# BHARATHIAR UNIVERSITY, COIMBATORE

## B.Sc. Electronics and Communication Systems

### Scheme of Examination (CBCS PATTERN)

For candidates admitted during the Academic Year 2015-2016 and onwards

<table>
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<tr>
<th>SEM</th>
<th>Part</th>
<th>Sub Code</th>
<th>Subject and Paper</th>
<th>Instruction Hrs./Week</th>
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@ No University Examinations. Only Continuous Internal Assessment (CIA)
# No Continuous Internal Assessment (CIA). Only University Examinations.

| List of Elective papers (Colleges can choose any one of the paper as electives) |
|-------------------------------|-----|------------------------------|
| Elective – I | A | ASIC Design |
| Elective – I | B | Remote Sensing |
| Elective – I | C | Mobile Computing |
| Elective – II | A | Robotics and Automation |
| Elective – II | B | Programmable Logic Control |
| Elective – II | C | Automotive Electronics |
| Elective - III | A | Industrial Management |
| Elective - III | B | Virtual Instrumentation |
| Elective - III | C | Biomedical Instrumentation |
BASIC ELECTRONICS

Subject Description: This subject is the introductory for electronics, it presents the basic components theorems, devices and circuit

Goals: Enable the students to learn the basics of Electronics

Objectives: Upon completion of the subject, the student should understand the Basic components and its operations. Gain knowledge about Electric and Electronic circuits and Network theorems

UNIT I RESISTORS & INDUCTORS


UNIT II CAPACITORS


UNIT III ELECTRICAL ELEMENTS AND CIRCUITS


UNIT IV NETWORK THEOREMS


UNIT V AC CIRCUITS


TEXT BOOK:

SEMICONDUCTOR DEVICES

Subject Description: This subject is the introductory for electronic devices, it presents the basic components devices and circuits

Goals: Enable the students to learn the basics of Electronic devices

Objectives: Upon completion of the subject, the student should understand the Basic components and its operations Gain knowledge about Electric and Electronic circuits and devices

UNIT I PN JUNCTION DIODE


UNIT II SPECIAL DIODES

Zener diode - VI Characteristics – Breakdown - Backward diode - Varactor diode - Steprecovery diode - Point contact diode - Scott key diode - Tunnel diode - Gunn diode - Impaat diode - PIN diode - PNPN diode.

UNIT III BJT


UNIT IV FET AND UJT

Introduction to FET - Construction and operation of N-channel JFET - Drain characteristics - Comparison of JFET & BJT - Introduction to MOSFET - Enhancement MOSFET – Depletion MOSFET - FET as a voltage variable Resistor(VVR) - Introduction to UJT – Characteristics – UJT as relaxation oscillator - Introduction to PUT – SCR – TRIAC - DIAC

UNIT V OPTOELECTROIC DEVICES

TEXT BOOK:
2. S. L. Kakani, K. C. Bhan Dai “A TEXT BOOK OF ELECTRONICS”.

BASIC ELECTRONICS LAB
(Any 16 Experiments)
1. Study of Multimeter – Checking of components.
2. Measurement of Amplitude, Frequency & Phase difference using CRO.
3. Verification of Ohm’s Law.
5. Resistance in series, parallel and series – Parallel.
6. Voltage and Current dividers
7. Verification of Kirchoff’s Law.
8. Wheatstone Bridge.
9. Verification of Norton’s theorem.
10. Verification of Thevenin’s Theorem.
11. Verification of Millman’s Theorem.
12. Verification of Superposition Theorem.
13. LCR Bridge.
15. Parallel resonance circuit.
17. Transient response of RL Circuit.
22. Verification of Maximum power transfer Theorem
23. Measurement of resistance and capacitance in series and parallel
Core Practical – II

**SEMICONDUCTOR DEVICES LAB**
(Any 16 Experiments)

1. Band Gap energy of Silicon / Germanium Diode.
4. Transistor Characteristics of CE Configuration.
5. Transistor Characteristics of CB Configuration.
6. Transistor Characteristics of CC Configuration.
7. Clipping Circuits.
8. Clamping Circuits.
11. V-I Characteristics of JFET.
12. V-I Characteristics of UJT.
13. UJT as Oscillator.
14. FET as Voltage Variable Resistor (VVR).
15. Characteristics of LDR.
17. Study of IR (Tx & Rx).
18. Study of LED and 7 Segment display.
20. Zener as a Voltage regulator.
21. ON / OFF control of relay using Opto – Couplers.
22. Characteristics of SCR
23. TRIAC Characteristics
PRINCIPLES OF COMMUNICATION SYSTEMS

Subject Description: An important consideration in the design of the subject is to provide knowledge about communication medium, transmitter, receiver and modulation techniques.

