

**MANONMANIAM SUNDARANAR UNIVERSITY  
TIRUNELVELI**

**UG COURSES – AFFILIATED COLLEGES**

**B.Sc. Electronics  
(Choice Based Credit System)**

**(with effect from the academic year 2016-2017 onwards)**

**(45<sup>th</sup> SCAA meeting held on 09.02.2017)**

| Se<br>m. | Pt. I<br>/II/II<br>I/IV/<br>V | Sub.<br>No. | Subject<br>status                            | Subject Title  | Hrs./<br>Week | Cre-<br>dits | Marks   |      |      |                    |      |
|----------|-------------------------------|-------------|--|--|---------------|--------------|---------|------|------|--------------------|------|
|          |                               |             |  |  |               |              | Maximum |      |      | Passing<br>minimum |      |
|          |                               |             |  |  |               |              | Int.    | Ext. | Tot. | Ext.               | Tot. |
| V        | III                           | 29          | Core - 6                                     | Microprocessors and<br>Microcontrollers  | 4             | 4            | 25      | 75   | 100  | 30                 | 40   |
|          |                               | 30          | Core – 7                                     | Medical Electronics  | 4             | 4            | 25      | 75   | 100  | 30                 | 40   |
|          |                               | 31          | Core - 8                                     | Mathematics for<br>Electronics   | 4             | 4            | 25      | 75   | 100  | 30                 | 40   |
|          |                               | 32          | Major<br>Practical -5                        | Microprocessors and<br>Microcontrollers Lab  | 8             | 4            | 50      | 50   | 100  | 20                 | 40   |
|          |                               | 33          | Major<br>Elective –II<br>(Select any<br>one) | A)Television<br>Engineering<br>B)Communication<br>System                           | 6             | 5            | 25      | 75   | 100  | 30                 | 40   |
|          | IV                            | 34          | Skill Based<br>subject<br>(Common)           | Personality<br>Development/<br><br>Effective<br>Communication/<br>Youth Leadership | 4             | 4            | 25      | 75   | 100  | 30                 | 40   |
|          |                               |             |  | Subtotal   | 30            | 25           |         |      |      |                    |      |

| Se<br>m. | Pt. I<br>/II/II<br>I/IV/<br>V | Sub.<br>No. | Subject<br>status      | Subject Title   | Hrs./<br>Week | Cre-<br>dits | Marks   |      |      |                    |      |
|----------|-------------------------------|-------------|------------------------|---|---------------|--------------|---------|------|------|--------------------|------|
|          |                               |             |                        |   |               |              | Maximum |      |      | Passing<br>minimum |      |
|          |                               |             |                        |   |               |              | Int.    | Ext. | Tot. | Ext.               | Tot. |
| VI       | III                           | 35          | Core - 9               | Power Electronics   | 4             | 4            | 25      | 75   | 100  | 30                 | 40   |
|          |                               | 36          | Core - 10              | Semiconductor<br>Fabrication<br>Technology                  | 4             | 4            | 25      | 75   | 100  | 30                 | 40   |
|          |                               | 37          | Core - 11              | Robotics  | 4             | 4            | 25      | 75   | 100  | 30                 | 40   |
|          |                               | 38          | Core - 12              | Mobile<br>Communication                                     | 4             | 4            | 25      | 75   | 100  | 30                 | 40   |
|          |                               | 39          | Major<br>Practical -6  | Power Electronics<br>and System Design<br>Lab               | 8             | 4            | 50      | 50   | 100  | 20                 | 40   |
|          |                               | 40          | Major<br>Elective -III | A) Hardware<br>Development<br>B) Embedded<br>System & RTO'S | 6             | 5            | 25      | 75   | 100  | 30                 | 40   |
|          |                               |             | Subtotal               | 30  | 25            |              |         |      |      |                    |      |

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-V/ Ppr.no.29/ Core - 6**

**MICROPROCESSORS AND MICROCONTROLLERS**

**UNIT I**

Architecture of 8085 -Instruction set – Data Transfer, Arithmetic, Logical, Branching and I/O Instruction, Instruction types- various Addressing Modes. Different 8 bit & 16 bit processors Z80, MC 6800 & INTEL 8086, Timing sequence- Instruction cycle- Machine cycle- Halt wait state-. ALP- Mnemonic - simple Assembly language program flow chart stack and subroutines- Interrupts.

