HINDI MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)

(Affiliated to Osmania University)

Nallakunta, Hyderabad-44

B.Sc. II YEAR, SEMESTER III & IV

DEPARTMENT OF PHYSICS

(2021-2022)

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS
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18/12/2021
Prof. M. SRINIVAS
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Members of BOS

1. Prof. M. Prasad
   Department of Physics
   Osmania University
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Dr. M. PRASAD
Professor
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2. Dr. P. Sakuntala
   HOD, Department of Physics
   RBVRR Women's College
   Narayanaguda, Hyderabad.

P. Sakuntala

Head Department of Physics & Electronics

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)

COMPOSITION OF THE BOARD OF STUDIES IN AN AUTONOMOUS COLLEGE

I. Composition: Department of Physics

1. **Head of the Department concerned (Chairperson)**
   Ms.M. Shivaleela, Department of Physics
2. The entire faculty of each specialization
   1. Ms.M.Shivaleela
   2. Ms. S.Keerthi
3. One expert to be nominated by the Vice Chancellor from a panel of six recommended by the College Principal
   1. Prof.D.KarunaSagar, University Nominee andHOD, Department of Physics,OU,Hyd.
   2. Prof. M. Srinivas, Chairman, BOS, Department of Physics, Osmania University, Hyd.
   3. Prof.M.Prasad, Member, Department ofPhysics, OU.
   4. Dr. P. Sakuntala, Member, Department of Physics, RBVRR Women's College, Narayanaguda, Hyderabad.
4. Three experts on the subject from outside the college to be nominated by the Academic Council.
   (a)Experts from outside the College whenever special courses of studies are to be formulated. To be nominated.
   (b) Other members of staff of the same faculty.

M. Shivaleela
Chairperson
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Dept. of Physics, OU
Hindi Mahavidyalaya BoS Chairperson
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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS
AGENDA OF THE MEETING

4.1 Welcome address by the chair.

4.2 Previous Meeting Details.

4.3 Details of choice based credit system.

4.4 Discussion and Distribution of Common Core Syllabus for all the Semester (III and IV).

4.5 Marks allotted for internal and end semester exams.

4.6 Discussion on Pattern and model paper of Semester Exam and internal exam for all the Semesters (III and IV).

4.7 Discussion on Practical exam model paper for all the Semesters (III and IV).

4.8 Panel of Examiners.

4.9 Any other matter.

4.10 Vote of thanks.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF PHYSICS
BOARD OF STUDIES
Academic Year – 2021-2022

Minutes of BOS Meeting

BOS meeting of the Department of Physics was held on ...18/12/2021....The following members were present

Ms.M.Shivaleela	-	Chairperson	M. Shivaleela
Prof.D.KarunaSagar	-	University Nominee& Head, Department of Physics, OU	
Prof.M.Srinivas	-	Chairperson BOS, Department of Physics,OU	
Prof.M. Prasad	-	Member	
Dr. P. Sakuntala	-	Member	P. Sakuntala

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Head Department of Physics & Electronics

4.1 Welcome address by the chair

The chair welcomed the University Nominee, Chairperson BOS, O.U. Department of Physics and Member of BOS.

4.2 Previous Meeting details

The CBCS system has been introduced by Osmania University from 2016-17. The theory and practical syllabus of I, II & III years of B.Sc., question paper pattern for theory and practical, internal assessment pattern, practical examination scheme and panel of examiners were discussed and approvedby all the BOS Members in previous BOS meeting.

4.3 Details of choice based credit system

Members were informed that TSCHE has referred that from the academic year 2016-17 autonomous institutions have to follow CBCS i.e. From the Academic Year 2016-17 Osmania

University has instructed all the Degree colleges including Autonomous Degree colleges to follow CBCS under which after passing the exam student will get the Grade in the Final Result. B.Sc. III YEAR in V and VI semester 3 credits are given for theory paper and 1 credit is given for practical in each semester.

4.4 Discussion and Distribution of Common Core Syllabus for semester III and IV.

i. Members were informed by the chair that Department of Physics, Hindi Mahavidyalaya is following common core syllabus prescribed by Osmania University B.Sc. II YEAR in III and IV semesters.

ii. The syllabus comprises of 4 units.
Syllabus copy for both the semesters is enclosed.

iii. Syllabus was approved by the Members of BOS.

