SARVODAYA KELAVANI SAMAJ MANAGED,

SHREE MANIBHAI VIRANI AND SMT. NAVALBEN VIRANI SCIENCE COLLEGE,
An Autonomous College - Affiliated to Saurashtra University, Rajkot.

Re-Accredited at 'A' Level by NAAC
STAR college Scheme & Status by MST-DBT
UGC- College with Potential for Excellence (CPE)
UGC-DDU KAUSHAL Kendra
GAAA – Highest Grade A-1 by KCG, Government of Gujarat
GPCB-Government of Gujarat approved Environment Audit Center
UGC-Autonomous College

Board of Studies (BoS)

DEPARTMENT OF PHYSICS

COMPOSITION / AGENDA / NOTES / ATTENDANCE / MoM

Academic Year	Meeting Number	Date
2018- 2019	5	05/05/2018

Shree Manibhai Virani & Smt. Navalben Virani Science College, Rajkot

(Autonomous)

Affiliated to Saurashtra University, Rajkot

Department of Physics

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Shree Manibhai Virani & Smt. Navalben Virani Science College, Rajkot

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BOARD OF STUDIES- PHYSICS

Date: 5-5-2018 **Time:** **Venue: Room no.**

Shree Manibhai Virani & Smt. Navalben Virani Science College, Rajkot

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BOARD OF STUDIES- PHYSICS

Proposed Agenda:

1. To Review syllabus of Physics-3 & Physics-4 **allied courses** of Sem. 3rd & 4th of **B.Sc. Mathematics and 5 years integrated B.Sc.-M.Sc. Mathematics** programs for students admitted from **2017-18 & onwards.**
2. Syllabi for 3rd to 6th semester courses of **B. Sc. Physics** programme for student admitted from **A.Y. 2017-18 & onwards.**
3. Revision in **Evaluation norms** of the internal component of Contentious Internal Exam (Theory and Practical) of **B.Sc.** for **all** relevant DSE **Allied Courses** of all programmes for student admitted from **A.Y. 2016-17 & onwards** and **B.Sc. Physics** Programme for student admitted from **A.Y. 2017-18 & onwards.**
4. Updating List of Examiners and paper setters
5. Any other matter with permission of the chair.

The BoS in Physics met as indicated above and discussed on the above Agenda.

All the members appreciated the material presented to them by the department with respect to the agenda. Sharing their expertise with proactive inputs, they deliberated on the agenda and unanimously resolved that Regulations, Scheme of Instruction and Examinations as appended are to be recommended to Academic Council for approval for students admitted from **AY 2018-2019 & onwards:**

1. The Syllabi framed for the courses of the **3rd to 6th** Semesters of the following programme:
   - B.Sc. PCM (Majoring in Physics) - **Enclosure-I**
2. Proposed change in syllabus for semester 3 & 4 for physics as allied subject in B.Sc Mathematics and B.Sc. /M.Sc. Integrated Mathematics **Enclosure-II**
3. Revision in **Evaluation norms** of the internal component of Contentious Internal Exam (Theory and Practical) of **B.Sc. Physics** Programme for student admitted from **A.Y. 2017-18 & onwards. Enclosure-III**
4. Revision in **Evaluation norms** of the internal component of Contentious Internal Exam (Theory and Practical) of **B.Sc.** for **all** relevant DSE **Allied Courses** of all programmes for student admitted from **A.Y. 2016-17 & onwards** and
5. List of paper setters and examiners for courses of **3rd to 6th** semesters of UG Program B.Sc. PCM (Physics) - **Enclosure-V**

The members unanimously resolved to authorize the Chairperson of the BoS to finalize on the above mention agenda:

S.No.	Name of Member	Signature
1.	Mr. B. G. Panelia	
2.	Dr. B. A. Joshi	Voluntary resign
3.	Dr. P. C. Shah	
4.	Dr. B.S. Trivedi	
5.	Ms. H. K. Bhatt	
6.	Dr. D. J. Dave	
7.	Dr. H. C. Mandavia	
8.	Dr. H. H Joshi	
9.	Dr. G. J. Baldha	

