Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Electronic Equipment Maintenance &
Approved by H E the Governor of Madhya Pradesh
Session 2017-18
JULY 2017 Onwards

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Class- B.Sc (Electronic Equipment Maintenance)

Paper Code		Internal			Theory	Total	Practical	Grand Total
	First Year	**Three Months**	**Six Months**	**Total**				
BSCEEM11	**Electronic Components & Semiconductors**	10	10	20	40	80		100
BSCEEM12	**Electronic Devices and circuits**				40			
BSCEEM13P	PRACTICAL						50	50
	Second Year							
BSCEEM21	**Digital Electronics**	10	10	20	40	80		100
BSCEEM22	**Microprocessor & Interfacing**				40			
BSCEEM23P	PRACTICAL						50	50
	Third Year							
BSCEEM31	**Electronics & Communication**	10	10	20	40	80		100
BSCEEM32	**Instrumentation & TV**				40			
BSCEEM33P	PRACTICAL						50	50
							Grand Total	**450**

Remark: (i) Each theory paper contain five objective type question of 1 mark and
(ii) Five short answer type question of 2 marks and
(iii) Five long answer type question of 5 marks, with internal choice in (ii) and (iii)

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Application
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Session 2017-18 onwards

Class - B.Sc. First Year
Subject - ELECTRONICS EQUIPMENT MAINTENANCE
Paper - I (Electronic Components & Semiconductors)

Maximum Marks: 40

UNIT –I Passive Components:
Resistance: General Information, Symbol, Colour Code, Types of Variable Resistors, Potentiometers, Types Of Potentiometer, Testing of Resistance, Area of Application, Problem Related to Joule Heating, Tolerance, Temperature Coefficient, Applications, Potential Dividers.
Inductors: General Information, Symbols and Various Types , Frequency Response of an Inductor, Measurement of Inductance, Choke Coil, Fabrication Method of a Single Layer Coil and Multilayer Coil, Rate Of Growth and Delay of Current, Magnetic Energy Storage, Phase Logs in a Relay, A.C. Impedance and Power Factors.
Capacitor: General Information, Symbols and Various Types, Colour Code.

UNIT – II Fuses: Fast and slow fuse, Pilots Lamp,
PCB: types of PCB, Layout Techniques, Cables and connectors for PCB.
Transformer: General information, Principle, types of Transformer, Frequency dependence of Transformer, Design of main Transformer and CVT, Step up and Step down Transformer. Problem related to core losses, Eddy losses, Turn ratio.

UNIT – III LCR and Wave Shaping Circuit:
AC current and voltage, RMS and mean value, j – operator, LR, CR and LCR circuit, Series and Parallel resonance, Equivalent circuit, Idea of two terminal and two port network, Equivalent circuit, Integration, Differentiation using RC circuit, Delta factor, Bandwidth, Coupling Circuits, Coefficient of coupling, Problem and numerical related to Power Factor.

UNIT – IV Introduction to Semiconductor:
Energy Band Diagram, Conductor, Semi conductor, Insulator, Intrinsic and Extrinsic semiconductor (P and N type) Diffused Junction, Depletion layer, Barrier Potential, Drift and Diffusion Current, forward and reverse bias of Diode, Concept of recombination of carriers, Temperature variation of forward current and reverse current through PN junction, Junction Capacitance of PN junction.

UNIT –V Power supply and CRO:
Three terminal ICs Power Supply, Study of power supply with respect to Variation in load and line voltage, switched mode power supply- Design principle and application, Basic block diagram of CRO, construction of CRT, and applications of CRO.

Note: Question paper must be set in both English and Hindi language.

Text/ Reference Books

1. Integrated Electronics by Millmann & Halkias
2. Elecronic devices & Circuit theory by boylasted & Nashalsky
3. Elecronic Instrumentation by Cooper and halfrick

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Class - B.Sc. First year
Subject - ELECTRONICS EQUIPMENT MAINTENANCE
Paper - II (Electronic Devices and Circuits)

Maximum Marks: 40

UNIT –I Junction Diodes:
Switching response of diode, DC model of diode, Forward and reverse bias characteristics, Varactor Diode, Photodiode, Light Emitting Diode, IR sources and detectors, Optical Isolator's, PIN diode, Point-contact Diode, Schottky-barrier Diode, Zener Diodes, Tunnel Diode.

UNIT –II Applications of Diode:
Half and Full wave Rectifier with and without Filters,
Clipper and Clampers, Voltage multipliers, Definition and Calculation of Ripple factor, Efficiency, PIV and other parameters.