Goals: Enable the students to learn the basic principles used in communication systems.

Objectives: After successful completion of the course the students should understand the concepts and techniques in communication systems.

UNIT I WAVE PROPAGATION


UNIT II ANTENNAS


UNIT III MODULATION TECHNIQUES


UNIT IV SINGLE SIDEBAND MODULATION


UNIT V RECEIVER


TEXT BOOKS

DIGITAL PRINCIPLES AND APPLICATIONS

Subject Description: The design of the subject is to impart the knowledge about code conversion, Boolean algebra, logic gates, combinational and sequential logic, and converters.

Goals: Enable the students to design the logical circuits

Objectives: Upon Completion of the subject, the student should be able to Convert one number system to another number system, Construct truth tables for logic gates, Simplify Boolean expression, Write VHDL coding for logic circuits

UNIT I  NUMBER SYSTEM AND CODES


UNIT II  BOOLEAN ALGEBRA AND LOGIC GATES


UNIT III  COMBINATIONAL LOGIC CIRCUITS


UNIT IV  SEQUENTIAL LOGIC CIRCUITS


UNIT V  D/A AND A/D CONVERTERS

Digital to Analog converters: Resistive divider type and Ladder type – Accuracy and Resolution – Analog to Digital converters: Counter – Ramp type – simultaneous conversion – Dual slope type – Successive approximation type – Accuracy and resolution.

TEXT BOOKS

ELECTRONIC CIRCUITS

Subject Description: This subject describes the classification and operation of amplifiers, oscillators, rectifiers, and filter circuits.

Goals: Enable the students to become an electronic technician and circuit designer.

Objectives: Upon completion of the subject, the student should be able to design and troubleshoot the amplifiers, oscillators, power supply, and filters.

UNIT I REGULATORS


UNIT II SMALL SIGNAL AMPLIFIERS


UNIT III POWER AMPLIFIERS

Operation and graphical representation of Class A, Class B, Class C and Class AB amplifiers – Maximum collector efficiency of class A power amplifier – Collector dissipation curve – Harmonic distortion – Class B push pull amplifier – Crossover distortion – Complementary symmetry push pull amplifier.

UNIT IV FEEDBACK AMPLIFIERS

Basic concepts of feedback – Positive feedback – Negative feedback – Effects of negative feedback on gain, bandwidth and distortion – Noise – Voltage series feedback - Voltage shunt feedback – Current series feedback – Current shunt feedback.

UNIT V OSCILLATORS AND MULTIVIBRATORS


TEXT BOOK
COMPUTER ARCHITECTURE AND ORGANIZATION

Subject Description: This subject presents the Modern computer organization, Processor and memory design, Peripherals and recent system architecture.

Goals: Enable the students to learn the newest computer technology and trends.

Objectives: Upon completion of the subject, the student should: Gain the knowledge of Processor and Memory Design and understand the recent computer organization and architecture.

UNIT 1 MODERN COMPUTER ORGANIZATION


UNIT 2 PROCESSOR DESIGN AND DATA PATH

Introduction – Processor role – Processor design goals – Processor design process – Data path organization – Main memory interface – Local storage register file – Data path simple instructions

UNIT 3 MEMORY DESIGN AND MANAGEMENT

Introduction – Memory parameters – Classification of memory – Memory Technology – Main memory allocation – Static RAM IC – Dynamic RAM – ROM logic – Multiple memory decoding – Memory Hierarchy – Main memory drawbacks – Cache memory – Principle of cache – Virtual memory Concept – Advantage of Virtual memory

UNIT 4 COMPUTER PERIPHERALS


UNIT 5 ADVANCED SYSTEM ARCHITECTURE


TEXT BOOK

IC’S AND INSTRUMENTATION

Subject Description: The design of the subject is to impart the knowledge on IC fabrication, Timer, PLL, Op-amp, transducers and electronic instruments.

Goals: Enable the students to acquire the knowledge of IC fabrication, and its application in electronic circuits and know the measurements using electronic instruments.

Objectives: Upon Completion of the subject, the student should understand the IC fabrication, Design circuits with ICs and Gain knowledge about electronic instruments.

UNIT I IC FABRICATION TECHNOLOGY


UNIT II TIMER AND PLL

Functional block diagram of 555 timer – Monostable operation – Applications: – Linear ramp generator – Pulse width modulator – Astable operation – Applications: Schemitt trigger – FSK Generator
Phase locked loop: Functional block diagram – Phase detector / Comparator – Voltage Controlled Oscillator – Low pass filter – Applications: Frequency multiplier/Division – AM detection

UNIT III OPERATIONAL AMPLIFIER


UNIT IV TRANSDUCERS


UNIT V ELECTRONIC INSTRUMENTS


TEXT BOOKS

TELEVISION ENGINEERING

Subject Description : The design of the subject is to impart the knowledge on Television standards, receiver section, sync separator color television with advanced techniques.

