GENERIC ELECTIVE-I - FOR ALL SCIENCE FACULTY DEPARTMENTS

B.Sc., III YEAR, V Semester

PUBLIC HEALTH AND HYGIENE

Credits: 2

Theory : hours/week **Marks:**

UNIT – I : NUTRITION AND ENVIRONMENT

1.1 Balanced diet and Malnutrition.

1.2 Nutritional deficiencies and disorders- Carbohydrates, proteins, lipids, vitamins and minerals.

1.3 Occupational, Industrial, agricultural and urban Health-Exposure at work place, urban areas, industrial workers, farmers and agricultural labourers, Health workers and health disorders and diseases.

1.4 Environmental pollution and associated Health hazards, Water borne diseases and Air borne diseases.

UNIT-II : DISEASES AND HEALTH CARE

2.1 Causes, Symptoms, Diagnosis, Treatment and Prevention - Malaria, Filaria, Measles, Polio, Chicken pox, Rabies, Plague, Leprosy,.

2.2 Causes, Symptoms, Diagnosis, Treatment and Prevention of non communicable diseases - Hypertension, Coronary Heart diseases, Stroke, Diabetes, Obesity and Mental ill-health.

2.3 Health care legislation in India – Termination of pregnancy act, Maternity benefit act, Biomedical waste act, ESI act.

2.4 First Aid and Health awareness, personal health care record maintenance.

Dr. B. Venkatram Reddy
Chairman, Board of Studies in Physics, KU, Wgl
Date: 24th Aug., 2016 & 5th June, 2017

B.Sc. (ELECTRONICS) – III year
Semester - V
Paper - V:: Digital Electronics
(DSC – Compulsory)
(w.e.f the academic year 2018-19)

Total number of hours:
No of hours per week:

UNIT-I (11 Hrs)

Number system and Logic gates: Conversion of binary, octal, decimal & hexadecimal number systems, Binary addition and subtraction (1's and 2's complement methods).

Logic gates- OR, AND, NOT, XOR, NAND, NOR gates and their truth tables – Design of basic gates using the universal gates- NAND and NOR gates, half adder, full adder and parallel adder logic circuits. Logic families and their characteristics – TTL, CMOS and ECL logic circuits.

UNIT-II (10 Hrs)

Boolean algebra and Combinational logic circuits: Boolean algebra - Laws and identities, DeMorgan's Theorems. Simplification of Boolean expressions using Boolean identities- Reduction of Boolean expressions using Karnaugh Maps - Sum of Products (SOP) representation (up to four variables). Multiplexer, De-Multiplexer, Decoder (3 to 8) and Encoder(8 to 3).

UNIT-III (10 Hrs)

Sequential logic circuits: Flip-flops:- SR, D, JK, T, JK and JK Master-Slave; **Registers** - Shift registers - SISO,SIPO, PISO and PIPO registers, Universal shift register(IC 7496), **Shift register counters-** Ring counter , Johnson Counter.

UNIT-IV (11 Hrs)

Counters and Semiconductor memories:

4-bit Asynchronous (Ripple) counter, Modulo-N counter, synchronous counter. Up/down counters – ripple counter IC7493 - Decade counter IC7490 – working, truth tables and timing diagrams.

Semiconductor memories :: Organization and working of ROM, types of ROM's - PROM, EPROM, EEPROM, FLASH, RAM- static and dynamic.

Books Recommended:

1. Digital Principles and Applications – Malvino& Leach - TMH.
2. Digital Principles and Applications-Ronald J.Tocci-– Pearson Education.
3. Text book of Electronics Bsc III year (vol.III)-Telugu Akademi
4. Digital Fundamentals – F.Loyd& Jain – Pearson Education.
5. Fundamentals of Digital Circuits – Anand Kumar – PHI
4. Digital Electronics Principles and Integrated circuits – Maini – Wiley India.
5. Digital Electronics - Gothman

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B.Sc. (Electronics Practicals) – III year
Semester - V
Paper - V:: Digital Electronics Lab

1. Verification of truth tables of AND, OR, NOT, NAND, NOR, XOR Gates using IC 74XX series.
2. Construction of basic gates using NAND and NOR gates.
3. Construction of Half Adder using gates. Verification of truth table.
4. Construction of Full Adder using gates and verification of truth table.
5. Verification of truth tables of flip flops: RS, D, and JK using IC's.
6. Construction of binary counters 7493

Simulation experiments:

1. 4bit parallel adder using Full adders.
2. Decade counter using JK flip flops.
3. Up/Down counters using JK flip flops.
4. Up/down counter using 74193
5. Multiplexer/DeMultiplexer.
6. Encoder.