UNIT –III Bipolar junction Transistor and FET:
Basic working principle of Bipolar junction transistor, Characteristics, Basic configuration and Biasing, Operating point, Load line, Biasing for stabilization of operating point, Transistor as an amplifier, Early effect, FET characteristics and applications, JFET and MOSFET.

UNIT –IV Operational Amplifiers:
Specifications, ideal characteristics, inverting and non-inverting amplifier, Applications of OPAMP, Comparators, Zero crossing detector, Instrumentation amplifiers, Log –antilog amplifier, Precision rectifier.

UNIT –V Waveform Generators:
Multivibrators and its applications, Types of multivibrators, Astable, monostable and bistable multivibrators, 555 timers and its applications.

Note: Question paper must be set in both English and Hindi language.

Text/ Reference Books:

1. Integrated Electronics by Millmann & Halkias
2. Electronic devices & Circuit theory by boylasted & Nashalsky
3. Micro electronics by Sedra Smith
4. OP-AMP by Gayakwad
5. Micro Electronics by P. Rashid

Kanwani Rajesh Pandey (Member) (Dr P. Sinha)

B.Sc. First Year

Electronics Equipment Maintenance

List of Proposed Experiments :

1. Testing of components : Resistor, Inductor, Capacitor, Diode, Transistor
2. PCB Making and soldering
3. Construct Analog circuit and testing
4. Measurement of Voltage and frequency of input waveforms on CRO.
5. Analysis of VI Characteristics of PN Junction Diode (Si & Ge Diode).
6. Analysis of VI Characteristics of Zener Diode .
7. Analysis of waveforms and calculation of different parameters of Half Wave Rectifier.
8. Analysis of waveforms and calculation of different parameters of Full Wave Rectifier
9. To Find out Input and Output Characteristics of PNP & NPN Transistor
10. Analysis of waveforms of Clipper and Clamper circuit.
11. Study of Operational Amplifier working in Inverting Mode.
12. Study of Operational Amplifier working in Non- Inverting Mode
13. To Study Operational Amplifier as Integrator.
14. To Study Operational Amplifier as Differentiator.
15. To Study Operational Amplifier as Comparator.
16. To Study 555 Timer as Astable Multivibrator.
17. To Study 555 Timer as Monostable Multivibrator.

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Class - B.Sc. II year
Subject - ELECTRONICS EQUIPMENT MAINTENANCE
Paper - I (Digital Electronics)

Maximum Marks: 40

UNIT –I Number System:
Introduction to Decimal, Binary, Octal Hexadecimal number system, BCD code inter conversion of decimal, Binary and BCD number, Parity, Grey and Johnson Code, Boolean Axioms, De-Morgan's theorem statement, Verifications and application. Logic Gates, Symbols and Truth table, Universal Gates.

UNIT – II Combinational Circuits:
Simplification of Boolean Expressions, SOP & POS, Half Adder, Full Adder, Half Substractor, Full Substractor, Encoder and Decoder, Multiplexer & De-Multiplexer

UNIT –III Sequential Circuits:
Flip Flop: RS, Clocked RS, T, D, J-K, Master Slave JK FF, Shift Registers and it's Types, Counters & It's types.

UNIT –IV Digital Circuits & Memories:
Analog to digital converter, Clock for A/D converter, Sample and hold circuit, Analog multiplexer, Interfacing of A/D converter ADC800, Digital to analog converter (DAC) operating principle, Types of Memories: RAM, ROM, PROM, EPROM, EEPROM, DRAM, SDRAM.

UNIT –V Microcomputer fundamentals:
Introduction, Microcomputer architecture, Memory organization, Instruction set, CPU organization, Microcomputer operation.
Microprocessor architecture, Data/address register, Stack pointer and addressing modes, I/O modes.

Note: Question paper must be set in both English and Hindi language.

Text / Reference Books:

1. Digital Logic and computer design by Moris Mano
2. Digital Principles and applications by Malvino & Leach
3. Digital Fundamentals by Floyd

(Dr P. Sinha)

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Class - B.Sc. II Year
Subject - ELECTRONICS EQUIPMENT MAINTENANCE
Paper - II (Microprocessor & Interfacing)

Maximum Marks: 40

UNIT –I The Intel 8080/8085 Microprocessor:- Introduction, 8085 pin diagram and it's functions, The 8085 architecture, Register Structure, Addressing Modes, Interrupts on 8085: Hardware & Software interrupts, Interrupts call-locations, RIM & SIM, I/O Ports

UNIT –II Memory and I/O Interfacing: Memory Interfacing, I/O Interfacing, Data Transfer Scheme: Synchronous Data Transfer, Asynchronous Data Transfer, Handshaking & Polling, Interrupt Driven Data Transfer, DMA Data Transfer

UNIT –III The 8085 instructions set, the 8085 data transfer instructions.
The 8085 arithmetic instructions:- The 8085 logical instruction and arithmetic instructions. The 8085 stack, I/O and machine control Instructions. Programming the Microprocessor: Machine and assembly languages, Subroutine, Call and return operations, Miscellaneous operation writing programs related to branching and looping.