**UNIT II**

Peripheral device – Programmable peripheral Interface (8255 A) - Programmable Interrupt controller (8259 A) - USART- Serial Communication Interface. Programmable DMA Controller (8257), Interfacing –Analog to Digital Converter- Digital to Analog Converter-Traffic Light Controller- Stepper Motor – Key Board & Display Interface.

**UNIT III**

Intel 8051 microcontroller – Block Diagram, pin out – oscillator and clock – Program Counter and Data pointer, A and B registers, flags and program status word – Internal RAM – the Stack and Stack pointer –special functions registers – Internal ROM – I/O Pins, ports and circuits – External memory. Counters, Timers and Addressing Modes  
Timer counter interrupts – Timing – Timer – Modes of operation – Counting – Addressing.

**UNIT IV**

Data exchanges – Logical operations – Byte level operation – Bit level logical operations – Rotate and swap operations – Arithmetic operations – Jump and call instructions – Jump and call program range – Jumps – Calls and subroutines – Interrupts and return.

**UNIT V**

Assembly Language programming for 8051 Micro controller family – Programs 8–Bit addition – 8–Bit subtraction – 8–Bit Multiplication – 8–Bit Division - Greatest and smallest number in an array – ascending and Descending – Delay –Routines – Calculation of Time delay – Block data transfer. Interfacing Keyboard –Scanning programs for small keyboards – Interfacing LED, LCD Display – Pulse measurement and pulse width measurement – A/D and D/A Interfacing.

## REFERENCE BOOKS

1. Microprocessor and Interfacing: Programming and Hard ware, Douglas V.Hall,Mc GrawHill, New York (1988)
2. Microprocessor Architecture Programming and applications with 8085/ 8080A. S.Ramesh Goankar, Wiley Eastern Limited(1986)
3. Digital systems & Microprocessor Douglas V.Hall, Mcgraw Hill.
4. Microprocessor- Srinath, PHI Ltd.
5. 8051 Micro controller Architecture, Kennath J. Ayala, Programming and applications, Penram International Publishing
6. Microprocessor Principles and Applications – 2<sup>nd</sup> Edition, Gilmore – Tata McGraw Hill.

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-V/ Ppr.no.30/Core - 7**

**MEDICAL ELECTRONICS**

**UNIT I**

Transducer and its principles –active transducers-passive transducers- transducers in bio medical applications-resting and action potentials-propagation of action potentials-bio electric potentials- bio potential electrodes.

**UNIT II**

The heart and cardio vascular system–blood pressure-characteristics of blood flow-heart sounds-electro cardio graphy ECG Recorder Principles-measurement of blood pressure, blood flow and cardiac output-pletnysmography- measurement of hearts sounds.

**UNIT III**

Patient care and monitoring- the elements of intensive care monitoring-diagnosis calibration and reparability of Patient monitoring equipment-pace makers-defibrillators.

**UNIT IV**

Psycho physiological measurements –testing motor responses-sensory measurements –bio feed back instrumentation-bio telemetry introduction physiological parameters- bio telemetry components-application of telemetry.

**UNIT V**

X-ray machine-computer tomography (CT scanner) - Magnetic Resonance Imaging system- Ultra sonic imaging system. Colour Doppler.

**TEXT BOOKS**

1. Bio medical instrumentation and measurements – Leslie Cromwell, Fred J.Weibell and Erich A Pfeiffer-PHI, second edition-1996
2. Hand book of Bio medical instrumentation- R.S.Khandpur, Tata McGraw Hill 1997 (Unit V: Chapter 19, 20, 21).