Goals : Enable the students to acquire the knowledge about television and its recent Developments.

Objectives : Upon Completion of the subject, the student should acquire knowledge of television standards and be skilled in trouble shooting of television.

UNIT I      TELEVISION STANDARDS


UNIT II     TELEVISION RECEIVER SECTION


UNIT III    SYNC SEPARATOR


UNIT IV     COLOUR TELEVISION


UNIT V      ADVANCE TECHNIQUES


TEXT BOOKS

DIGITAL AND CELLULAR COMMUNICATIONS

Subject Description : An important consideration in the design of the subject is to enhance the knowledge in communication with digital and cellular systems

Goals : Enable the students to learn the digital and cellular technology

Objectives : After successful completion of the course the students understand the Digital carrier modulation and Quantization, Gain knowledge about Cellular systems

UNIT I DATA TRANSMISSION


UNIT II COMMUNICATION SYSTEM

Model of communication system – Elements of digital communication system: Information source, Source encoder/decoder, Communication channel, Modulator, Demodulator, Channel encoder/decoder, other functional blocks – Analysis of communication system – Design of communication system.

UNIT III DIGITAL CARRIER MODULATION SCHEMES


UNIT IV PULSE MODULATION AND QUANTIZATION


UNIT V DIGITAL CELLULAR SYSTEMS


TEXT BOOKS

DIGITAL ELECTRONICS LAB

(ANY 16 EXPERIMENTS)

1. Verification of basic gates and universal gates
2. Verification of Demorgan’s Theorem
3. 2-bit comparator using gates
4. Half adder and full adder
5. Half subtractor and full subtractor
6. 4-bit binary adder
7. Multiplexer and De multiplexers
8. Encoder and Decoder
9. BCD to 7-segment Display
10. Study of Flip Flops
11. Binary to Grey and Grey to Binary conversion
12. Shift registers and Ring counter
13. Analog to Digital converter
14. Digital to Analog converter
15. Op-Amp: adder and subtractor
16. Op-Amp: integrator and differentiator
17. Current to Voltage and Voltage to Current
18. IC 555: Monostable multivibrator
19. IC 555: Astable multivibrator
20. VCO using IC 555
21. Design and Simulation of Basic Logic Gates using VHDL Coding
22. Design and Simulation of Universal Logic Gates using VHDL Coding
23. Design and Simulation of Adder Circuits using VHDL Coding
ELECTRONIC CIRCUITS, RADIO, TV AND INSTRUMENTATION LAB

(ANY 16 EXPERIMENTS)

ELECTRONIC CIRCUITS

1. DC regulated power supply using Zener diode
2. Voltage doubler
3. Feedback amplifier
4. Emitter follower
5. Transformer coupled amplifier
6. Hartley Oscillator
7. Colpitts oscillator
8. Phase shift Oscillator
9. Wein Bridge oscillator
10. RC coupled amplifier
11. Half wave and full wave rectifier
12. Filter circuits

RADIO, TV AND INSTRUMENTATION LAB

1. Amplitude modulation and Detection
2. Frequency modulation and Detection
3. First IF Amplifier
4. Second IF Amplifier
5. Audio Amplifier using TBA 810
6. Alignment of Color Television Using Video Pattern Generator
7. Sync Separator
8. Vertical Section and Horizontal Section fault of a TV Receiver
9. Video Amplifier Fault
10. EHT Generation
11. Temperature Measurement Using Thermistor
12. Displacement Measurement Using LVDT
13. Weighing machine Using Load Cell
14. Instrumentation Amplifier
15. Characteristics of Photo Voltaic cell (solar cell)
VISUAL PROGRAMMING

Subject Description : The subject presents windows programming, visual basic programming, Visual c++ programming, ODBC and GUI

Goals : Enable the students to learn the Visual programming

Objectives : After successful completion of the course the students student acquire knowledge about visual programming and able to program the applications using VB and VC++

UNIT I

UNIT II

UNIT III

UNIT IV
Communicating with other window applications – Database development with Visual Basic (DAO, RDO) – Building ActiveX controls – OLE.

UNIT V
VC++ Fundamentals – Using Visual Studio’s IDE – Menus – Writing, Compiling and Debugging simple programs – Building a basic application – Types – Overview of MFC.