4.5 Marks allotted for Internal and end Semester exams.

1. Internal assessment is of 30 marks in which 20 marks are for online test, where students have to answer 20 MCQs in 30 minutes. Each question carries 1 mark. In each semester two online tests of 20 marks will be conducted and an average of both the tests will be added in the marks of theory exam.
2. Theory Question paper is of 70 marks.
3. Total allotted marks are 100 for each theory paper (III & IV)
4. Total allotted marks are 25 for each Practical Paper (III & IV) (One Question 15Marks + Record 5 Marks + Viva 05 Marks)
5. Internal assessment is of 15 marks for SEC. One online internal assessment of 10 marks will be conducted and added in the marks of theory exam.
6. Theory Question paper for SEC is of 35 marks.
7. Total allotted marks are 50 for each SEC.

The distribution of marks was approved by the members of BOS.

4.6 Discussion on Pattern and Model Paper of Semester exam and Model Paper of Internal Exams

1. It was informed by the department that in each Semester Two Internal exams will be conducted for DSC of 20 marks. The continuous internal assessment will have three sections.

Section – A 20 multiple choice questions each carries 1 mark (20 x 1=20M),
Section – B Assignment – 5 Marks
Section – C Seminar– 5 Marks

Average of marks of these two internal exams will be taken.

2. It was informed by the department that in each Semester one Online test will be conducted for SEC of 10 marks. The internal assessment will have two sections

Section – A 10 multiple choice questions each carries 1 mark (10 x 1=10M),
Section – B Assignment/seminar – 5 Marks

3. Semester exam will be conducted as per the Almanac which will be provided by the exam branch. Internal exam duration will be 30 min and Semester exam duration will be of 2 ½ hrs.

4. Model Question paper for Semester III and Semester IV was discussed. Theory paper for each Semester will have 2 sections.

i). Section A contains 8 short Questions. The student has to answer six questions.
Each Question carries 3 Marks (6X3=18 Marks)
ii). Section B contains 4 Essay type Questions with internal choice.
Each Question carries 13 Marks (4X13=52 Marks)

5. Model Question paper of SEC for Semester III and Semester IV was discussed.
Theory paper for each SEC will have 2 sections.

i). Section A contains 4 short Questions. The student has to answer THREE questions. Each Question carries 5 Marks (3X5=15 Marks)
ii). Section B contains 2 Essay type Questions with internal choice.
Each Question carries 10Marks (2X10=20 Marks)

6. Model Question paper for Practical of Semester III and Semester IV was discussed.
One Question 15 Marks, Record 05 marks and Viva 05 Marks

- Pattern of Model Theory Question Papers for DSC and SEC Paper III and Paper IV are enclosed.
- Pattern of Model Theory Question Papers for DSC and SEC was approved by Member Of BOS

4.7 Discussion on Practical Exam Model paper.

It was decided in BOS meeting that 25 Marks Practical Exam of 3hrs. Will be held in each Semester and 1 credit will be given for Practical in each Semester.

- It is decided that the practical examinations held for B.Sc. Second years (Semester III & IV) from the academic year 2021-22 onwards will have the pattern of 25 marks scheme and the credits will remain the same i.e. 1 credit. The duration of the exam will be 3 hours.
- Pattern of Model Practical Question Papers for Paper III and Paper IV are enclosed.
- Pattern of Model Practical Question Papers was approved by Members of BOS.

4.8 Panel of Examiners

The panel of examiners was approved by the members.