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-V/ Ppr.no.31/Core - 8**

**MATHEMATICS FOR ELECTRONICS**

**UNIT I**

Finite differences-difference table operator  $E$ ,  $\Delta$ ,  $D$ -Relations between these operators-Difference equations- Linear difference equation Homogeneous linear difference equation with constant coefficients

**UNIT II**

Interpolation using finite differences-Newton Gregory formula for forward interpolation-Divided differences-properties-Newtons formula for unequal intervals-Lagranges formula-Relation between ordinary differences and divided differences

**UNIT III**

Solutions of algebraic and Transcendental equation iterative method, Bisection method, Newton Raphson method. Solution of simultaneous Linear equations-Gauss method-Gauss Jordan method – Iteration method-Gauss Seidel method

**UNIT IV**

Theory of equation-relation between roots and coefficients-Transformation of equation

**UNIT V**

Reciprocal equation –approximate solution of equation-Newton's method and Horner's method

**BOOKS FOR REFERENCE**

1. Mathematics For Electronics-K.C Pillai
2. Numerical analysis-Armugam and Isaac
3. Numerical analysis-Gupta and Kapoor
4. Theory of equation-Armugam and Isaac
5. Algebra-Manikavasagam pillai

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-V/ Ppr.no.32/ Major Practical -VI**

**MICROPROCESSOR AND MICROCONTROLLER LAB**

**All experiments have to be carried out compulsorily from A and B**

**A. Microprocessor Lab**

1. Program for 8 Bit Addition and Subtraction
2. Program for 16 Bit Addition and subtraction
3. Program for 8 Bit Multiplication and division
4. Program for 16 Bit Multiplication and Division
5. Program for Square and Square root of a number
6. Program for Sorting and Searching
7. Program for Smallest and Largest number in a array.
8. Program for Reversing a String
9. Program for Fibonacci series.
10. Program for Factorial of a number
11. Program for B.C.D to Binary, Binary to B.C.D, A S C I I to Binary,
12. Binary to ASCII Conversion
13. Six letter word display.
14. Rolling display
15. Interfacing seven segment display to display any character.
16. Program to display Time(Hours and Minutes)
17. Program for 1's complement and 2's complement of 8 bit and 16 bit data
18. Interfacing Traffic light controller
19. Interfacing Stepper motor control
20. Interfacing Matrix Keyboard
21. Interfacing A.D.C
22. Interfacing D.A.C
23. Study of 8255 chip and generation of
  1. Square wave
  2. Triangular wave
  3. Saw Tooth wave

## **B. Microcontroller 8051 Lab**

1. Addition – 8 bit, 16 bit.
2. Subtraction – 8 bit, 16 bit.
3. Multiplication 8 bit
4. Division 8 bit
5. Array addition (multibyte)
6. Logical Operations – AND, OR, NOT
7. Decimal to ASCII and ASCII to Decimal.
8. Decimal to Hexa and Hexa to Decimal.
9. Ascending Order.
10. Descending Order
11. Up/down Counter
12. Block data transfer
13. Interfacing with LCD.
14. Interfacing with Matrix Keypad.
15. Square wave generator
16. Interfacing with ADC.
17. Interfacing with DAC.
18. Digital Clock.
19. Interfacing with Stepper Motor.



**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-V/Ppr.no.33 (A) / Elective – II (A)**

**TELEVISION ENGINEERING**

**UNIT I**

Elements of Television system: Basic block schematic of television transmitter and receiver, Analysis of Television pictures, Scanning, human factor consideration, flicker, interlaced scanning, number of scanning lines, Horizontal and vertical resolution, maximum video frequency, Colour resolution and bandwidth, Composite video signal, video signal dimensions, vertical and horizontal synchronization signal dimensions, channel bandwidth, vestigial side band transmission, channel bandwidth and allocations for colour transmission.

**UNIT II**

Television camera and transmitters: Photoelectric effects, Working principle of image orthicon, vidicon, plumbicon, CCD, structure of CCD and its working, Monochrome and Colour television camera: block schematic explanation, TV transmitters: Positive and negative modulation and its comparison, high level and low level modulation and its comparison. Colour TV picture tubes: purity and convergence, Delta gun, PIL, Trinitron tubes, LCD screens.