B.Sc. PCM (Physics)

SEMESTER-III

17UPHCC05	**Core:5 Mathematical and Solid State Physics**	**4 hours/week**	**Credits:4**

UNIT I: ***Vectors*** ***(12 Hr)***

- Introduction to Vector and vector algebra
- Vectors transform
- Gradient
- The operator Del (∇)
- The Divergence
- The Curl and their significance
- Fundamental theorem for Gradient for Divergences and Curls
- Relations between fundamental theorems

UNIT II: ***Fourier analysis*** ***(09 Hr)***

- Introduction
- Definition and derivation of the coefficients of Fourier Series
- Exponential form of Fourier series and evaluation of its constants
- Odd and Even series
- Parseval's equation and Fourier integral
- Application of Fourier integral as wave packet and derivation of uncertainty principle
- Applications of Fourier analysis

UNIT III: ***Solid state*** ***(10 Hr)***

- Introduction
- Forces between atoms
- Bonding energy
- Bonding in solids
- Ionic bonds and Ionic crystals
- Properties of Ionic Solids
- Covalent bonds , Covalent crystals and its properties
- Metallic bond
- Molecular bond : Hydrogen and Vander walls Bond
- Comparison between various bonds

- Electron drift in electric field
- Classical Free electron theory of metal
- Band theory of metals and classification of conductors , Insulator and semiconductor

UNIT IV: *Crystallography* *(10 Hr)*

- Introduction
- Concept of lattice , Primitive and unit cell
- Bravais lattice in three dimension
- Seven crystal system
- Miller indices of cubic planner and directions
- Elementary crystal system (NaCl , ZNS and Diamond)
- Hexagonal packed structure

UNIT V: *X - Rays* *(12 Hr)*

- Origin of X - Ray
- Properties of X – Ray
- X – Ray Spectra
- Coolidge tube method
- Intensity measurement technique
- Laues Spots
- Bragg's law and Bragg spectrometer
- Application of X - Ray

Text Book:

- Mathematical Physics by B.S. Rajput
- Solid state Physics by C. Kittel

Reference Books:

- Mathematical Physics by Jyoti Kumar
- Introduction to Modern Solid State Physics by Yuri M. Galperin

17UPHCC06	Core:6 Physics Practical 3	5 hours/week	Credits:3

Exp.1. Determination of crystal structure by X – Ray film
Exp.2. Young Modulus by bending.
Exp.3. Energy band gap by thermister
Exp.4. M.I of a Flywheel
Exp.5. Fourier analysis of given wave form
Exp.6. Determination of temperature coefficient of resistivity of given semiconductor.
Exp.7. Fabrication – I: Zener diode as voltage regulator
Exp.8. Fabrication - II: Full wave rectifier
Exp.9. To determine thermal conductivity of given bad conductor
Exp.10. Detraction grating

B.Sc. PCM (Physics)

SEMESTER-IV

17UPHCC07	Electro and Magneto static & Electronics	4 hours/week	Credits:4

UNIT I: ***Electrostatic*** ***(10 Hr)***

- Introduction
- Coulombs law ,Electric Field
- Continuous charge distribution
- Field lines and flux
- Divergence of electric field and Gauss law
- Curl of Electric filed
- Electrical Potential
- Poisson and Laplace equation
- Potential of point charge distribution
- Work and energy in electrostatic
- Energy of continuous charge distribution

UNIT II: ***Magneto static*** ***(8 Hr)***

- Introduction
- Magnetic field
- Magnetic forces
- Currents
- Biot-Savart's law
- Divergence and curl of magnetic field
- Comparison between magneto static and electro static
- Magnetic vector potential

UNIT III: ***Transistor (BJT)*** ***(12 Hr)***

- Introduction
- Current flows in transistors
- Transistor circuit configuration
- Current amplification factor
- Leakage current
- Comparison between three configuration
- Why CE amplifier is preferred?

