List of Revised Courses

Department : *Pure and Applied Physics*

Program Name : *B.Sc. (Electronics)*

Academic Year : 2016-17

List of Revised Courses

Sr. No.	Course Code	Name of the Course
01.	BE-101	Network Theorems and AC Circuits
02.	BE-102	Basic Electronics – I
03.	BE-201	Digital Electronics - I
04.	BE-202	Basic ELectronics-II

Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2016-17

School : *School of Physical Sciences*

Department : *Pure and Applied Physics*

Date and Time : *December 12, 2016 – 11:30 AM*

Venue : *Smart Class Room*

The scheduled meeting of member of Board of Studies (BoS) of Department of Pure and Applied Physics, School of Studies of Physical Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur, was held to design and discuss the B. Sc. (Electronics) First year (I and II Semesters), scheme and syllabi.

The following members were present in the meeting:

1. Dr. R. P. Prajapati
2. Dr. M. N. Tripathi
3. Dr. R. K. Pandey
4. Dr. Parijat Thakur
5. Dr. H. S. Tewari
6. Prof. D. P. Ojha
7. Prof. P. K. Bajpai

The committee discussed and approved the scheme and syllabi. The following courses were revised in the B. Sc. (Electronics) First year (I and II Semesters):

- Network Theorems and AC Circuits (BE-101)
- Basic Electronics - I (BE-201)
- Digital Electronics – I (BE-201)
- Basic Electronics – II (BE-202)

Signature & Seal of HoD

Scheme and Syllabus

Semester-I
Paper-I (BE-101): Network theorems and A.C. Circuits

Objective: This course is designed to develop basic understanding of passive electronic components and their response under DC and AC signal using network theorems.

Unit-I : Network theorems: conventional and electron flow, Concept of voltage source, Concept of current source, Kirchoff's current and voltage law, superposition theorem, reciprocity theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, impedance, parameters for two-port network, , reduction of complicated circuit method T and pi form, conversion of T and pi sections.

Unit-II : A.C. Fundamentals: Simple waveforms, complex wave forms, time period, frequency, amplitude, different forms of emf equations, phase, phase difference, root mean square value, average value, form factor,

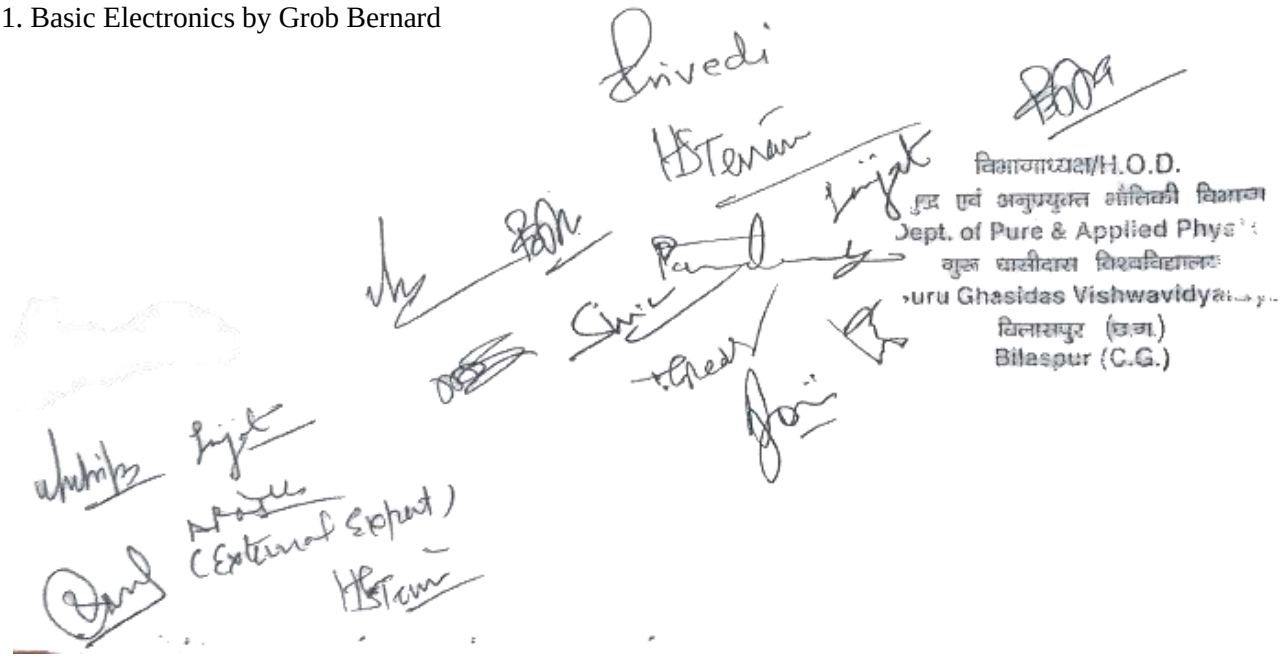
Unit-III: Phasor algebra: symbolic notation, significance of operator j, conjugate complex number, various forms of vector representations.