TEXT BOOKS

REFERENCES
8085 MICROPROCESSOR AND APPLICATIONS

Subject Description: This subject presents the architecture, Programming in 8085ALP and real world applications of the 8085 microprocessor.

Goals: To enable the students to learn the instruction set, programming, and interfacing concepts of 8085 microprocessor.

Objectives: On successful completion of this course the students should have: Developed the programming skills in 8085ALP, understood the interfacing concept memory, & I/O devices. Understood the concept of microprocessor based system design.

UNIT I INTRODUCTION TO 8085

Pin Diagram – Architecture – Demultiplexing the bus – Generation of control signals – Fetching, decoding and execution of instruction – Instruction timing and operation status.

UNIT II INSTRUCTION SET AND ADDRESSING MODES

Instruction set – Addressing modes – Instruction format – Simple program – Memory Read machine cycle – Memory write machine cycle.

UNIT III INTERFACING CONCEPTS


UNIT IV PARALLEL AND SERIAL INTERFACE


INTERRUPT AND TIMER LOGIC


UNIT V APPLICATIONS


TEXT BOOKS

1. R.S.Gaonkar “Microprocessor Architecture, Program And Its Application With 8085”, New Age International (P) Ltd.
INDUSTRIAL AND POWER ELECTRONICS

Subject Description: This subject presents the principles and applications of industrial and power electronics.

Goals: To enable the students to learn and design industrial & power electronic circuits.

Objectives: On successful completion of the course the students should have: Developed the circuit designing skills power electronics. Understood the concept industrial electronics system design.

UNIT I


UNIT II


UNIT III


UNIT IV

Application in industrial systems: Thermostat control of quench oil temperature – proportional mode pressure control system – strip tension controller – automatic weighing system – control of relative humidity in a textile moistening process – warehouse humidity controller.

UNIT V


Microprocessor based industrial applications: Speed control of DC motor – measurement of physical quantities – water level indicator – firing angle control of thyristor.

TEXT BOOKS

INTERNET & JAVA PROGRAMMING

Subject Description: The design of the subject is to provide knowledge about internet, Java data types, classes and files

Goals: Enable the students to learn the internet concept and Java programming systems

Objectives: After successful completion of the course the students should Gain knowledge about the concepts of Internet and able to program the applications using Java

UNIT I

Internet – Introduction- Understanding Internet- Internet Addressing - Hardware Requirements to Connect to the Internet

UNIT II

Data types, Arrays, Operators, Flow control – Branching, Looping

UNIT III

Classes – New Operator, Dot Operator, Method Declaration and Calling, Constructors, This In Constructors, Inheritance, Super, Method Overriding Final, Finalize, Static, Package and Import Statement, Interface and Implements

UNIT IV

Exception Handling – Exception Types, Uncaught and Calling, Nested Try Statements, Java Thread Model, and Thread, Runnable, Thread Priorities, Synchronization, Deadlock

UNIT V


TEXT BOOKS

SATELLITE AND NETWORK COMMUNICATION SYSTEMS

Subject Description : An important consideration in the design of the subject is to provide orbital aspects, space craft and satellite system, data communication, network protocols and LAN.

Goals : Enable the students to learn the digital and cellular technology

Objectives : After successful completion of the course the students should: Understand the Digital carrier modulation and Quantization, Gain knowledge about Cellular systems enhance the knowledge in communication with satellite and network systems

UNIT I  ORBITAL ASPECTS


UNIT II  SPACE CRAFT


UNIT III  DATA COMMUNICATION


UNIT IV  NETWORKS PROTOCOLS AND OSI MODEL


UNIT V  LOCAL AREA NETWORKS

Introduction – Primary Attributes Of A LAN- Broadband And Base Band LANS – IEEE LAN Standards – Relationship Of The 802 Standards To The ISO/CCITT Mode 1 – Connection Options With LANS LLC And Mac Protocol Data Units- LAN Topologies And Protocols – CSMA/CD and IEEE 802.3 – Token Ring and IEEE 802.5 – Token Bus and IEEE 802.4 – Concept of MAN and WAN

TEXT BOOKS

8051 MICROCONTROLLER AND EMBEDDED SYSTEMS

Subject Description: This subject presents the architecture, Programming in ALP & C and real world applications of the 8051 microcontroller.

Goals: To enable the students to learn the instruction set, programming, and interfacing concepts of 8051 microcontroller.

Objectives: On successful completion of the course the students should have: Developed the programming skills in 8051ALP Understood the concept of Embedded C programming Understood the concept of embedded system design

UNIT I OVERVIEW AND INSTRUCTION SET

Microcontrollers and embedded processors – microcontrollers for embedded systems – overview of 8051 family – 8051 instruction set and registers.

