**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 |
|---|---|---|
| 2017- 2018 | 3 | 12-07-2017 |

**Shree Manibhai Virani & Smt. Navalben Virani Science College (Autonomous)**

**Affiliated to Saurashtra University, Rajkot**

## Department of Physics

## INDEX

## Shree Manibhai Virani & Smt. Navalben Virani Science College (Autonomous)

**Affiliated to Saurashtra University, Rajkot**

# BOARD OF STUDIES- PHYSICS

**Date: 12.07.2017 Time: 2:00 noon Venue: A.V. Room Library**

**AGENDA:**

1. **Regulations** for B. Sc. PCM Program.
2. **Scheme of Instruction and Examinations** for all semesters of B. Sc. PCM for students admitted from 2017-2018 and onwards
3. **Syllabi for 1st & 2nd semester** courses of B. Sc. PCM Program.
4. **Evaluation norms** for all general courses of B. Sc. PCM Program.
5. **Framing of question paper pattern** for Semester End Evaluation (SEE)
6. **List of Examiners and Paper Setters** for Semester End Examination (SEE)
7. **Any other matter** with permission of the chair

**BoS Members:**

| S.No. | Name | Designation | Present/Absent |
|---|---|---|---|
| 1. | Mr. B. G. Panelia | Chair person | |
| 2. | Dr. B. A. Joshi | Faculty member | |
| 3. | Dr. B. S. Trivedi | Faculty member | |
| 4. | Dr. P. C. Shah | Faculty member | |
| 5. | Ms. H. K. Bhatt | Faculty member | |
| 6. | Dr. D. J. Dave | Subject Expert, AC Nominee | |
| 7. | Dr. H. C. Mandavia | Subject Expert, AC Nominee | |
| 8. | Dr. H. H. Joshi | Subject Expert, VC Nominee | |
| 9. | Dr. G. J. Baldha | Industry Representative | |

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 2017-2018 & onwards:**

1. The Regulations framed for the following program:
   - B.Sc. PCM (Majoring in Physics) - **Enclosure-I**
2. The Scheme of Instruction & Examinations framed for all semesters of the following program:
   - B.Sc. PCM (Majoring in Physics) - **Enclosure-II**
3. The Syllabi framed for the courses of the 1st& 2ndSemestersof the following program:
   - B.Sc. PCM (Majoring in Physics) - **Enclosure-III**
4. Evaluation Norms.
   - B.Sc. PCM (Majoring in Physics) - **Enclosure-IV**
5. Question paper pattern.
   - B.Sc. PCM (Majoring in Physics) - **Enclosure-V**
6. The members unanimously resolved to authorize the Chairperson of the BoS to finalize on the following:
   - List of paper setters and examiners for courses of 1st& 2nd semesters of UG Program B.Sc. PCM (Majoring in Physics) - **Enclosure-VI**

| S.No. | Name of Member | Signature |
|---|---|---|
| 1. | Mr. B. G. Panelia | |
| 2. | Dr. B. A. Joshi | |
| 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 | |

**Enclosure – I**

# Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous)

**Affiliated to Saurashtra University, Rajkot**

## Department of PHYSICS

### B. Sc. PCM (Majoring in Physics)

### Regulations for Students Admitted from A.Y. 2017-2018 & Onwards

**ELIGIBILITY**

Candidate who has passed 02 years Higher Secondary Certificate (10+2) examination with Science subjects in respective streams of Gujarat State or any other examination recognized as equivalent there to with a good academic record, shall be eligible for admission, subject to such other conditions prescribed by the Saurashtra University and State Government from time to time. All admissions are provisional and subject to the approval of Saurashtra University.

**DURATION OF THE PROGRAMME**

The Program shall extend over a period of three years comprising of six semesters with two semesters in one academic year. Each semester normally consists of 90 teaching days.