Note: Student has to perform minimum of eight experiments

1. Lab manual for Electronic Devices and Circuits – 4th Edition. By David A Bell – PHI
2. Basic Electronics – A Text Lab Manual –Zbar, Malvino, Miller.

B.Sc. (ELECTRONICS) – III year
Semester - V
Paper – VI (A):: Digital Communication
(DSE – Elective-1)
(w.e.f the academic year 2018-19)

Unit -I: (10 Hrs)
Signals Analysis: Fourier series, Complex Fourier spectrum, Fourier transform, Continuous spectrum, Properties of Fourier transform, Fourier transform of periodic functions, Convolution, sampling theorem, random signals and noise, correlation and power spectrum.

Unit- II: (11 Hrs)
Pulse modulation systems: Introduction, pulse amplitude modulation (PAM) – Natural sampling, Flat-top sampling, Demodulation of PAM signals, pulse code modulation (PCM), Quantization, Encoding, Line codes; Noise in PCM systems – Transmission noise, Quantizing noise; Bandwidth of PCM; pulse width modulation (PWM), pulse position modulation (PPM), delta modulation and their quantization and noise consideration.

Unit - III: (10 Hrs)
Digital Transmission: Timing, base band systems, amplitude shift keying (ASK), frequency shift keying (FSK), phase shift keying (PSK), quadrature phase shift keying (QPSK) – Transmitter and receiver, differential phase shift keying (DPSK), base band signal receiver, probability of error in FSK, PSK and DPSK.

Unit - IV: (11 Hrs)
Error detection and coding: Introduction, coding efficiency, parity check, cyclic redundancy check (CRC), Hamming distance, Hamming codes, Cyclic codes, line synchronization codes, Manchester code, Non-Return to Zero (NRZ) coding, Walsh codes.

Reference Books:
1. Communication systems – R P Singh and S D Sapre, 2nd edn, McGraw-Hil.l
2. Digital Communications, Simon Haykin, John Wiley, 2nd Edition , 2007
3. Analog and Digital Communication systems- M.S. Roden, 3rd Edition, Prentice Hall of India.
4. Modern Digital and Analog Communication Systems-B.P. Lathi.
5. Communication Techniques for digital and Analog signals – M. Kanefsky, John Wiley and Son.
6. Telecommunication – T.H. Brewster, McGraw Hill.
7. Principles of Digital communication, Das, Chatterjee and Mallick, Wiley Eastern Ltd.

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B.Sc. (Electronics Practicals) – III year
Semester - V
Paper – VI (A) :: Digital Communication Lab

I Experiments on Internet working:

1) Testing of RJ-45 Cable (Straight/ Cross)
2) Introduction to LAN cable and Hub.
3) Verifying physical and logical address.
4) Sending data/ Data transfer from system to system.
5) Concept of HTTP.
6) File transfer FTP.
7) Introduction to server and client.
8) Introduction to network IP address.
9) Identification of NET ID using masks.
10) Mail transfer using SMTP.
11) Encryption (plain text to Hypertext).
12) Study of Router configuration.
13) Study of two networks between LAN and LAN/ MAN and MAN/ WAN and WAN.
14) Introduction to network devices.
15) Static Routing.
16) Basic RIP (observe RIP routers and understand the commands)
17) RIP V2.
18) OSPF (Open Shortest Path First)

II Experiments in Data Communication.

1) Study of serial communication.
2) Study of protocol in communications.
3) Study of Fiber optic communications.
4) Study of wireless communications.
5) Study of parallel communication.

Note: Minimum of 8 experiments to be performed.

B.Sc. (ELECTRONICS) – III year
Semester - V
Paper – VI (B):: Electronic Instrumentation
(DSE – Elective-1)
(w.e.f the academic year 2018-19)

Unit – I: CHARACTERISTICS OF AN INSTRUMENT (11 Hrs)
Functional elements of a measurement system – Static characteristics – Accuracy, precision, bias, linearity, threshold, resolution, hysteresis, dead space, scale readability, span, static stiffness, input impedance, repeatability and reproducibility - Errors and calculation of errors in overall system – Dynamic characteristics – Zero, first and second order instruments - Responses for step, impulse, ramp and sinusoidal inputs.