Unit-IV: AC through RC, RL, RLC series and parallel circuits, resonance in series and parallel RLC circuits, graphical representation of series and parallel resonance circuits, band width and Q - factor of series RLC circuits.

Outcomes: After completion of this course students should be able to understand the behaviour of passive electrical circuit elements such as resistance, capacitance, inductance, source of electrical energy, analysis of linear electrical circuit under DC and AC electrical signals.

Text books:
1. Basic Electronics by Thareja B.L.
2. Principles of Electronics by Mehta V.K.

Reference books:
1. Basic Electronics by Grob Bernard



Paper-II (BE-102): Basic Electronics-I

Objective: To understand the physical construction, working and operational characteristics of semiconductor devices and digital electronic concepts.

UNIT-I: Energy Bands in Solids, Classification of materials based on band gap energy. Donor and Acceptor impurities. Law of electrical neutrality, Law of mass action. Carrier concentration and Fermi level of intrinsic Semiconductor, relation of intrinsic carrier density with band gap energy. **(07)**

UNIT-II:
Carrier density and Fermi level in extrinsic semiconductors (N-type and P-type). Electrical conductivity in semiconductors. Idea of carrier mobility, Drift and Diffusion current, Einstein relation. **(06)**

UNIT-III:
P-N junction properties: depletion region, barrier formation, barrier potential, barrier width, and junction capacitance. Bending of energy bands in PN Junction diode. Qualitative mechanisms of junction breakdown: avalanche breakdown and zener breakdown, Zener diode. **(07)**

UNIT-IV:
Idea of biasing, biasing of P–N junction diode, current across P–N junction, diode equation, diode resistances, load line of diode circuit. **(06)**

Outcome: This course provides students the fundamental concept of electronic devices through lecture, laboratory and out–of-class assignments. Students are provided learning experiences that enables them the ability to design and conduct experiments.

Text books:

1. Electronic Principles by Malvino A.P.
2. Basic Electronics by Grob Bernard
3. Basic Electronics by Thareja B.L.
4. Principles of Electronics by Mehta V.K.
5. Fundamentals of Microelectronics by Behzad Razavi

विभागाध्यक्ष/H.O.D.
शुद्ध एवं अनुप्रयुक्त भौतिकी विभाग
Dept. of Pure & Applied Physics
गुरु घासीदास विश्वविद्यालय
Guru Ghasidas Vishwavidyalaya
बिलासपुर (छ.ग.)
Bilaspur (C.G.)

Paper-III (BE-103): Lab-I

Objective: To understand the physical construction, working and operational characteristics of semiconductor devices and digital electronic concepts.