**UNIT III**

Monochrome and colour reception, Monochrome receiver: Detailed block schematic, Yagi antenna, BALUN transformers, RF tuner, electronic tuning, SAW filters, IF conversion, VSB reception and correction, video detector, AGC: delayed AGC and Keyed AGC, video amplifier, cathode and grid modulation, sync separation, horizontal and vertical deflection circuits and wave forms, sound separation. Power supplies: SMPS and block schematic explanation, EHT generation.

**UNIT IV**

Colour Television: Compatibility consideration, Colour response of human eye, Three colour theory, additive mixing of colours, chromaticity diagram, Luminance and chrominance, colour difference signal and its generation, Polarity of colour difference signal, Frequency interleaving and Colour burst signal, delay lines, Basic colour television systems: PAL and NTSC, Block schematic explanation.

**UNIT V**

Television applications: CCTV and its functional block schematic, Cable television: converters, cable connections, and Satellite television: Dish antenna, LNB, down converters, Video discs: VCD and DVD, Digital recording, LASER source, High definition television.

## **BOOKS FOR REFERENCE**

1. Monochrome and colour television: R R Gulati, Wiley Eastern.
2. Colour Television, Theory and Practice: S P Bali, Tata Mc Graw Hill.
3. Television engineering: A M Dhake, Tata Mc Graw Hill
4. Basic Television Engineering: Bernad Grob, Mc Graw Hill.

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-V/ Ppr.no.33 (B) / Elective – II (B)**

**COMMUNICATION SYSTEM**

**UNIT I**

Introduction: communication systems – Modulation - need for modulation- bandwidth- Amplitude modulation - theory- mathematical representation- frequency spectrum - USB & LSB- power relation- Frequency modulation - theory- mathematical representation- frequency spectrum- Phase modulation- comparison of AM- FM- PM.

**UNIT II**

Radio transmitters: AM transmitter - block diagram - Solid state modulators - circuit explanation- FM transmitter - reactance modulator- varactor diode modulator- Amstrong modulator.

**UNIT III**

Radio receivers: Tuned radio frequency receiver- superheterodyne receiver - block schematic- selectivity- sensitivity- importance of IF - image frequency rejection - AM receivers - schematic explanation - RF amplifiers - circuit explanation - Mixer circuits - IF amplifiers - circuit explanation- simple diode detector - Automatic gain control circuit - simple and delayed AGC - FM receivers - block schematic explanation - amplitude limiting - FM demodulators: slope detectors- phase discriminator- ratio detectors.

**UNIT IV**

Side band communication: Single side band transmission - suppression of carrier - balanced modulator - filtering of unwanted sideband - SSB receivers - block schematic explanation - pilot carrier receiver - suppressed carrier receiver - Vestigial side band transmission - transmitter and receiver responses - advantages of VSB in television.

**UNIT V**

Telephone Systems - Telephone subscribers loop circuit - subscribers line interface circuit - Pulse and tone signaling - Frequency assignments - Electronic telephone - block schematic of a telephone set- block schematic of single line analog SLIC board - two wire repeaters - Electronic private automatic branching exchange - basic block schematic- Power line communication: block schematic explanation- Facsimile - FAX transmitter and receiver.

## **BOOKS FOR REFERENCE**

1. Electronic communication Systems: Wayne Tomasi- Pearson Edn.
2. Electronic communication: Roody and Coolen- PHI.
3. Electronic Communication systems: George Kennedy- Mc Graw Hill.
4. Electronic and radio engineering: A P Mathur.
5. Telephony and Carrier current engineering: P N Das.
6. Modern communication Systems: Couch- PHI.

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-VI / Ppr.no.35 / Core - 9**

**POWER ELECTRONICS**

**UNIT I**

Power Devices: Need for semiconductor power devices, Power diodes, Enhancement of reverse blocking capacity, Introduction to family of thyristors.

Silicon Controlled Rectifier (SCR): structure, I-V characteristics, Turn-On and Turn-Off characteristics, ratings, Factors affecting the characteristics/ratings of SCR, Gate-triggering circuits, Control circuits design and Protection circuits, Snubber circuit.

**UNIT II**

Diac and Triac: Basic structure, working and V-I characteristic of, application of a Diac as a triggering device for a Triac.

