Parallel plate waveguides, TEM, TM and TE modes, Rectangular waveguides, circular waveguides, Power transmission and attenuation, Rectangular cavity resonators, directional couplers, isolator, circulator.

Unit-4

Radiation of electromagnetic waves: Concept of retarded potentials, Antenna Parameters: Radiation Mechanism, Current Distribution on a Thin Wire Antenna, Radiation Pattern, Radiation Power Density, Radiation Intensity, Beamwidth, Directivity, Antenna Efficiency, Gain, Beam Efficiency, Bandwidth, Polarization, Input Impedance Antenna Radiation Efficiency, Effective Length and Equivalent Areas, Maximum Directivity and Maximum Effective Area, Friis Transmission Equation and Radar Range Equation

Types of Antenna: Hertzian dipole, Half wave dipole, Quarter-wave dipole, Yagi-Uda, microstrip, Parabolic antenna, Helical antenna, Antenna array.

Suggested books:

1. M. N. O. Sadiku, Principles of Electromagnetics, Oxford University Press (2001)
2. Karl E. Longren, Sava V. Savov, Randy J. Jost., Fundamentals of Electromagnetics with MATLAB,PHI
3. W. H. Hayt and J.A. Buck, Engineering Electromagnetics, Tata McGraw Hill (2006)
4. D. C. Cheng, Field and Wave Electromagnetics, Pearson Education (2001)
5. J. A. Edminster, Electromagnetics, Schaum Series, Tata McGraw Hill (2006)
6. N. Narayan Rao, Elements of Engineering Electromagnetics, Pearson Education (2006)
7. G. S. N. Raju, Antennas and Propagation, Pearson Education (2001)

Transmission Lines, Antenna and Wave Propagation Laboratory
(Scilab/MATLAB/Other Mathematical Simulation Software) (Any Six)

1. Program to determine the phasor of forward propagating field
2. Program to determine the instantaneous field of a plane wave
3. Program to find the Phase constant, Phase velocity, Electric Field Intensity and Intrinsic ratio
4. Program to find skin depth, loss tangent and phase velocity
5. Program to determine the total voltage as a function of time and position in a loss less transmission line
6. Program to find the characteristic impedance, the phase constant an the phase velocity
7. Program to find the output power and attenuation coefficient
8. Program to find the power dissipated in the lossless transmission line
9. Program to find the total loss in lossy lines
10. Program to find the load impedance of a slotted line
11. Program to find the input impedance for a line terminated with pure capacitive impedance
12. Program to determine the operating range of frequency for TE10 mode of air filled rectangular waveguide
13. Program to determine Directivity, Bandwidth, Beam width of an antenna
14. Program to determine diameter of parabolic reflector
15. Program to find out minimum distance between primary and secondary antenna

Andhra University – Visakhapatnam
B.Sc., Electronics, Semester VI, CBCS, From 2017 - 2018
Paper VIII C 3 MOBILE APPLICATION PROGRAMMING (Cluster 3)

UNIT-1

Introduction: What is mobile Application Programming, Different Platforms, Architecture and working of Android, iOS and Windows phone 8operating system, Comparison of Android, iOS and Windows phone 8.

Android Development Environment: What is Android, Advantages and Future of Android, Tools and about Android SDK, Installing Java, Eclipse, and Android, Android Software Development Kit for Eclipse, Android Development Tool: Android Tools for Eclipse, AVDs: Smartphone Emulators, Image Editing

UNIT-2

Android Software Development Platform: Understanding Java SE and the Dalvik Virtual Machine, Directory Structure of an Android Project, Common Default Resources Folders, The Values Folder, Leveraging Android XML, Screen Sizes, Launching Your Application: The AndroidManifest.xml File, Creating Your First Android Application.

UNIT-3

Android Framework Overview: The Foundation of OOP, The APK File, Android Application Components, Android Activities: Defining the User Interface, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications, Content Providers: Data Management, Android Intent Objects: Messaging for Components, Android Manifest XML: Declaring Your Components.

UNIT-4

Views and Layouts, Buttons, Menus, and Dialogs, Graphics Resources in Android: Introducing the Drawables, Implementing Images, Core Drawable Subclasses, Using Bitmap, PNG, JPEG and GIF Images in Android, Creating Animation in Android. Handling User Interface(UI) Events: An Overview of UI Events in Android, Listening for and Handling Events , Handling UI Events via the View Class, Event Callback Methods, Handling Click Events, Touchscreen Events, Keyboard Events, Context Menus, Controlling the Focus.

UNIT-5

Content Providers: An Overview of Android Content Providers, Defining a Content Provider, Working with a Database. Intents and Intent Filters: Intent, Implicit Intents and Explicit Intents, Intents with Activities, Intents with Broadcast Receivers. Advanced Android: New Features in Android 4.4.

iOS Development Environment: Overview of iOS, iOS Layers, Introduction to iOS application development. Windows phone Environment: Overview of windows phone and its platform, Building windows phone application.

Suggested Books:

1. Beginning Android 4, Onur Cinar , Apress Publication
2. Beginning iOS 6 Development: Exploring the iOS SDK, David Mark, Apress
3. Beginning Windows 8 Application Development, István Novák, Zoltan Arvai, György Balássy and David Fulop
4. Professional Windows 8 Programming: Application Development with C# and XML, Allen Sanders and Kevin Ashley; Wrox Publication
5. Programming with Mobile Applications: Android, iOS, and Windows Phone 7 , Thomas Duffy, Course Technology, Cengage Learning 2013
6. Professional Android 4 Application Development, Reto Meier, Wrox

Mobile Application Programming Laboratory (Any Six)

1. Develop and application that uses GUI components, Font and Colours.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application/
4. Write an application that draws basis graphical primitives on the screen.
5. Develop an application that makes use of database
6. Develop an application that makes use of RSS Feed.
7. Implement an application that impliments Multi threading.
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement and application that creates an alert upon receiving a message.
11. Write a mobile application that created alarm clock.