UNIT II ASSEMBLY PROGRAMMING & ADDRESSING MODES

Introduction to 8051 assembly programming – the program counter and ROM – Data types and directives – flag bits and PSW register – register bank and stack – loop and Jump instructions – I/O port programming – addressing modes.

UNIT III ARITHMETIC AND LOGICAL OPERATIONS IN ALP & C

Arithmetic instructions and programs – unsigned addition and subtraction and unsigned Multiplication and division – logic instructions and programs – single bit instructions and programming. Programming with C: Data types – time delay programming – I/O programming – logic operations arithmetic operations

UNIT IV 8051 INTERRUPTS & PERIPHERALS


UNIT V REAL WORLD APPLICATIONS

Interfacing LCD to the 8051 – interfacing ADC – interfacing sensors to 8051 – interfacing Stepper motor – 8051 interfacing to the keyboard – interfacing DAC to the 8051

TEXT BOOK

SEM – V & VI

MICRO PROCESSOR AND MICROCONTROLLER LAB

(ANY 16 EXPERIMENTS)

8085 MICROPROCESSOR LAB

1. Addition / subtraction of 8 / 16 bit data.
2. Multiplication / division 8 bit data.
3. Block data transfer.
4. Smallest / largest of N numbers.
5. To arrange in ascending / descending order.
6. Sum of N 8 bit numbers.
7. 1’s and 2’s compliment of an array (8 bit).
8. UP/DOWN counter using 7 segment displays.
10. Data transfer using 8255 (PPI).
11. Square wave generator using 8255.
12. ADC interface.
13. DAC interface.

8051 Microcontroller Lab

15. Arithmetic and Logical Programs
16. Key Interface
17. LED Interface
18. Solid State Relay Interface
19. Square wave Generation
20. ADC interface.
21. DAC interface.
22. Stepper motor interface
23. LCD Interface
INDUSTRIAL AND POWER ELECTRONICS LAB

(ANY 16 EXPERIMENTS)

1. Triggering of SCR by R, C and Diac.
2. Design of snubber circuit.
3. Fan regulator using Triac.
4. Thyristor chopper.
5. TRIAC Flasher.
7. Speed control of DC motor using SCR.
8. Automatic street light controller.
9. Burglar Alarm
10. Sequencer Circuit.
11. Power Inverter
12. Switching Regulators
13. Automatic Battery Charger
14. Fire alarm
15. ON / OFF relay control using opto – coupler
16. Servo stabilizer
17. Layout and Art Work preparation for PCB
18. Etching Drilling and Component mounting of PCB
21. Phase Control Circuit
22. Cycloconverter
23. Thyristor protection circuit
ELECTRONIC COMMUNICATION LAB

(ANY 16 EXPERIMENTS)

1. Pulse Amplitude Modulation (PAM) and Detection
2. Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM)
3. Generation and Detection of PCM
4. Generation of delta and Adaptive delta modulation
5. Amplitude Shift Keying
6. Frequency Shift Keying
7. Phase Shift Keying
8. QPSK
9. DPSK
10. Study of TDM/FDM
11. Full duplex communication model
12. Alignment of satellite receiver
13. Study of GPS Handset
14. Study of GSM Module
15. PIN Diode Characteristics
16. Laser Diode Characteristics
17. Fiber Optics Tx and Rx
18. Signal Sampling and Reconstruction
19. GUNN diode Oscillator
20. Reflex Klystron Characteristics using microwave bench
22. Radiation pattern of Dipole & Yagi Uda antennas
23. Radiation pattern Loop & array antennas
VISUAL AND JAVA PROGRAMMING LAB

VISUAL PROGRAMMING (ANY 8 EXPERIMENTS)

2. Working with Intrinsic Control and Active X controls.
3. Create an Application with multiple forms and dialogs.
4. Write a VB program to design an e-mail registration form.
5. Create an Application with Menu editor.
6. Create an Application with DAO controls
7. Create an Application using Common dialogs.
8. Write a program for Drag and Drop Events.
9. Create a Database for library management using ADD controls.
10. Creating an application using Active X control.
11. Create a Scientific calculator in VB.
12. Develop a VB application to either link or embed MS Word document to an OLE control.
13. Display Student information using Grid control.
15. Develop an application to perform the following operation in the Employee table using DAO.
   i)   Add a new Record.
   ii)  Delete a Record.
   iii) Modify a Record.

JAVA PROGRAMMING (ANY 8 EXPERIMENTS)

1. Program to print the following triangle of numbers
   
   1
   12
   123
   1234

2. Defining a class with the following attributes 1. xname 2. Date of Birth 3. Date on which leg injection has to be given (sixty days from date of birth) 4. xdate on which polio drops is to be given (45 days from Date of birth). Write a constructor to construct the baby object. The constructor must find out the leg and polio drops dates from the date of birth. In the main program define a baby and display its details.