Insulated Gate Bipolar Transistors (IGBT): Basic structure, I-V Characteristics, switching characteristics, device limitations and safe operating area (SOA) etc.

Power MOSFETs: operation modes, switching characteristics, power BJT, second breakdown, saturation and quasi-saturation state.

**UNIT III**

Power Inverters: Need for commutating circuits and their various types, d.c. link invertors, Parallel capacitor commutated invertors with and without reactive feedback and its analysis, Series Invertor, limitations and its improved versions, bridge invertors.

**UNIT IV**

Choppers: basic chopper circuit, types of choppers step-down chopper, step-up chopper, operation of d.c. chopper circuits using self commutation, cathode pulse turn-off chopper, load sensitive cathode pulse turn-off chopper (Jones Chopper), Morgan's chopper Application of SCR: SCR as a static switch, phase controlled rectification, single phase half wave, full wave and bridge rectifiers with inductive & non-inductive loads; AC voltage control using SCR and Triac as a switch.

**UNIT V**

Heating – Resistance welding – Seam welding – Induction heaters – High voltage DC transmission – Fan regulator using TRIAC. Electromechanical Machines: Principle of operation Thyristor based speed control of dc motors, AC motor.

## **BOOKS FOR REFERENCE**

1. Power Electronics, P.C. Sen, TMH
2. Power Electronics & Controls, S.K. Dutta
3. Power Electronics, M.D. Singh & K.B. Khanchandani, TMH
4. Power Electronics Circuits, Devices and Applications, 3rd Edition, M.H. Rashid, Pearson Education
5. Power Electronics, Applications and Design, Ned Mohan, Tore.
6. Power Electronics, K. HariBabu, Scitech Publication.
7. Power Electronics, M.S. Jamil Asghar, PHI.
8. A Textbook of Electrical Technology, B.L. Thereja, A.K. Thereja, S.Chand
9. Industrial electronics – G.K. Mithal, Khanna Publications – Delhi – 15<sup>th</sup> Ed. 1992.
10. Industrial and power electronics – C. Harish – Raj Umesh Publications – 4<sup>th</sup> Edn. 1992.
11. Basic electronics and linear circuits – N.N. Bhargava, D.C.Kulsheshtha and S.C.Gupta – Tata McGraw Hill - 1987.

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-VI/ Ppr.no.36/Core - 10**

**SEMICONDUCTOR FABRICATION TECHNOLOGY**

**UNIT I**

Introduction: General classification of integrated circuits – Scale of integration – Advantages over discrete components.

**UNIT II**

Thick film technology: Features of hybrid IC technology – Thick film conductors – Dielectric – Resistors – Thick film processing – Thick film substrate – Design ideas – Advantages and applications.

**UNIT III**

Thin film technology : Thin film conductors – resistors – dielectric – substrates – thin film processing – Advantages and applications – Monolithic IC process : Growth and refining of Si crystals – Substrate slicing and polishing – Wafer preparation – Diffusion – Ion implantation – Oxidation – Photolithography – CVD – Epitaxial grown – Metallization – Monolithic resistors and capacitors.

**UNIT IV**

Introduction – Modern VLSI devices – High field effect – MOSFET devices – long channel & short channel MOSFET.

**UNIT V**

Bipolar devices – n.p.n. transistor – characteristics of typical n.p.n. transistor – Bipolar device design – Design of emitter, base and collector region – concept of HDL.

**TEXT BOOKS**

1. Integrated Circuits (K.R. Botkar) . Unit (i, ii, iii).
2. Fundamentals of Modern VLSI Devices by Yuan Taur and Tak H. NING  
Cambridge Publishers. unit (iv and v)

**BOOKS FOR REFERENCE**

1. Basic VLSI Design Systems and Circuits by Douglas A. Pucknell and Kamran Eshragian, PHI.
2. Device Electronics for Integrated Circuits – Richard Maller.
3. Integrated Electronics – Millman & Halkars.
4. VLSI Technology – S.M. Sze.