Unit –II: TRANSDUCERS AND SENSORS (11 Hrs)
Definition of transducer and sensor – Classification of transducers – Pressure (strain gauge, piezoelectric transducer), displacement (potentiometric, LVDT), temperature (thermometer, thermistor, thermocouple) and photosensitive (Vacuum & gas filled phototubes, photomultiplier, photoconductive cell, photovoltaic cell) transducers.

Unit –III: BRIDGE MEASUREMENTS (10 Hrs)
Introduction - Wheatstone bridge - Kelvin bridge – Guarded Wheatstone bridge - AC bridges and their applications – Maxwell bridge – Hay bridge - Schering bridge - Wien bridge.

Unit – IV: TESTING INSTRUMENTS (10(Hrs)
Oscilloscopes – Block diagram – CRT Circuits – Vertical and horizontal deflection systems – Delay line, Multiple trace – Probes – Special oscilloscopes.

Text Books:
1. C. S. Rangan, G. R. Sarma and V. S. V. Mani, 1999, Instrumentation Devices and Systems, *Tata McGraw-Hill, New Delhi.*
2. A. D. Helfrick and W. D. Copper, 1992, Modern Electronic Instrumentation and Measurement Techniques, *Prentice-Hall of India, New Delhi.*
3. A. K. Sawhney, A Course in Electrical and Electronic Measurement andInstrumentation, *Dhanpat Rai & Sons.*

Reference Books:
1. E. O. Doebelin, 1983, Measurement Systems Application and Design, *3rd Ed., McGraw-Hill*
2. D. V. S. Moorthy, 1995, Transducer and Instrumentation, *Prentice-Hall of India, NewDelhi.*
3. J. W. Dalley, W. F. Riley and K. G. McConnel, 1993, Instrumentation for Measurements,*Wiley, NY.*
4. B. C. Nakre and K. K. Chaudry, Instrumentation Measurements and Analysis, *Tata McGraw-Hill, New Delhi.*

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B.Sc. (Electronics Practicals) – III year
Semester - V
Paper – VI (B):: Electronic Instrumentation Lab

I Analog Experiments:

1.Power control by SCR using UJT.
2. PLLas FM detector (using IC 565).
3.Active high pass filter.
4.Active low pass filter.
5.Calibration of Strain gauge.
6. LVDT.
7. AC Bridges: Maxwell and Wein bridge.

II Analog Simulation Experiments (S/W):

1) Active filters using Op-Amp.
2) Frequency modulation and detection.
3) Amplitude modulation and detection.
4) Solution of differential equation using analog computation (using TUTSIM).

III Digital Experiments (H/W & S/W)

1. Construction of synchronous Up/Down Counter using IC 74192 and display using 7-segment display.
2. Implementation of Boolean functions using multiplexer.
3. Construction of shift registers using IC7495.
4. Construction of an 8-bit full adder using two 4-bit adders.
5. Given a four variable Boolean function design and simulate the circuit using gates.
6. Simulate a 4-bit binary/BCD decade counter.
7. Simulate a full adder circuit using Decoder/ Demodulator.
8. Simulate a 4-bit shift register.
9. Simulate a Johnson counter.

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Note: Minimum of 8 experiments to be studied

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B.Sc -Faculty of Sciences
CBCS Pattern in Semester System (*with effect from 2016-17*)

B.Sc. ELECTRONICS SYLLABUS

B.Sc. III YEAR, Semester - V

Paper - VI –C (Elective)

DSE: SEMICONDUCTOR DEVICES FABRICATION

UNIT-I

Introduction: Review of energy bands in materials. Metal, Semiconductor and Insulator. Doping in Semiconductors, Defects: Point, Line, Schottky and Frenkel. Single Crystal, Polycrystalline and Amorphous Materials. Czochralski technique for Silicon Single Crystal Growth.

Thin Film Growth Techniques and Processes: Vacuum Pumps: Primary Pump (Mechanical) and Secondary Pumps (Diffusion, Turbo-molecular, Cryopump, Sputter -Ion)– basic working principle, Throughput and Characteristics in reference to Pump Selection. Vacuum Gauges (Pirani and Penning).

Unit-II

Sputtering, Evaporation (Thermal, electron-Beam, Pulse Laser Deposition (PLD), Chemical Vapor Deposition (CVD). Epitaxial Growth, Deposition by Molecular Beam Epitaxy (MBE).

Thermal Oxidation Process (Dry and Wet) Passivation. Metallization.Diffusion of Dopants. Diffusion Profiles.Ion implantation.