3. Program to create and display a message on the window.

4. Program to draw several shapes in the created window.

5. Program to create an applet and draw gridlines.

6. Java program to create a frame with two buttons called father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother similar details of mother appear.

7. Java program to create a frame with four text fields for name, age and qualification and a text field of multiple lines for address.

8. Program to draw circle, ellipse, square and rectangle at the mouse click position.
9. Java program to create four text fields for the name, street, city and pin code with suitable labels. Also add a button called my details, when you click the button your name, street, city and pin code must appear in the text fields.

10. Java program to demonstrate the multiple selection list boxes.

11. Program to create a canvas which displays a clock with hour hand and a minute hand depending upon an int variable minutes. Write another program with a frame, which displays the clock canvas. It must also have three buttons, tick, reset and close. When we click reset, the clock must reset to 12 hrs. When we click close, the frame closes.

12. Java program to create a menu bar and pull down menus.

13. Java program to create a window when we press M or m the window displays Good Morning A or a the window displays Good Afternoon E or e the window displays Good Evening N or n the window displays Good Night.

14. Java program to move different shapes (Circle, Ellipse, Square, and Rectangle) according to the arrow key pressed.

15. Program to handle the divide by zero exception.

16. Program to explain the multithreading with the use of multiplication tables. Three threads must be defined and each one must create one multiplication table; they are 5 tables, 7 tables and 13 table.

17. Program to illustrate thread priority. Create three threads and assign three different priorities.
ASIC DESIGN

UNIT – I: INTRODUCTION TO ASICS

UNIT – II: CMOS LOGIC

UNIT – III: ASIC DESIGN

UNIT II VHDLM
Introduction to VHDL – Behavioral, Data Flow and Structural Model - Operators – Data objects - Data types - Design examples.

UNIT III VERILOG
Introduction- Language elements- Gate-level modeling- data flow- Behavioral- structural modeling – Modeling examples

TEXT BOOKS

REFERENCES
4. www-ee.eng.hawaii.edu/~msmith/ASICs/HTML/ASICs.htm
REMOTE SENSING

UNIT I PRINCIPLES OF REMOTE SENSING

Remote sensing system and its components, Electromagnetic spectrum, definition of emissivity, reflectance, absorbance and transmittance. Spectral signature, atmospheric window, active and passive remote sensing systems. Interaction of electromagnetic energy with atmosphere and earth features, factors affecting the reflectance.

UNIT II PLATFORMS AND SENSORS

Airborne and space platforms, Advantages and disadvantages of each, principle and functioning of camera, films, multi-spectral, thermal & line scanners, side looking airborne radars, and hyperspectral sensors. Different satellite and sensor combinations: LANDSAT, SPOT, IRS series of satellites and sensors. Their important characteristics such as flight altitude, IFOV, spatial resolution, swath, spectral bands, and repetivity.

UNIT III IMAGE CHARACTERISTICS AND INTERPRETATION

Differences between aerial and space borne imagery, Elements of visual interpretation of images, radiometric processing including correction of instrumental artifacts and atmospheric corrections; geometric corrections and registration. Geometric enhancement including spatial filtering, edge detection and enhancement.

UNIT IV DIGITAL IMAGE PROCESSING

Image Transformations such as subtraction, rationing, NDVI and PCA, Thematic classification and clustering to include unsupervised and supervised classification based on minimum distance and maximum likelihood classification; accuracy assessment of classification. Concepts of hyperspectral image analysis.

UNIT V ANCILLARY DATA SOURCES AND INTEGRATION

Ground truth, Geographic and Radiometric, Introduction of GIS, Integration of Remote sensing and GIS, Digital terrain models, GPS and its role to remote sensing data.

TEXT BOOKS

2. Curran, Paul J., Principles of Remote sensing
5. Reddy, M. Anji, Remote sensing and Geographic Information System
MOBILE COMPUTING

UNIT I  INTRODUCTION


UNIT II  WIRELESS NETWORKS


UNIT III  MOBILE NETWORK LAYER


UNIT IV  MOBILE TRANSPORT LAYER

Traditional TCP- Indirect TCP- Snooping TCP- Mobile TCP- Fast retransmit/ Fast Recovery-Transmission/Timeout Freezing – Selective Retransmission- Transaction Oriented TCP

UNIT V  WAP


TEXT BOOKS

ROBOTICS AND AUTOMATION

UNIT I CLASSIFICATION OF ROBOTIC SYSTEMS


UNIT II SENSORS AND VISION SYSTEMS

Types of sensors, tactile sensors, proximity sensors and speed sensors – Encoder, resolvers. Vision systems: Image processing and analysis, Segmentation, Feature extraction, Object Recognition.

