FACULTY OF SCIENCES

SYLLABUS

of

Electronics

For

B.Sc. Non-Medical

(Semester I & II)

(Under Continuous Evaluation System)

(12+3 System of Education)

Session: 2018-19

The Heritage Institution

KANYA MAHA VIDYALAYA JALANDHAR (Autonomous)

SEMESTER–I
Electronics
PRINCIPLE OF ELECTRONICS-I (101)
(THEORY)
Course Code: BSNM-1184

Time: 3 Hrs.   **Max. Marks: 100**
Theory : Paper-101 : 30 & Paper-102 : 30
Practical: 20
CA: 20

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT -1
(i). Circuit Concepts: Circuit elements, independent and dependent sources, signals and wave forms, periodic and singularity functions
(ii). Mesh & Nodal Analysis: Loop currents and loop equations, node voltages and node equations, mesh and supermesh analysis, nodal and supernodal analysis, duality, graphical method of determining the dual of N/Ws.
UNIT-II
(i). Network Theorems: Superposition, Thevenin, Norton, Maximum power Transfer, Tellegen, Reciprocity theorem, Millman theorem for DC and AC sources.
(ii). Basic Components and Source Transformation: R, L and C component, Ohm's Law, Kirchhoff's Volatge Law, Kirchhoff's Current Law, Source Transformation, Simple RC, RL and RLC dc and ac circuits.

UNIT- III
(i). Junction Diode Circuits: Basic idea about junction (Homojunction and Hetrojunction), Theory of PN junction diode, depletion layer, Volt- Ampere Characteristics, Temperature Dependence of PN diode, diode breakdown, circuit model of PN diode.
(ii). Types of diodes and Applications – Zener diode, LED, photo diode, varactor diode, Diode Clippers, Diode Clampers, Zener as voltage regulator, Rectifiers–half wave and full wave, filters.

UNIT–IV
(i). Bipolar Junction Transistors: Junction Transistor structure and types, current components, CB, CE and CC transistor configurations and characterstics, current amplification factor, transistor as an amplifier, transistor as an switch.
(ii). Field Effect Transistors: The JFET, V/I characteristics, pinch off voltage, MOSFET Enhancement type and depletion type(structure and operation).
Recommended Books:
1. Basic Electronics & Linear Circuits by N.N. Bhargava (TMH).
2. Basic Electronics by B.L.Theraja (S. Chand & Co.).
3. Circuit and Network Analysis & Synthesis by R. Sudhakar, Tata McGraw-Hill Education.
4. Circuit Theory: Analysis and Synthesis by A. Chakrabarti, Dhanpat Rai Publications.
5. Network and Systems by D.R.Choudhury, New Age International Publishers.

DIGITAL ELECTRONICS-I (102)
(THEORY)
Course Code: BSNM-1184

Time: 3 Hrs.   **Max. Marks: 100**
                                  Theory : Paper-101 : 30 & Paper-102 : 30
                                                          Practical: 20
                                                                CA: 20

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT–I
Binary System: Number system (Decimal, binary, octal, hexadecimal), binary addition and subtraction, negative number representation, 1's complement, 2's complement of binary number, subtraction using 1's and 2's complement method.

UNIT–II
Digital Codes: Weighted Codes – Binary Coded Decimal (BCD), Unweighted Codes – Excess–3 Code, Gray Code, Code conversion— binary to BCD, BCD to binary, binary to Gray, Gray to sbinary, decimal to Excess–3, BCD to Seven segment display.

UNIT–III
Boolean Algebra–Logic Gates
Boolean Algebra, Minimization using Boolean algebra, Logic Gates, universal property of NAND and NOR gates, Duality theorem, De Morgans' Laws,

UNIT-IV
Simplification of Boolean
Karnaugh mapping (up to 4 variables), SOP and POS form, Don't care terms, Q-M Method.

Books Recommended:
1. Digital Design by Mano M. Morris (PHI),
2. Fundamentals of Digital Circuits by A. Anand Kumar (PHI).
3. Digital Principles & Applications by Mulvino and Lelach (TAIII)
4. Digital Electronics Principal Malvino (TIIM).
5. Digital Electronics by V.K. Puri

Electronics
SEMESTER–I
(PRACTICAL)
Course Code: BSNM-1184

Time: 3 Hrs. **Marks: 20**

Instructions for the paper setter: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

General Guidelines for Practical Examination:
I. The distribution of marks is as follows :
i) One experiment 7 Marks
ii) Brief Theory 3 Marks
iii) Viva–Voce 5 Marks
iv) Record (Practical file) 5 Marks
II. There will be one sessions of 3 hours duration. The paper will have one session.
Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.
III. Number of candidates in a group for practical examination should not exceed 12.
IV. In a single group no experiment be allotted to more than three examinee in any group.

EXPERIMENTS
1. To verify (1) Thevenin's theorem; (2) Reciprocity theorem; (3) Maximum power transfer theorem. (4) Norton theorem.
2. Practical on Source Transformation.
3. To study the forward and reverse characteristics of PN junction diode.
4. To design a regulated power supply using Zener diode.
5. To use a digital trainer to verify the given Boolean identity.
6. To study the logic gates (OR, AND, NOT, NAND, NOR, X-OR and X-NOR).
7. To demonstrate the operation BCD to seven segment display.
8. To study Half wave Rectifier with and without filter.
9. To study Full Wave Rectifier with and without filter.