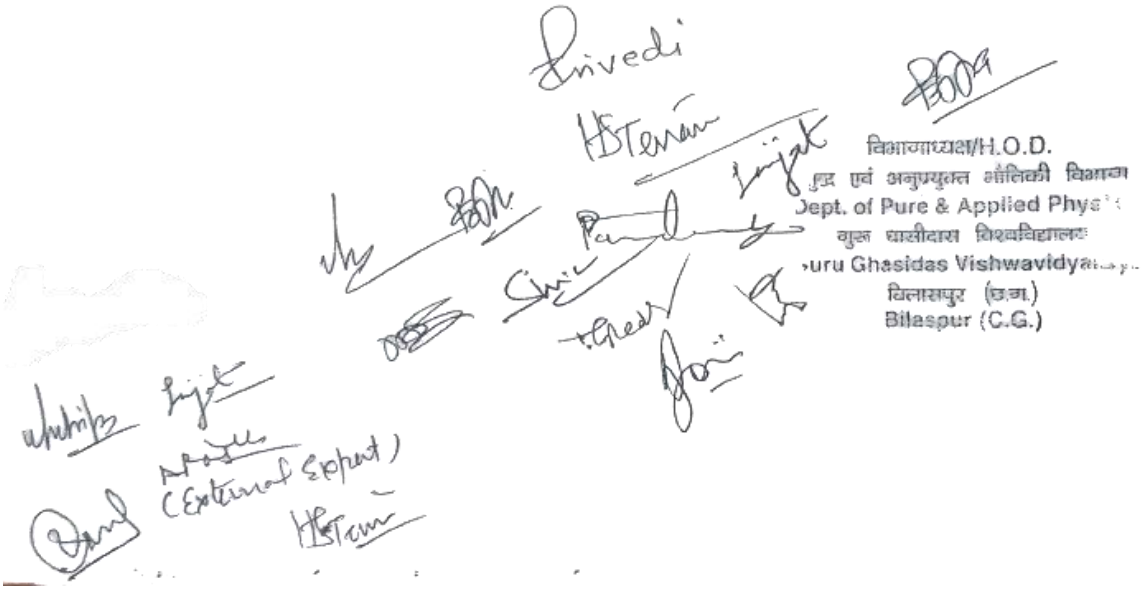
List of Experiments

1. Introduction to Basic Electronic Components (resistor, capacitor, inductor, diode)
2. Introduction to Test and Measurement Instruments (power supply, signal generator, multimeter, CRO)
3. Verify the Thevenin, Norton and Superposition Theorem.
4. Verify the Maximum Power Transfer Theorem.
5. To study forward biased and reversed biased characteristics of p-n junction diode.
6. To study the characteristics of the Zener diode.
7. To determine the band gap of the semiconductor.
8. To determine the capacitance of a capacitor by studying the variation of voltage during its charging and discharging
9. To determine the resonance frequency of LCR series circuit
10. Study of half wave rectifier
11. Study of Full wave rectifier
12. Study of ripple factor of half wave and full wave rectifier

Outcome: This course provides students the fundamental concept of electronic devices through lecture, laboratory and out–of-class assignments. Students are provided learning experiences that enables them the ability to design and conduct experiments.

Books:

1. Practical Physics-D. Chattopadhyay and P.C. Rakshit
2. Practical Physics-Wilson
3. Practical Physics- Geeta Sanon



Semester-II

Paper-IV (BE-201) DIGITAL ELECTRONICS-I

Objective: Investigate the fundamental issues driving network design. Learn about dominant network technologies.

Unit I: Number systems:

Binary number system, Binary to decimal conversion, Decimal to binary conversion, octal number system, octal to decimal conversion – decimal to octal conversion, binary to octal conversion, octal to binary conversion, advantages of octal number system, hexadecimal number system, binary to hexadecimal conversion, hexadecimal to binary conversion. **(07)**

Unit II: Binary operations:

Addition, subtraction, multiplication, and division. Complement of a number- 1's complementary and 2's complementary methods. Laws of Boolean algebra, De Morgan's theorem, Logic circuits, Positive and Negative Logic, OR gate and equivalent circuit of an OR gate, AND gate and equivalent circuit of an AND gate, NOT gate and equivalent circuit of a NOT gate. **(07)**

Unit III:

Diode OR gate circuit, Diode AND gate circuit, Transistor OR gate circuit, Transistor AND gate circuit. NOR gate and XNOR gate, NOR gate as a Universal gate, NAND gate, NAND gate as a Universal gate. **(06)**

Unit IV:

Adders and Substractor, Half Adder, Full Adder, Half Substractor, Full Substractor, Half Adder using NAND gate, Full Adder using NAND gate. **(06)**

Outcome: Demonstrate the ability to unambiguously explain networking as it relates to connection of computers media and devices.

References:

1. Modern Digital Electronics by R.P.Jain
2. Principles of Electronics. V. K. Mehta, Rohit Mehta
3. Digital Computer Electronics: Malvino and Brown
4. Digital Electronics by Malvino and Leech

Paper-V: (BE-202) Basic Electronics-II

Objective: To understand the physical construction, working and operational characteristics of semiconductor devices and digital electronic concepts.