Unit-III

Memory Devices: Volatile Memory: Static and Dynamic Random Access Memory (RAM), Complementary Metal Oxide Semiconductor (CMOS) and NMOS, NonVolatile - NMOS (MOST, FAMOS), Ferroelectric Memories, Optical Memories, Magnetic Memories, Charge Coupled Devices (CCD). (10 Lectures)

Unit- IV

VLSI Processing: Introduction of Semiconductor Process Technology, Clean Room Classification, Line width, Photolithography: Resolution and Process, Positive and Negative Shadow Masks, Photoresist, Step Coverage, Developer. Electron Beam Lithography. Idea of Nano-Imprint Lithography. Etching: Wet Etching. Dry etching (RIE and DRIE). Basic Fabrication Process of R, C, P-N Junction diode, BJT, JFET, MESFET, MOS, NMOS, PMOS and CMOS technology. Wafer Bonding, Wafer Cutting, Wire bonding and Packaging issues (Qualitative idea).

Reference books:

1. Physics of Semiconductor Devices, S. M. Sze. Wiley-Interscience.
2. Handbook of Thin Film Technology, Leon I. Maissel and ReinhardGlang.
3. Fundamentals of Semiconductor Fabrication, S.M. Device and G. S. May, JohnWiley and Sons, Inc.
4. The Science and Engineering of Microelectronics Fabrication, Stephen A.
5. Champbell, 2010, Oxford University Press.
6. Introduction to Semiconductor materials and Devices, M. S. Tyagi, John Wiley & Sons
7. VLSI Fabrication Principles (Si and GaAs), S.K. Gandhi, John Wiley & Sons, Inc.

B.Sc -Faculty of Sciences
CBCS Pattern in Semester System (*with effect from 2016-17*)
B.Sc. ELECTRONICS SYLLABUS
B.Sc. III YEAR, Semester – V Practical
Paper – VI -C: SEMICONDUCTOR DEVICES FABRICATION LAB

No. of hours per week: 3

1. Fabrication of alloy p-n Junction diode and study its I-V Characteristics.
2. Study the output and transfer characteristics of MOSFET.
3. To design and plot the static & dynamic characteristics of digital CMOS inverter.
4. Create vacuum in a small tube (preferably of different volumes) using a Mechanical rotary pump and measure pressure using vacuum gauges.

5. Deposition of Metal thin films/contacts on ceramic/thin using Thermal Evaporation and study IV characteristics.
6. Selective etching of Different Metallic thin films using suitable etchants of different concentrations.
7. Wet chemical etching of Si for MEMS applications using different concentration of etchant.
8. Calibrate semiconductor type temperature sensor (AD590, LM 35, LM 75).
9. Quantum efficiency of CCDs.
10. To measure the resistivity of a semiconductor (Ge) crystal with temperature (up to 150o C) by four- probe method.
11. To fabricate a ceramic and study its capacitance using LCR meter.
12. To fabricate a thin film capacitor using dielectric thin films and metal contacts and study its capacitance using LCR meter.
13. Study the linearity characteristics of (a) Pressure using capacitive transducer (b) Distance using ultrasonic transducer

Reference Books:

1. Physics of Semiconductor Devices, S. M. Sze. Wiley-Interscience.
2. Handbook of Thin Film Technology, Leon I. Maissel and ReinhardGlang.
3. The science and Engineering of Microelectronics Fabrication, Stephen A. Champbell, 2010, Oxford University Press.

B.Sc -Faculty of Sciences
CBCS Pattern in Semester System (*with effect from 2016-17*)

Skill Enhancement Course-III - FOR ALL SCIENCE FACULTY DEPARTMENTS
B.Sc., III YEAR, V Semester
VERBAL REASONING FOR APTITUDE TEST

Credits: 2

Theory: 2 hours/week **Marks - 50**

Unit – I NUMBERS AND DIAGRAMS

1.1 Series Completion: Number series, Alphabet Series
1.2 Series Completion: Alpha Numeric Series, Continuous Pattern Series
1.3 Logical Venn Diagrams
1.4 Mathematical Operations: Problem solving by substitution, Interchange of signs and numbers

Unit – II ARITHMETICAL REASONING

2.1 Mathematical Operations: Deriving the appropriate conclusions
2.2 Arithmetical Reasoning: Calculation based problems, Data based problems
2.3 **Arithmetical Reasoning**: Problems on ages, Venn diagram based problems
2.4 Cause and Effect Reasoning

Text Book: A Modern Approach to Verbal & Non-Verbal Reasoning by Dr.R.S.Aggarwa