CE Amplifier:

- Characteristic of CE transistor
- Cut off , active and saturation region
- Amplification action
- Phase relation between input and output

- D.C. and A.C. Load Line.
- Limit of operation

UNIT IV: *Transistor Biasing* *(12 Hr)*

- Operating point
- Single stage transistor amplifier
- Multi stage transistor amplifier explanation with block diagram
- Biased stabilization and its requirement
- Stability factor
- Method of transistor biasing (Fix biases , Collector to base bias , Emitter Biased and Voltage divider Biased and analysis)

UNIT V: *Field effect transistor* *(10 Hr)*

- Introduction
- Types of FET
- Junction field effect transistor
- Working principle of JFET
- Schematic symbol of JFET
- Importance of JFET
- Difference between BJT and JFET
- JFET characteristics
- Parameters of JFET
- JFET single stage amplifier
- Advantages of JFET
- Introduction to MOSFET and its working
- Type of MOSFET
- Current flow in MOSFET

Text Books:

- Basic electronics by Malvino
- Properties of Matter by R Murugeshan

Reference Books:

- N N Bhargav and Kushreshtha ,Basic Electronics and Linear Circuits
- Allen Mottershead, Electronic Device and Circuits
- D.S. Mathur, S. Chand Publications, Elements Of Properties Of Matter
- C.Kittel , Introduction to Solid State Physics

17UPHCC08	Core:8 Physics Practical 4	5 hours/week	Credits: 3

Exp.1. CE Transistor characteristics and parameters

Exp.2. CE Transistor characteristics and D.C. Load Line and Q - Point

Exp.3. Deflection magnetometer

Exp.4. Magnetic field of solenoid

Exp.5. FET characteristics

Exp.6. FET as a voltmeter

Exp.7. Parameters of FET

Exp.8. Fabrication of regulated power supply using 3 – Pin regulation and its Load Characteristics

Exp.9. Fabrication of Zener regulated power supply and its Load Characteristics

B.Sc. PCM (Physics)

SEMESTER-V

17UPHCC09	C.M & Q.M	4 hours/week	Credits:4

Classical Mechanics

UNIT I: ***Lagrangian Formulation*** **(16 *Hr*)**

- Constraints
- Generalized coordinates
- D'Alembert's principle
- Lagrange' equations
- A general expression for kinetic energy
- Symmetries and laws of conservation
- Cyclic or ignorable coordinates
- Velocity-dependent potential of electromagnetic field
- Rayleigh's dissipation function
- Problems

UNIT II: ***Variational Principle*****:** **(16 *Hr*)**

- Lagrange's and Hamilton's Equations Configuration space,
- Hamilton's principle
- Equivalence of Lagrange's and Newton's equations
- Advantages of the Lagrangian formulation-electro-mechanical analogies
- Lagrange's undetermined multipliers
- Applications of the Lagrangian method of undetermined multiplies
- Hamilton's equations of motion
- Some applications of the Hamiltonian formulation
- Phase space
- Problems.

Text Books for Unit I & II:

- Introduction to Classical Mechanics by Takwale and Puranik.
- Classical mechanics by Griffith.

UNIT III: *The Schrodinger equation and Stationary States Schrodinger equation* (13 *Hr*)

- A Free Particle In One Dimension
- Generalization To Three Dimensions
- The Operator Correspondence And The Schrodinger Equation For A Particle Subject , Normalization And ψ To Forces
- Physical Interpretation On Probability Interpretation
- Non-Normalizable Wave Functions And Box Normalization
- Conservation Of Probability
- Expectation Values, Ehrenfest's Theorem
- Admissibility Conditions On The Wave Function,
- Stationary States: The Time Independent Schrodinger Equation
- A Particle In A Square Well Potential, Bound States In A Square Well(E0)

UNIT IV: *General Formalism of Wave Mechanics Schrodinger Equation and the Probability* (13 *Hr)*