UNIT-I: Filter circuits, Inductor and capacitor filter, L-section filter, ∏-section filter, voltage regulation, Idea of BJT, PNP & NPN transistors, transistors parameters **(07)**

UNIT-II: CE, CB, and Cc configurations, transistors characteristics curves, active, cut off and saturation regions, load line, operation point. **(07)**

UNIT-III: field effect transistors, construction and working of JFET, channel width, various parameters of JFET, derivation of voltage and current gain, input and output impedance, expression for drain current, voltage gain of JFET, JFET as an amplifier, MOSFET, Characterization. **(07)**

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UNIT-IV: BJT amplifiers, equivalent circuits of transistors, analysis of single stage CE amplifier, CB amplifier, practical circuit of CE amplifier. **(07)**

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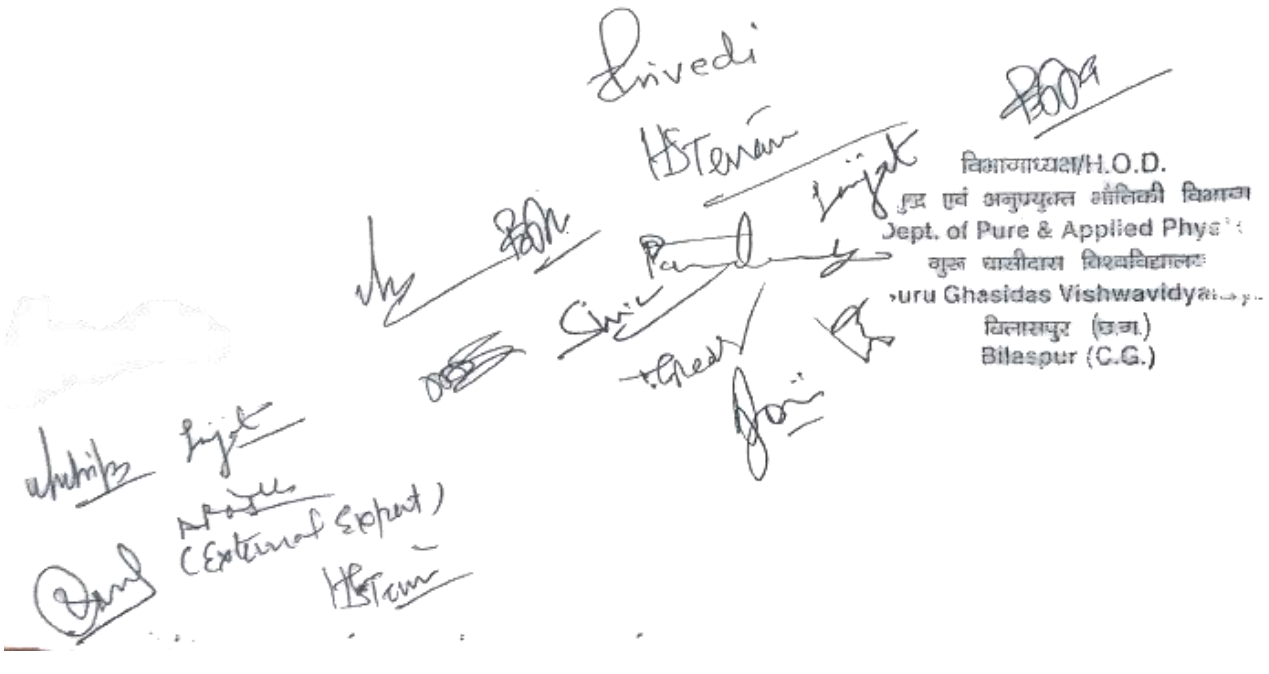
Outcome: This course provides students the fundamental concept of electronic devices through lecture, laboratory and out–of-class assignments. Students are provided learning experiences that enables them the ability to design and conduct experiments.

Text books:

1. Electronic Principles by Malvino A.P.
2. Basic Electronics by Grob Bernard
3. Basic Electronics by Thareja B.L.



Paper-VI (BE-203): Lab-II

Objective: Investigate the fundamental issues driving network design. Learn about dominant network technologies.

List of Experiments

1. To verify AND, OR, NOT gates.
2. To study the I-V Characteristics of the Common Emitter configuration of BJT.
3. To study the I-V Characteristics of the Common Base configuration of BJT.
4. To study the I-V Characteristics of the Common Collector configuration of BJT.
5. To study the I-V Characteristics of the Common Source FET configuration.
6. To study the I-V Characteristics of the Common Gate FET configuration.
7. To study the I-V Characteristics of the Common Drain FET configuration.
8. To study the I-V Characteristics of MOSFET.
9. To study the Half wave rectifier and study the effect of C filter.
10. To study the Full wave rectifier and study the effect of C filter.
11. To study a Single Stage CE amplifier.

Outcome: Demonstrate the ability to unambiguously explain networking as it relates to connection of computers media and devices.

Books:

1. Practical Physics-D. Chattopadhyay and P.C. Rakshit
2. Practical Physics-Wilson
3. Practical Physics- Geeta Sanon

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