Books Recommended:
1. Basic Electronics and Linear Circuits by N.N. Bhargava et. al. (TMH, New Delhi).
2. Circuits and Systems by K.M. Soni (S.K. Kataria & Sons, New Delhi).
3. Digital Electronics Circuit and System by V.K. Puri (TMH, New Delhi).
4. Digital Design by M. Morris Mano (PHI, New Delhi).

Electronics
PRINCIPLE OF ELECTRONICS-II (201)
(THEORY)
Course Code: BSNM-2184

Time: 3 Hrs.   **Max. Marks: 100**
Theory : Paper-201 : 30 & Paper-202 : 30
Practical: 20
CA: 20

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT–I
Laplace Transforms: Basic Introduction to Laplace Transformation, Transforms of elementary functions like exponential, step, ramp, impulse, sinusoidal, partial fraction expansion, evaluation of residues, Initial value theorem and final value theorem, application of Laplace transforms to network analysis, Relation between step response, impulse response and frequency.

UNIT-II
Network Functions: Z, Y, H and ABCD parameters, equivalent circuit in terms of parameters, between parameter sets, parallel and cascade interconnection of two port network function of terminated two port, application of two port parameters to analysis of T, ladder bridged–T and lattice networks.

UNIT–III
Single stage transistor amplifier, graphical analysis, DC and AC equivalent of amplifier, load line analysis, current and voltage gain of amplifier, small signal transistor model (H parameter, resistance models), Multistage amplifiers, RC coupled amplifiers, transformer coupled amplifier,
direct coupled amplifier, Amplifier classification, Distortion in amplifiers.

UNIT–IV
Feedback and Oscillator: Feedback in amplifiers, positive feedback, negtive feedback, Principles of oscillators, types of oscillators, Hartley, Collpit, Crystal Oscillators, RC Phase Shift, Wein Bridge Oscillator.

Recommended Books:
1. Basic Electronics & Linear Circuits by N.N. Bhargava (TMH).
2. Basic Electronics by B.L. Theraja (S. Chand & Co.)
3. Electronic devices and circuit Theory by Boylsted
4. Network Analysis & Synthesis by K.M Soni.
5. Network Analysis & Synthesis by R. Sudhakar.

Digital Electronics -II (202)
(THEORY)
Course Code: BSNM-2184

Time: 3 Hrs.   **Max. Marks: 100**
Theory : Paper-201 : 30 & Paper-202 : 30
Practical: 20
CA: 20

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT–I
Combinational Logic Circuits: Arithmetic and Logic circuits, half adder, full adder, half subtractor, full subtractor, comparator, multiplexer, demultiplexer, encoder, decoder, parity generator and checker.

UNIT–II
Flip-flop: Introduction to sequential circuits; flip flops, RS flip-flop, Clocked RS flip-flop, D flip-flop, Latches, level triggered & edge triggered flip-flops, positive and negative edge triggering, limitations of JK flip-flop, race-around condition. Applications of flip flops.

UNIT–III
Converters: Digital to analog converters: variable resister network, binary ladder. Analog–to–digital converters: simultaneous conversion, counter method, continuous conversion, dual–slope conversion.

UNIT-IV
Semiconductor Memories:
Introduction, Memory organization, Classification and characteristics of memories. Read/write memory, ROM, RAM, EPROM, EEPROM, Basic idea of static dynamic memory,

Recommended:
1. Digital Design by Mano M. Morris (PHI).
2. Fundamentals of Digital Circuits by A. Anand Kumar, (PHI).
3. Digital Principles & Applications by Leach & Donald (TMH).
4. Digital Logic Design by Leach/Mal. (McGraw Hill).
5. An Engg. Approach to Digital Design : Fletcher (PRI)

Electronics
SEMESTER–II
(PRACTICAL)
Course Code: BSNM-2184

Marks: 20

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and one of these is to be allotted by the external examiner.
III. Number of candidates in a group for practical examination should not exceed 12.
IV. In a single group no experiment be allotted to more than three examinee in any group.

EXPERIMENTS

1. To determine (1) z–parameters; (2) y–parameters; (3) h–parameters and (4) ABCD–parameters, of a two port resistive network. 2.
2. To study truth table of shift register.
4. To study the truth table of flip flop.
5. Study of encoder, decoder circuit.
6. Study of A/D and D/A converter.
7. To form a half adder and a full adder using NAND gates and verify their truth tables.
8. To form a 2 bit comparator using NAND gates.

Books Recommended:–
1. Basic Electronics and Linear Circuits by N.N. Bhargava et. al (TMH, New Delhi).
2. Circuits and Systems by K.M. Soni (S.K. Kataria & Sons, New Delhi).
3. Digital Electronics Circuit and System by V.K. Puri (TMH, New Delhi).
4. Digital Design by M. Morris Mano (PHI, New Delhi).