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-VI/ / Ppr.no.37/Core - 11**

**ROBOTICS**

**UNIT I**

Introduction Robotics and programmable automation, historical background, laws of robotics, robot definition, robot anatomy and systems, human systems and robotics. specification of robotics

**UNIT II**

Robot Drives, Actuators And Control Function of drive systems, general types of fluids, pump classification, pneumatic system, electrical drives, DC: motors, stepper motor and drives mechanisms

**UNIT III**

Robot End-Effectors Classification of end-effectors, drive system for grippers, mechanical, magnetic, vacuum and adhesive grippers, hooks, scoops and others devices, active and passive. Grippers

**UNIT IV**

Sensors And Intelligent Robots Artificial intelligence and automated manufacturing, AI and robotics, need for sensing systems, sensory devices, types of sensors, robot vision systems-Robot Languages and programming Different languages, classification of robot languages, computer control and robot software, VAL systems and languages

**UNIT V**

Application of Robots - Capabilities of robots - Robotics applications-Obstacle avoidance - Other uses of Robots - Robotic application in Computer Integrated Manufacturing environment - Robotics in india-Future of Robotics.

**TEXT BOOK**

I. Robotics technology and flexible automation by S.R. DEB Tata Mc Graw Hill

**REFERENCE BOOKS**

1. Robotics principles and practice by Dr. K.C. Jain and Dr. L.N Agarwal from Khanna publishers
2. Introduction to robotics, mechanics and control by John J. Craig from Addison Wesley;



**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-VI/ / Ppr.no.38/Core - 12**

**MOBILE COMMUNICATION**

**UNIT I**

Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems, General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

**UNIT II**

Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co channel interference-different types, Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

**UNIT III**

Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas, Numbering and grouping, setup access and paging channels channel assignments to

cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channelassignment, Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

**UNIT IV**

Second generation and Third generation Wireless Networks and Standards, WLL, Bluetooth, GSM, IS-95, DECT, GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

## **UNIT V**

Intelligent Cell Concept, Advanced Intelligent Network, SS7 Network and ISDN for AIN, AIN for Mobile communication, Asynchronous Transfer Mode Technology, Future Public Land Mobile Telecommunication System, Wireless Information Superhighway.

### **BOOKS FOR REFERENCE**

1. W.C.Y. Lee, "Mobile Cellular Telecommunications", 2nd Edition, Tata McGraw Hill, 2006.
2. Gordon L. Stuber, "Principles of Mobile Communications", 2nd Edition, Springer International, 2007.
3. Theodore. S. Rappoport, "Wireless Communications", 3rd Edition, Pearson Education, 2003.
4. Lee, "Wireless and Mobile Communications", 3rd Edition, McGraw Hill, 2006.
5. Jon W. Mark and Weihua Zhqung, "Wireless Communication and Networking", PHI, 2005.
6. R. Blake, "Wireless Communication Technology", Thompson Asia Pvt. Ltd., 2004.

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-VI/ / Ppr.no.39/Major Practical -VI**

**POWER ELECTRONICS AND SYSTEM DESIGN LAB**

**All experiments have to be carried out compulsorily from A and B**

**A .Power Electronics Lab Practical**

1. Characteristics of S.C.R
2. Characteristics of U.J.T
3. Characteristics of D.I.A.C
4. Characteristics of Triac
5. Characteristics of Power MOSFET
6. Characteristics of IGBT
7. R Triggering for Thyristors
8. R C Triggering for Thyristors
9. U.J.T Triggering For Thyristors
10. Speed control of D.C Motor
11. UJT Relaxation Oscillator
12. AC Power Control.

**B. Electronics Design Lab Practical**

Students must use dotted boards or Group boards and interconnect the joints by soldering.

Soldering Practice

- 1.Design and construction of fixed voltage power supply
2. Design and construction of Dual power supply
- 2.Design and construction of switching power supply
- 3.Design and construction of 1.5 to 12 V power supply using multi tap transformer.
- 4.Design and construction of Burglar alarm using L.D.R
- 5.Design and construction of Temperature switch using Thermistor
- 6.Design and construction of Light sensitive switch using Photo diode
- 7.Design and construction of Audio amplifier using LM 380
- 8.Design and construction of Timer circuit
- 9.Design and construction of Decade counter/ Seven segment decoder
- 10.Design and construction of Logic probe

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-VI/Ppr.no.40(A) / Elective – 3 (A)**

## **HARDWARE DEVELOPMENT**

### **Suggestions for Hardware skill development areas**

**1. Design of a 4-20 mA transmitter for a bridge type transducer.**

Design the Instrumentation amplifier with the bridge type transducer (Thermistor or any resistance variation transducers) and convert the amplified voltage from the instrumentation amplifier to 4 – 20 mA current using op-amp. Plot the variation of the temperature Vs output current.