UNIT III ROBOT PROGRAMMING & AUTOMATION

Lead through programming - Textual programming, programming examples - Social and Economical Aspects of Robots - Typical layouts of robots in Industries. AUTOMATION: Advantages of automation, building blocks of automation. Automatic feeding lines, material-handling devices, ASRS, transfer lines, automatic inspection, intelligent automation.

UNIT IV PROGRAMMABLE LOGIC CONTROLLERS (PLC)

Basics of PLC, Architecture of PLC, Advantages, Types of PLC, Types of Programming - Simple process control program's using Relay Ladder Logic. Introduction to PLC networking. Introduction to HMI, DCS and SCADA systems.

UNIT V COMPUTER NUMERICAL CONTROL (CNC)

Block diagram of a CNC control system, Advantages, Power supply, CPU. CNC and PLC interfacing, Control loops. Feed back devices in CNC machine, analog and digital CNC systems. Introduction to FMS.

TEXT BOOK

REFERENCES
PROGRAMMABLE LOGIC CONTROL

UNIT I

Programmable Logic Introduction, programmable Logic structures Programmable Logic Arrays (PLAs), Programmable Array Logic (PALs), Programmable Gate Arrays (PGAs), Field Programmable Gate Arrays (FPGAs) Sequential network design with Programmable Logic Devices (PLDs) Design of sequential networks using ROMs and PLAs Traffic light controller using PAL.

UNIT II

Programmable Logic Controllers (PLCs) Introduction Parts of PLC Principles of operation PLC sizes PLC hardware components I/O section Analog I/O section Analog I/O modules, digital I/O modules CPU Processor memory module Programming devices Diagnostics of PLCs with Computers.

UNIT III

PLC programming Simple instructions Programming EXAMINE ON and EXAMINE OFF instructions Electromagnetic control relays Motor starters Manually operated switches Mechanically operated and Proximity switches Output control devices Latching relays PLC ladder diagram Converting simple relay ladder diagram in to PLC relay ladder diagram.

UNIT IV

Timer instructions ON DELAY timer and OFF DELAY timer counter instructions Up/Down counters Timer and Counter applications program control instructions Data manipulating instructions math instructions.

UNIT V

Applications of PLC Simple materials handling applications Automatic control of warehouse door Automatic lubricating oil supplier Conveyor belt motor control Automatic car washing machine Bottle label detection Process control application.

Text Books
3. Siemens “PLC Handbook “.

Reference
AUTOMOTIVE ELECTRONICS

UNIT I

**Introduction:** Automotive component, operation, Electrical wiring terminals and switching, multiplexed wiring systems, Circuit diagrams and symbols. Charging Systems and Starting Systems: Charging systems principles, alternations and charging circuits, New developments, requirements of the starting system, Basic starting circuit.

UNIT II


UNIT III

**Instrumentation Systems:** Introduction to instrumentation systems, various sensors used for different parameters, sensing Driver instrumentation systems, vehicle condition monitoring trip computer, different types of visual display

UNIT IV

**Electronic control of braking and traction:** introduction and description control elements and control methodology, Electronic control of Automatic Transmission: Introduction and description Control of gear shift and torque converter lockup, Electric power steering, Electronic clutch.

UNIT V

**Engine Management Systems:** Combined ignition and fuel management systems, Exhaust emission control, Digital control techniques, complete vehicle control systems, Artificial intelligence and engine management, Automotive Microprocessor uses. Lighting and Security Systems: Vehicles lighting Circuits, Signaling Circuit, Central locking and electric windows security systems, Airbags and seat belt tensioners, Miscellaneous safety and comfort systems

TEXT BOOK
1. TOM DENTON, Automobile Electrical and Electronic Systems, Edward Arnold ph., 1995

REFERENCES
2. WILLIAM, T.M., Automotive Mechanics, McGraw Hill Book Co.,
INDUSTRIAL MANAGEMENT

UNIT I

**PRINCIPLES OF MANAGEMENT:** Meaning, definition and significance of management, basic functions of management - planning, organizing, staffing, directing and controlling. Engineers and organizational environment - social, economic, technological and political. Social responsibility of Engineers.

**MANAGEMENT CONCEPTS:** MBO, Theory Z, Kaizen, Six Sigma, Quality Circles and TQM.

UNIT II

**BUSINESS PROCESS REENGINEERING:** Need for BPR, various phases of BPR, production and productivity - factors influencing productivity.