UNIT –IV Programmable Peripherals Interface (PPI), Architecture of 8155 & 8255A & its Operating Modes, Programmable DMA controller:- Intel 8257A, Register of 8257A, Programmable Interrupt controller (PIC) Intel 8259, Internal Register of 8259, Programmable communication interface (Intel 8251).

UNIT –V Interfacing Basics: Interfacing with practical I/O ports, Synchronizing I/O data transfer using interrupts, Address decoding. Application to illustrate the use of microprocessor: Traffic Control, Temperature control, Digital clock, Stepper motor control, Washing machine control

Note: Question paper must be set in both English and Hindi language.

Text / Reference Books :

1. Microprocessor Architecture programming and applications with 8085 by R.S. Gaonkar
2. Introduction to Microprocessor by A.P. Mathur.
3. Fundamental of Microprocessors by B.Ram
4. Microprocessor – Schaum Series

B. Sc. Second Year

Electronics Equipment Maintenance

List of Proposed Experiments:

1. Verify truth table of different logic gates.(AND,OR,NOT,NOR,NAND EX-OR,EX-NOR)
2. Verification of De-Morgans Theorem
3. Verification of Half Adder& Full Adder.
4. Verification of Half Substractor & Full Substractor.
5. Verification of JK, RS, D & T Flip Flop.
6. Study and verify the operation of a Multiplexer Circuit.
7. Study and verify the operation of a De-Multiplexer Circuit.
8. Study and verify the operation of a Encoder Circuit.
9. Study and verify the operation of a Decoder Circuit.
10. Study and verify the operation of Up- Down counter.
11. Study of 8085 Microprocessor kit.
12. Execution of different programs on the 8085 kit based on
    a. data transfer Instructions
    b. Arithmetic Instructions
    c. logical Instructions
    d. Looping Instructions
    e. Branching instructions
13. Interfacing Devices to 8085
14. Interfacing Analog to Digital Conversion to 8085
15. Interfacing Digital to Analog Conversion to 8085

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Class - B.Sc. III Year
Subject - ELECTRONICS EQUIPMENT MAINTENANCE
Paper - I (Electronics & Communication)

Maximum Marks: 40

UNIT- I Introduction to Modulation:
Necessity of modulation, Principle of amplitude modulation, Modulation index power relation, Multi one modulation. Am wave generation Am square law modulations, Demodulation of AM, Synchronous detection- Nonlinear demodulation, Suppress carrier am demodulator envelop detector, Square law demodulator

UNIT –II FM modulations:
Principle, Modulation index modulation band width, Balance modulator. FM Detector - Diode detectors ratio detectors, Balanced demodulator
Antenna: Basic Principle of Wave Propagation, Types of Transmitting & Receiving Antenna

UNIT III Fibre Optics:
Structure of optical fibres, Classification of optical fibres, Plastic fibres propagation of light, Refraction and Snell's law, Total internal reflection, Light propagation through optical fibre.
Super heterodyne Receivers:- Principles, advantages, Block diagram, RF input and AE coupling arrangements, RF amplifiers, Mixer, Local oscillators, IF amplifier, Detector, Audio amplifier.

UNIT IV Acoustics:
Loud speaker, Automobile Radios, Subscriber Frequency Allotment, Channel organization, Block diagram of Public Address System, Requirement of a Public Address System, Public Address System for an Auditorium, Debating Hall, Football Stadium, Reverberation: Necessity of Reverberation, Absorption coefficients.

UNIT V Application of Communication: Television
Elements of a Television system:- Picture transmission, Sound transmission, Picture reception synchronization, Television standards.
Picture tubes – Monochrome and colour, Bean deflection, Screen phosphor, Television Receivers: Tube of television receivers, Receiver sections, Receiver power suppliers, Television receiver antenna, Colour television antenna.

Note: Question paper must be set in both English and Hindi language.