- List is enclosed

4.9 Any other matter

4.10 Vote of Thanks

Meeting concluded with the Vote of Thanks by Ms.M.Shivaleela

M. Shivaleela

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18/12/2021

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2. P. Sawantale
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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. II Year, Semester – III
PHYSICS Paper III
Electromagnetic Theory

Theory Classes	**4 Hrs. /Week**
Practical Classes	**3 Hrs. /Week**
Credit for Theory	**4**
Credit for Practical	**1**
Duration of Semester Examination	**2 ½ hours**
Duration of Internal Examination	**30 minutes**
Semester Examination Marks	**70 Marks**
Internal Marks	**30 Marks**

Unit – I **11 Hrs**

Electrostatics

Electric Field:-Concepts of electric field lines and electric flux, Gauss's law (Integral and differential forms), application to linear, plane and spherical charge distributions. Conservative nature of electric filed 'E', Irrotational field

Electric potential:-Concept of electric potential, relation between electric potential and electric field, potential energy of a system charges. Energy density in an electric field. Calculation of potential from electric field for a spherical charge distribution

Unit-II **12 Hrs**

Magnetostatics

Concept of magnetic field 'B' and magnetic flux, Biot-Savarts law, B due to a straight current carrying conductor. Force on a point charge in a magnetic field. Properties of B, curl and divergence of B, solenoidal field. Integral form of Ampere's law, Application of Amperes law: field due to straight, circular and solenoidal currents, Energy stored in magnetic field .Magnetic energy in terms of current and inductance .Magnetic force between two current carrying conductors. Magnetic field intensity.

Ballistic Galvanometer:-Torque on a current loop in a uniform magnetic field, working principle of B.G, current and charge sensitivity, electromagnetic damping, critical damping resistance.

Unit-III **13 Hrs**

Electromagnetic Induction and Electromagnetic waves

Faraday's laws of induction (differential and integral form), Len's law, self and mutual Induction. Continuity equation, modification of Ampere's law, displacement current, Maxwell equations.Maxwells equations in vacuum and electric medium, boundary conditions .plane wave equatipon:transverse nature of EM waves, velocity of light in vacuum and in medium.Poynting theorem.

Unit-IV **12 Hrs**

Network Theorems (6 Hrs.)

Passive elements, Power sources, Active elements, Network models: T and π Transformations, Super position theorem, Thevenin'sthorem, Norton's theorem. Reciprocity theorem and Maximum power transfer theorem (Simple problems).

Varying and alternating currents (6 Hrs.)

Growth and decay of currents in LR.CR and LCR circuits-Critical damping .Alternating current, relation between current and voltage in pure R, C and L-vector diagrams-power in ac circuits.
LCR series and parallel resonant circuit-Q-factor.AC &DC motors-single phase, three phase (Basics only).

Text Books

1. Fundamental of electricity and magnetism by Arthur F. Kip (McGraw-Hill,1968)
2. Telugu Academy
3. Electricity and magnetism by J.H.Fewkes& John Yarwood.Vol.1(Oxford Univ.Press,1991)
4. Introduction to Electrodynamics, 3rd edition, by David Griffiths, (Benjamin Cummings, 1998).
5. Electromagnetism by Joseph A.Edminister 2nd ed.(New Delhi: Tata McGraw Hill,2006)

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
THIRD SEMISTER PRACTICALS (3 hrs / week)
Practical Paper – III

1. To verify the Thevenin Theorem.
2. To verify Norton Theorem.
3. To verify Superposition Theorem.
4. To verify Maximum power transfer theorem.
5. To determine a small resistance by Carey Foster's bridge.
6. To determine the (a) current sensitivity, (b) charge sensitivity, and (c) CDR of a B.G
7. To determine high resistance by leakage method.
8. To determine the ratio of two capacitances by De Sauty's bridge.
9. To determine self-inductance of a coil by Anderson's bridge using AC.
10. To determine self-inductance of a coil by Rayleigh's method.
11. To determine coefficient of Mutual inductance by absolute method.
12. LR circuit.
13. RC circuit.
14. LCR series circuit.
15. LCR parallel circuit.

Note: Minimum of eight experiments should be performed.

Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of two hours per week.

Text and reference books

1. B.L .Worsnop and H. T.Flint, Advanced practical Physics, Asia Publishing House, New Delhi.
2. InduPrakash and Ramakrishna, A Text Book of Practical Physics KitabMahal.