**2. Design of AC/DC voltage regulator using SCR**

Design a phase controlled voltage regulator using full wave rectifier and SCR, vary the conduction angle and plot the output voltage.

**3. Design of process control timer**

Design a sequential timer to switch on & off at least 3 relays in a particular sequence using timer IC.

**4. Design of AM / FM modulator / demodulator**

Design AM signal using multiplier IC for the given carrier frequency and modulation index and demodulate the AM signal using envelope detector. Design FM signal using VCO IC NE566 for the given carrier frequency and demodulate the same using PLL NE 565.

**5. Design of Wireless data modem.**

Design a FSK modulator using 555/XR 2206 and convert it to sine wave using filter and transmit the same using IR LED and demodulate the same PLL NE 565/XR 2212.

**6. PCB layout design using CAD**

Drawing the schematic of simple electronic circuit and design of PCB layout using CAD

**7. Microcontroller based systems design**

Design of microcontroller based system for simple applications like security systems combination lock.

**8. DSP based system design**

Design a DSP based system for echo cancellation, using TMS/ADSP DSP kit.

**MSU/2016-17/UG-Colleges/Part-IV/(B.SC.ELECTRONICS)/  
Semester-VI/ Ppr.no.40(B)/ Elective – 3 (B)**

**EMBEDDED SYSTEM AND RTOS**

**UNIT I**

Introduction to Embedded systems: Embedded systems - Application of Embedded Systems - processors in the system - Other Hardware units - software embedded to a system - Exemplar embedded system - Embedded system – on - chip (SOC) and in VLSI circuit

**UNIT II**

Devices and Buses for device network: I/O Device - timer and counting devices - serial communication using I2C, CAN and USB. Parallel communication using PCI, PCIX and advanced parallel High Speed Buses.

**UNIT III**

Device drivers for device and interrupts serving mechanism: Device drives-parallel port devices drive in a system, serial port Device Drivers in a system, Drivers for internal programmable timing Devices – Interrupt servicing Mechanism – Context and the periods for context switching, Deadline and Interrupt Latency.

**UNIT IV**

Embedded Software Delopment using IDE: Introduction to Integrated development environment (IDE) – programming concepts and embedded programming in Assembly and C – creating a New project – Adding Files to a project – Building a project – Debugging and simulating the application – Getting Embedded software into the Target system.

**UNIT V**

Real Time Operating System (RTOS): Introduction to basic concepts of RTOS, Basics of real time& embedded system operating systems, RTOS-Interrupt handling, task scheduling; embedded system design issues in system development process-Action plan, use of target system, emulator,use of software tools.

**TEXT BOOKS**

1. Rajkamal,"Embedded System-Architecture, Programming, Design"Tata Mc Graw Hill 2006.
2. Daniel W.Lewis"Fundamentals of Embedded Software" Prentice Hall of India, 2004.

## REFERENCE BOOKS

1. David E Simon, "An Embedded Software Primer" person Education Asia, 2006.
2. Frank Vahid, Embedded System Design – A Unified hardware & Software Introduction John Wiley, 2002.
3. Sriram V. Iyer, Pankaj Gupte, Embedded Real Time Systems Programming "Tata Mc Graw Hill, 2004.
4. Steve Heath, "Embedded System Design" II edition, Elsevier, 2003.
5. Arnold Berger, "Embedded System Design: An Introduction to processes, Tools, and Techniques", CMP Books, 2001.
6. Wayne Wolf, "Computers as components" Morgan Kaufmann Publishers, 2005.
7. Douglas V Hall, "Microprocessors and Interfacing: Programming and Hardware", Tata McGraw – Hill, Second Edition, 2001.