- Interpretation for an N Particle System
- The Fundamental Postulates of Wave Mechanics: (a) Representation of States (b) Representation of Dynamical Variables
- The Adjoint of an Operator, and Self Adjointness
- The Eigen value Problem; Degeneracy
- Eigen values and Eigen functions of Self-Adjoint Operators
- The Dirac-Delta function

Text Books for Unit III & IV:

- Text Book of Quantum Mechanics by Mathews and Venkateshan
- Quantum Mechanics: Theory and Applications by A. K. Ghatak & Loknathan

Reference Books:

- Mathematical Physics - P.K.Chattopadhyay
- Mathematical methods in Physical Science - M.L.Bose, John Willy & Sons
- Classical Mechanics - Gupta, Kumar and Sharma. Pragati Prakashan, Meerut, India
- Classical Mechanics - Goldstein
- Quantum Mechanics - Ghatak and Loknathan, Macmillan India Ltd., Delhi
- Quantum Mechanics - Ajoy Ghatak
- Elements of Quantum Mechanics - Kamal Singh and S.P.Singh, S.Chand Co.

17UPHCC10	**Self study (Recent trends in physics)**	**1 hours/week**	**Credits:4**

Different topics on recent trends in physics will be assigned to students (On individual base or in group)

17UPHDC01	**Optics , statistical Mechanics , Spectroscopy**	**4 hours/week**	**Credits:4**
17UPHDC02	**Solid State Physics**	**4 hours/week**	**Credits:4**
17UPHCC 11	**CBT**		**Credits:2**
17UPHCC 12	**Practical (C.M. & Q.M.)**	**9 hours/week**	**Credits:3**
17UPHDC03	**Practical**	**6 hours/week**	**Credits:2**
17UPHDC04	**Practical**	**6 hours/week**	**Credits:2**

B.Sc. PCM (Physics)

SEMESTER-VI

17UPHCC13	**Electrodynamics and Nuclear Physics**	**4 hours/week**	**Credits:4**
17UPHDC05	**Electronics**	**4 hours/week**	**Credits:4**
17UPHDC06	**Electronics and Communication**	**4 hours/week**	**Credits:4**
17UPHCC14	**Practical Electrodynamics and Nuclear Physics**	**9 hours/week**	**Credits:4**
17UPHDC07	**Practical Electronics**	**5 hours/week**	**Credits:2**
17UPHDC08	**Practical Electronics and Communication**	**5 hours/week**	**Credits:2**
17UPHCC15	**Project/Internship/Training**	**6 hours/week**	**Credits:2**

Physics as allied subject B.Sc. Mathematics / B.Sc., M.Sc. Integrated Mathematics

Following changes are proposed in syllabus of sem. 4 for B.Sc. Mathematics / B.Sc., M.Sc. Integrated Mathematics for Physics as allied subject (Subject code 16UMTDA07/16UMTDA08

Chapter in syllabus in 2017 - 2018 which are irrelevant so to be removed	**Chapter to included syllabus from 2018 – 2019 Onward**
Magneto static	***Vectors*** ***(07 Hr)*** • Introduction to Vector and vector algebra • vectors transform • Gradient The operator Del (∇), The Divergence The Curl and their significance
Classical Mechanics	***Fourier analysis*** ***(07Hr)*** • Introduction • Definition and derivation of the coefficients of Fourier Series • Exponential form of Fourier series and evaluation of its constants • Odd and Even series • Applications of Fourier analysis
Quantum Mechanics	***Optics*** ***(08 Hr)*** Geometrical Optics: • Fermat's Principle • Law of reflection and refraction by Fermat's Principle • Dispersive power of prism • Cardinal Points of optical system Wave Optics: • Interference • Condition for constructive and destructive interference • Newton's ring • Interference by thin film ➢ In Practical course instead of fabrication of oscillator circuit practical of Newton's ring have to be introduce in sem. 4