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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B.Sc. II Year, Semester – IV
PHYSICS Paper IV
Waves and Optics

Theory Classes	**4 Hrs. /Week**
Practical Classes	**3 Hrs. /Week**
Credit for Theory	**4**
Credit for Practical	**1**
Duration of Semester Examination	**2 ½ hours**
Duration of Internal Examination	**30 minutes**
Semester Examination Marks	**70 Marks**
Internal Marks	**30 Marks**

Unit – I

Waves **12Hrs.**

Fundamental of Waves-Transverse wave propagation along a stretched string, general solution of wave equation and its signifance,modes of vibration of stretched string clamped at ends,overtones,energy transport, transverse impedance.

Longitudinal vibrations in bars-wave equation and its general solution. Special cases (i) bar fixed at both ends ii) bar fixed at the mid-point iii) bar free at both ends iv) bar fixed at one end. Transverse vibrations in a bar-wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

Unit-II **12Hrs.**

Interference

Principle of superposition-coherence-temporal coherence and spatial coherence-conditions for interference of light.

Interference by division of wave front: Fresnel's biprism-determination of wave length of light. Determination of thickness of a transparent material using Biprism – change of phase on reflection - Lloyd's mirror experiment.

Interference by division of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law)-Colours of thin films-Nonreflecting films-Interference by a plane parallel film illuminated by a point source-Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film)-Determination of diameter of wire-Newton's rings in reflected light with and without contact between lens and glass plate, Newton's rings in transmitted light (Haidinger Fringes)- Determination of wave length of monochromatic light – Michelson Interferometer – Types of fringes – Determination of wavelength of monochromatic light, Difference in wavelength of sodium D_1,D_2 lines and thickness of a thin transparent plate.

Unit –III **12Hrs.**

Diffraction

Introduction-Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction:- Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhofer diffraction due to double slit – Fraunhofer diffraction pattern with N slits (diffraction grating).

Resolving power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel diffraction – Fresnel's half period zones –area of the half period zones - zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – diffraction at a straight edge – difference between interference and diffraction.

Unit-IV **12Hrs.**

Polarization

Polarized light: Methods of Polarization by reflection, refraction, Double refraction, selective absorption, scattering of light – Brewster's law- Mauls law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

NOTE: Problems should be solved at the end of every chapter of all units.

Suggested Books

1. **Optics** by AjoyGhatak. The McGraw-Hill companies.
2. **Optics** by Subramaniyam and Balaji. S. Chand&Co.
3. **Second year physics** – Telugu Academy.
4. K.Ghatak, **Physical Optics**.
5. Smith and Thomson: '**Optics**' (John Wiley and sons).

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
FOURTH SEMISTER PRACTICALS (3 hrs / week)
Practical Paper – IV: Waves and Optics

1. Thickness of a wire using wedge method.
2. Determination of wavelength of light using Biprism.
3. Determination of Radius of curvature of a given convex lens by forming Newton's rings.
4. Resolving power of grating.
5. Study of optical rotation-Polari meter.
6. Dispersive power of a prism.
7. Determination of wavelength of light using diffraction gratting minimum deviation method.
8. Wavelength of light using diffraction grating –normal incidence method.
9. Resolving power of a telescope.
10. Refractive index of a liquid and glass (Boys Method).
11. Pulfrichrefractometer-determination of refractive index of liquid.
12. Wavelength of Laser light using diffraction grating.
13. Verification of Laws of a stretched string (Three Laws).
14. Velocity of Transverse wave along stretched string.
15. Determination of frequency of a bar-Melde's experiment.

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P.Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).

2. S.P. Singh, "Advanced practical Physics" (PragatiPrakashan, Meerut).

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. PHYSICS-II[nd] Year
Skill Enhancement course I

Experimental methods and error analysis **(Credits: 02)**

Unit-1: **15Hrs.**

Experimental methods: Least count of instruments, Instruments for measuring mass, length, time, Angle, current, voltage.Fundamental units. Precision and accuracy of measurements, source of error in measurements, necessity of estimating errors, types of errors, reading error of instrument, calibration error, random error, systematic error, significant digits, order of magnitude and rounding of numbers, rounding error, absolute and relative errors, Errors of computation- addition, subtraction, multiplication, division, error in power and roots, Propagation of errors, analysis of data, standard deviation, calculation of mean value.