Class - B.Sc. III Year
Subject - ELECTRONICS EQUIPMENT MAINTENANCE
Paper - II (Instrumentation & TV)

Maximum Marks: 40

UNIT – I

Measuring Instruments:
Multimeter, Analog/digital Oscilloscopes, Signal generators, Noise and sound level meters, Frequency counters, Sources and errors in the instrument, Precaution during measurements, Repair, Servicing, check specification, Maintenance.
Cable Television, Closed Circuit Television, Theatre Television picture, Video tape recording, Basic concept of recording and reproduction of electrical signal on magnetic tapes, problem in video recording on tape.
Remote control
Remote control, Electromechanical control system electronic touch turning, frequency synthesizer TV tuner, Automatic fine tuning (AFT) booster amplifier, Automatic brightness control, Picture tube boosters, Alignment and servicing equipment: Anti-static and low leakage multimeter, Soldering iron, Vacuum Tube Volt meter (VTVM)

UNIT –II

Automatic Gain Control :
Advantages of AGC, Gain control of transistor amplifier, Types of AGC, various AGC systems, Delayed AGC, AGC adjustment.
Essentials of colour television:- Compatibility, Natural light, Colour perception, Three colour theory, Luminance, Hue and saturation, Colour television camera, Gray scale tracking, Colour signal transmission & bandwidth, weighting factors, PAL colour television system, PAL – D colour receiver, Merits and demerits of PAL system.

UNIT –III

Television Trouble shooting:
Procedure, Monochrome receivers, Servicing of various functional bocks, colour receiver servicing circuit modules, Safety precaution in television servicing.
Signal processing, chrome processing: Colour under technique, Recovery of down converted chrome signals, Luminance processing-frequency modulation, Deviation and Bandwidth.

UNIT –IV

Servo mechanisms and system control:- Recording, Playback, Tracking capstan servo system control, Loading and threading and play mode, Record mode, Auto stops, Counter, Audio video muting.
Care of mechanical system: Cleaning of heads and tape path, Lubrication, Replacement of parts, Replacement of audio-CTC head, Replacement of video drum

Text/ Reference Books:

1. Fundamentals of Acoustics by Kinsder & Frey
2. Monochrome & Colour Television by P.R.Gulati
3. Communication Systems by Singh & Sapre
4. Modern Digital & Analog Communication by B. P. Lathi
5. Communication Systems by Simon Haykins
6. Optical Fiber communication by Keiser
7. Audio & Video System by P.R. Gupta

UNIT –V New technologies: Industrial aspects of consumer electronics. Figs and fixtures, Quality control/management, Production techniques, Business cycle, New technologies, Compact disc and Laser Disc.
Electronic system alignments:- Instruments, Fault finding-the power tracking video system play back section alignment, Amplifier balance and gain, Luminance signal adjustment, F.M. demodulator limited balance, Carrier leak, Noise canceller colour processing, Up conversion, Automatic colour correction.

Note: Question paper must be set in both English and Hindi language.

Text / Reference Books:

1. Electronic Instrumentation by Cooper and Halfrick
2. Handbook of Electronics by Gupta & Kumar
3. Communication Electronics by N.D. Deshpande
4. Radio Engineering by G. K. Mithal
5. Monochrome & Colour Television by R.R. Gulati
6. Television Engineering by Dhoke

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B.Sc. Third Year

Electronics Equipment Maintenance

List of Proposed Experiments

Communication & Instrumentation

1. Study and plot the radiation pattern of different types of transmitting antenna
2. Study of and draw the radiation pattern of different types of receiving antenna
3. Analysis of waveforms at the output of different blocks of AM modulation circuit (DSB-AM, DSB-SC, SSB & VSB modulation).
4. Analysis of waveforms at the output of different blocks of AM Demodulation circuit (DSB-AM, DSB-SC, SSB & VSB modulation).
5. Analysis of waveforms at the output of different blocks of FM Modulation
6. Analysis of waveforms at the output of different blocks of FM Demodulation circuit.
7. Analysis of waveforms at the output of different blocks of Super-heterodyne Receiver circuit.
8. To Build SMPS for Voltage between 6-15 Volts.
9. Study of PA System (Circuit Analysis)
10. Study of PA System (Fault Finding)
11. Study \$Fault Finding in VCR

Television: (Hands-on-Practice)

12. Study of Power Supply Section.
13. Study of Horizontal oscillator and Synchronous Section.
14. Study of Vertical Section.
15. Study of Sound Section.
16. Study of Video Section.
17. study of Picture Tube
18. Study of Remote Control
19. Voltage & Cold testing
20. Lists of Faults to be checked:
    1. Set Dead.
    2. No Raster, Sound Normal
    3. No Sound but Picture Normal.
    4. Bright Horizontal Line on Screen.
    5. picture Rolls Verification