**ORGANIZATIONAL BEHAVIOUR:** Significance of OB, role of leadership, personality and motivation. Attitudes, values and perceptions at work.

UNIT III

**INDUSTRIAL AND BUSINESS ORGANISATION:** Growth of industries (Small scale, medium scale and large scale industries). Forms of business organizations. Resource management – Internal and external sources.

**MATERIALS MANAGEMENT:** Importance and scope of materials management, purchase procedure, inventory control and systems for inventory control – ROL, EOQ, MRP, ABC Analysis, VED, FSN and Value Analysis.

UNIT IV

**MARKETING MANAGEMENT:** Definition and approaches to marketing management - marketing environment. The marketing process. Marketing mix, advertising, sales promotion and consumer behavior.

**HUMAN RESOURCE MANAGEMENT:** Importance, objectives and functions, job analysis and recruitment, selection and placement, training and development - case discussion.

UNIT V

**JOB EVALUATION:** Meaning and methods of job evaluation. Performance appraisal - meaning and methods of performance appraisal.

**WELFARE IN INDUSTRY:** Working condition, service facilities, legal legislation - Factories Act, 1948 and Workmen’s Compensation Act.

TEXT BOOKS

REFERENCES
VIRTUAL INSTRUMENTATION

UNIT I  INTRODUCTION

General functional description of a digital instrument - Block diagram of a Virtual Instrument - Physical quantities and Analog interfaces - Hardware and Software - User interfaces - Advantages of Virtual instruments over conventional instruments - Architecture of a Virtual instrument and its relation to the operating system.

UNIT II  SOFTWARE OVERVIEW

LabVIEW - Graphical user interfaces - Controls and Indicators - ‘G’ programming - Labels and Text - Shape, Size and Color - Owned and free labels - Data type, Format, Precision and representation - Data types - Data flow programming - Editing - Debugging and Running a Virtual instrument - Graphical programming palettes and tools - Front panel objects - Functions and Libraries.

UNIT III  PROGRAMMING STRUCTURE

FOR loops, WHILE loops, CASE structure, formula nodes, Sequence structures - Arrays and Clusters - Array operations - Bundle - Bundle/Unbundle by name, graphs and charts - String and file I/O - High level and Low level file I/O's - Attribute modes Local and Global variables. OPERATING SYSTEM AND HARDWARE OVERVIEW: PC architecture, current trends, Operating system requirements, Drivers – Interface Buses – PCI Bus – Interface cards – specification – Analog and Digital interfaces – Power, Speed and timing considerations.

UNIT IV  HARDWARE ASPECTS

Installing hardware, Installing drivers - Configuring the hardware - Addressing the hardware in LabVIEW - Digital and Analog I/O function - Data Acquisition - Buffered I/O - Real time Data Acquisition.

UNIT V  LABVIEW APPLICATIONS

IMAQ - Motion Control: General Applications - Feedback devices, Motor Drives - Instrument Connectivity - GPIB, Serial Communication - General, GPIB Hardware & Software specifications - PXI / PC1: Controller and Chassis Configuration and Installation.

TEXT BOOKS

REFERENCES
SEM – VI

Elective III - C

BIOMEDICAL INSTRUMENTATION

Subject Description: This subject presents various bio-potentials and working principles of medical instruments.

Goals: To enable the students to learn about bio-potentials and medical instruments.

Objectives: On successful completion of the course the students should have: Understood the concept of bio-potential, Understood the concept of medical instruments and Develop the troubleshooting skills of medical instruments.

UNIT I BASIC PHYSIOLOGY

Cells and their structures - Transport of ions through cell membrane - Resting and excited state transmembrane potential - Action potential - Propagation of Bioelectric potential - Nervous system - Physiology of muscles - Heart and Blood circulation.

UNIT II ELECTRODES AND TRANSUCDERS

Basic electrode theory - Micro electrodes - Skin surface electrodes - Needle electrodes - Equivalent circuit - Electrode materials - Chemical electrodes - Reference electrodes - The pH electrode - Blood gas electrode - Active transducers and passive transducers - Strain gauges – Thermistor.

UNIT III SIGNAL CONDITIONERS & DIAGNOSTIC EQUIPMENTS


UNIT IV DIAGNOSTIC EQUIPMENTS & BIOTELEMETRY

X-ray imaging - Radio fluoroscopy - Image Intensifiers - Angiography - Endoscopy – Diathermy. BIOTELEMETRY AND PATIENT SAFETY: Need for biotelemetry - Elements of telemetry system - Radio telemetry system - Physiological signals used in telemetry - TDM and FDM - Implantable units.

UNIT V PHYSIOLOGICAL ASSIST DEVICES


TEXT BOOKS


REFERENCES