Unit-2: **15Hrs.**

Statistical Analysis of errors: Mean, Median and Mode and standard deviation, standard deviation of mean, Least squares fitting, Normal distribution, covariance and correlation, Binomial distribution, Passion distribution, chi square test

NOTE: Problems should be solved at the end of every chapter of all units

References:

1. The theory of Errors in Physical Measurements-J C Pal-New Central Book Agency-2010

2. Data reduction and Error analysis for the physical sciences by DK Robinson and P R Bevington

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. PHYSICS-II[nd] Year
Skill Enhancement course II

ELECTRICAL CIRCUIT NETWORKING **(Credits: 02)**

Unit I: **(15Hrs.)Basic Electricity Principles:** Voltage, Current, Resistance, and Power. Ohm's law.Series, parallel, and series-parallel combinations.AC Electricity and DC Electricity.Familiarization with multimeter, voltmeter and ammeter.

Understanding Electrical Circuits: Main electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single phase and three-phase alternating current sources Rules to analyze AC sourced electrical circuits. Real, imaginary and complex power components of AC source.Power factor.Saving energy and money.

Electrical Drawing and Symbols: Drawing symbols. Blueprints.Reading Schematics. Ladder diagrams. Electrical Schematics.Power circuits. Control circuits Reading of circuit schematics. Tracking the connection of elements and identify current flow and voltage drop.

Generators and Transformers: DC Power sources. AC/DC generators.Inductance, capacitance, and impedance.Operation of transformers.)

Electric Motors: Single-phase, three-phase & DC motors. Basic design.Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor.

Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers.Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources

Unit II: **(15Hrs.)**

Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection.Grounding and isolating. Phase reversal. Surge protection Interfacing DC or AC sources to control elements (relay protection device).

Electrical Wiring: Different types of conductors and cables. Basics of wiring-Star and delta connection.Voltage drop and losses across cables and conductors.Instruments to measure current, voltage, power in DC and AC circuits Insulation.Solid and stranded cable.Conduit Cable trays.

Splices: wire nuts, crimps, terminal blocks, split bolts, and solder. Preparation of extension board.

NOTE: Problems should be solved at the end of every chapter of all units.

Reference Books:
A text book in Electrical Technology-BL Theraja-S Chand & Co

P. Samuel
Head Department of Physi
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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. PHYSICS-II[nd] Year
Skill Enhancement course III

BASIC INSTRUMENTATION **(Credits: 82)**

Unit I: **15 Hrs.**

Basics of Measurement: Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects.

Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance).

Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance.AC millivoltmeter: Type of AC millivoltmeters: Amplifier- rectifier, and rectifier-amplifier. Block diagram ac millivoltmeter, specifications and their significance

Cathode Ray Oscilloscope: Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only- no mathematical treatment), brief discussion on screen phosphor, visual persistence &chemical composition Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.

Use of CRO for the measurement of voltage (dc and ac frequency, time period.Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.

Unit II: **15 Hrs.**

Signal Generators and Analysis Instruments: Block diagram, explanation and specifications of low frequency Signal generators, pulse generator, and function generator. Brief idea for testing, specifications Distortion factor meter, wave analysis.

Impedance Bridges & Q-Meters: Block diagram of bridge working principles of basic (balancing type) RLC bridge. Specifications of RLC Bridge. Block diagram & working principles of a Q-Meter. Digital LCR bridges.

Digital Instruments: Principle and working of digital meters. Comparison of analog & digital instruments.Characteristics of a digital meter.Working principles of digital voltmeter.

Digital Multimeter Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time-base stability, accuracy and resolution

NOTE: Problems should be solved at the end of every chapter of all units

Reference Books:

1. A text book in Electrical Technology-BL Theraja-S Chand and Co.
2. Performance and design of AC machines-MG Say ELBS Edn.
3. Digital Circuits and systems, Venugopal 2013, Tata McGraw Hill.
4. Logic circuit design. Shimon P. Vingron, 2012. Springer.
5. Digital Electronics SubrataGhoshal, 2012, Cengage Learning.

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B.Sc. PHYSICS-II[nd] Year
Skill Enhancement course IV

BIOMEDICAL INSTRUMENTATION (Credits: 02)
Unit I: 15 Hrs.

FUNDAMENTALS OF BIOMEDICAL ENGINEERING:
Cell and its structure - Resting and Action Potential - Nervous system and its fundamentals - Basic components of a biomedical system-Cardiovascular systems- Respiratory systems -Kidney and blood flow-Biomechanics of bone - Biomechanics of soft tissues - Basic mechanics of spinal column and limbs -Physiological signals and transducers Transducers selection criteria - Piezo electric, ultrasonic transducers - Temperature measurements - Fibre optic temperature sensors.

NON ELECTRICAL PARAMETERS MEASUREMENT AND DIAGNOSTIC PROCEDURES

Measurement of blood pressure Cardiac output - Heart rate - Heart sound - Pulmonary function measurements-spirometer - Photo Plethysmography, Body Plethysmography - Blood Gas analysers, pH of blood-measurement of blood pCO2, pO2, finger-tip oxymeter-ESR. GSR measurements.

Unit II: 15 Hrs.
ELECRICAL PARAMETERS ACUQUISITION AND ANALYSIS:
Electrodes- limb electrodes – Floating electrodes – Pregelled disposable electrodes – micro needle and surface electrodes – Amplifier, preamplifiers, differentiable amplifiers, chopper amplifier – isolation amplifier-ECG-EEG-EMG-ERG-Lead systems and recording methods-Typical waveforms - Electrical safety in medical environment, shock hazards - leakage current-Instruments for checking safety parameters of biomedical equipment's.

IMAGING MODALITIES AND ANALYSIS
Radio graphic and fluoroscopic techniques Computer tomography MRI- Ultrasonography Endoscopy-Thermography -Different types of biotelemetry systems - Retinal Imaging - Imaging application in Biometric systems Analysis of digital images.

LIFE ASSISTING, THERAPEUTIC AND ROBOTIC DEVICES:
Pacemakers-Defibrillators-Ventilators-Nerve and muscle stimulators-Diathermy-Heart-Lung machine - Audio meters – Dialysers - Lithotripsy-ICCU patient monitoring system- Nano Robots - Robotic surgery - Advanced 3D surgical techniques - Orthopedic prostheses fixation.

References:
1. R. S. Khandpur, Handbook of Biomedical Instrumentation, Tata Ma Graw Hill.

2. J.G.Webster, Medical Instrumentation, Application and Design, John Wiley and Sons

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B.Sc. PHYSICS-II[nd] Year
Skill Enhancement course IV
B.Sc. (Physics) - II/III Year Semester-III/IV/V/VI

Digital Electronics **(Credits: 02)**

Unit I: **15 Hrs.**

Number Systems:
Decimal, Binary, Octal and Hexadecimal.
Conversion: Binary to Decimal, Octal to Decimal Hexadecimal to Decimal, Decimal to Binary, Decimal to Octal and Decimal to Hexadecimal Binary coded decimal, Exess-3 code, grey code, ASCII code
Logic Gates: OR, AND, NOT, EX-OR, NAND, NOR, Universal gates Half adder and Full adder.

Unit II: **15 Hrs.**

Boolean algebra: Boolean laws, DE Morgan's theorems Sum of products Product of sums and Karnaugh maps Multiplexers and Demultiplexers.
Flip-Flops: RS flip-flop D flip-flop, IK tip-flop and MS flip-flop
Registers: Types of registers
Counters: Synchronous and Asynchronous counters and their differences

NOTE: Problems should be solved at the end of every chapter of all units

References
1. Digital Electronics by Gothaman

2. Digital principles and applications by Malvino and Leach

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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B.Sc. PHYSICS SYLLABUS UNDER CBCS SCHEME
SCHEME OF INSTRUCTION
B.Sc. II YEAR, SEMESTER III & IV
DEPARTMENT OF PHYSICS
Academic year 2021-2022

Semester	THEORY/PRACTICAL	TITLE	WORKLOAD Hrs/Week	CREDITS
III	THEORY-III	Electromagnetic Theory	4	4
	PRACTICAL-III	Electromagnetic Theory Practical's	3	1
	SEC–III	Experimental methods and error analysis	2	2
IV	THEORY-IV	Waves & Optics Theory	4	4
	PRACTICAL-IV	Waves & Optics Practical's	3	1
	SEC– IV	BIOMEDICAL INSTRUMENTATION	2	2

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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B.Sc. PHYSICS-II[nd] Year

Semester – III & IV, Paper – III&IV

Theory Model Question Paper

Time: $2\frac{1}{2}$hrs Max. Marks: 70

SECTION A

I Write short notes on any Six of the following: **6 X 3 = 18 Marks**

1. A question from unit I
2. A question from unit I
3. A question from unit II
4. A question from unit II
5. A question from unit III
6. A question from unit III
7. A question from unit IV
8. A question from unit IV

SECTION B

II Answer all the Questions. Each question carries 13 marks **4 X 13 = 52 Marks**

9 (a) A question from Unit I
(b) A question from Unit I
(OR)
(c) A question from Unit I
(d) A question from Unit I

10 (a) A question from Unit II
(b) A question from Unit II
(OR)
(c) A question from Unit II
(d) A question from Unit II

11 (a) A question from Unit III
(b) A question from Unit III
(OR)
(c) A question from Unit III
(d) A question from Unit III

12 (a) A question from Unit IV
(b) A question from Unit IV
(OR)
(c) A question from Unit IV
(d) A question from Unit IV

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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B.Sc. PHYSICS-II Year
Semester – III&IV
Paper – III&IV
Scheme of Model Question for Paper III&IV

Time-$2\frac{1}{2}$ Hrs — Max.Marks:100

Semester Exam Pattern — 70 Marks

Section –A 8 Short Answer Questions-----Answer any Six — 6x3=18 Marks
Each carries 3 marks

Section –B 4 Long Answer Questions-----With internal choice — 4x13=52 Marks
Each carries 13 marks

Total Marks=70

Internal Assessment Pattern 30Marks Duration-30 Min

In internal assessment there will be 1 section	
Section A 20-Multiple choice question	20x1=20 Marks
Two internal Assessment Average is to be considered	=20 Marks
One assignment to be given	= 5 Marks
Seminar	=5 Marks

Total Marks=30

Note: Equal Weightage has to be given to all units in each semester.

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B.Sc. PHYSICS-II[nd] Year

Semester – III&IV

Paper – III&IV

Practical Model Question Paper

Time: 3 hrs. **Max. Marks: 25**

1. **One practical question paper** **15 Marks**
2. **Record** **05 Marks**
3. **Viva** **05 Marks**

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S.No.	Name of the Examiner	Institution Name	Mobile Number
1	Dr. P. Sakuntala Asst. Professor, Department of Pysics.	RBVRR Women's College, Narayanaguda, Hyderabad.	9440357573
2	Mrs. B. Srilatha Asst. Professor, Department of Physics.	RBVRR Women's College, Narayanaguda, Hyderabad.	9849885589
3	Dr. Komala Asst. Professor, Department of Physics.	St. Pious, Ramnagar, Hyderabad.	9989740735
4	Dr. ChinnaBabu Asst. Professor, Department of Pysics.	Govt Degree College, Vidyanagar, Hyderabad.	9394801744
5	Dr. Vinodini Asst. Professor, Department of Pysics.	Govt City College, Hyderabad	9949214767
6	Smt. V.R. Manjula Asst. Professor, Department of Pysics.	Bhavan's New Science College, Narayanaguda, Hyderabad.	9676499011
7	Dr. Sarala Asst. Professor, Department of Pysics.	St. Ann's Degree College for Women, Mehdipatnam, Hyderabad.	9440750244
8	Dr. N. V. Prasad Asst. Professor, Department of Pysics.	Osmania University, Hyderabad.	9849553669
9	Dr. D. Aparna Asst. Professor, Department of Pysics.	Osmania University (OU Engineering), Hyderabad.	810667887

10	Smt. Usha Praveena Asst. Professor, Department of Pysics.	St. Francis, Hyderabad.	8106265680

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