**STRUCTURE OF THE PROGRAMME**

Each UG program shall have a curriculum comprising theory and practical courses with a specified syllabus. The curriculum of the program is a blend of theory courses and practical courses as Core, Discipline Specific Electives (DSE) and Generic Electives (GE). In addition, project, internship/training and personality development courses as Ability Enhancement Courses (AEC) and Skill Enhancement Courses (SEC) shall be offered.

The medium of instruction and examinations shall be English except for courses on languages other than English

**EVALUATION**

The evaluation shall generally comprise of Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) with percentage weightage as specified below, unless specified otherwise in the Scheme of Instruction and Examinations.

| ***Theory Courses*** | | ***Practical Courses*** | |
|---|---|---|---|
| Continuous Internal Evaluation (CIE) | 30% | Continuous Internal Evaluation (CIE) | 40% |
| Semester End Examination (SEE) | 70% | Semester End Examination (SEE) | 60% |

For the purpose of computation of credits the following mechanism is adopted:

a) 1 hour instruction of Theory = 1 Credit
b) 1 hour instruction of Tutorial = 1 Credit
c) 2-3 hours instructions of Practical = 1 Credit

## ISSUE OF MARKSHEET AND DEGREE CERTIFICATE

The college shall publish the result after evaluation and with the recommendations of Result Passing Board at the end of each semester. On approval/ratification of the results by the Academic Council, the candidate will be recommended to Saurashtra University for award of the degree on completion of all courses and components of the curriculum.

**Enclosure – II**

# Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous)

**Affiliated to Saurashtra University, Rajkot**

## Department of Physics
## B. Sc. PCM (Majoring in Physics)

## SCHEME OF INSTRUCTION AND EXAMINATIONS
## For Students Admitted from A.Y. 2017-2018 & Onwards

### OBJECTIVES OF THE PROGRAMME

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

- This programme will enable students to acquire knowledge on the fundamentals of Physics, Chemistry, Mathematics to enable them to understand emerging and advanced concept in Modern Physics and help them to take their career in this field.

- After completion of the program, the students can able to acquire the necessary theoretical and practical competencies in Physics to enable them to undertake higher studies in recognized Institutions of higher learning and engage gainful self-employment.

- The Program is intended to help the students to be the innovative and versatile personalities in the field of Physics with quality education and provide the skilled manpower required by Research and Development, Institutions of Higher Learning and Industry.

**Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous)**
**Affiliated to Saurashtra University, Rajkot**

**Department of Physics**
**B. Sc. PCM (Majoring in Physics)**

**SCHEME OF INSTRUCTION AND EXAMINATIONS**
**For Students Admitted from A.Y. 2017-2018 & Onwards**

| **SEMESTER: I** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **Course** | **Hours of Instruction/ week** | **Exam Duration** | **CIE** | **SEE** | **Total** | **Credits** |
| Part- I | | | | | | | |
| 17ULCEN01 | Functional English -I | 3 | 3 | 40 | 60 | 100 | 3 |
| Part- II | | | | | | | |
| 17UPHCC01 | **Core 1:** Modern Physics | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDA01 | **DSE Allied 1:** Mathematics-1 | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDA02 | **DSE Allied 2:** Chemistry-1 | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHCC02 | **Core Practical 1:** Physics-I Practical | 5 | 4 | 40 | 60 | 100 | 3 |
| 17UPHDA03 | **DSE Allied Practical 1:** Mathematics-I Practical | 5 | 3 | 40 | 60 | 100 | 3 |
| 17UPHDA04 | **DSE Allied Practical 2:** Chemistry-I Practical | 5 | 5 | 40 | 60 | 100 | 3 |
| | **TOTAL** | **30** | | | | **700** | **24** |
| Part- III | | | | | | | |
| 17UAEES01 | **AECC – I :** Environmental Sciences | 1 | - | - | - | - | - |
| 17UAEVE02 | **SEC-I**: Value Education - I | 1 | - | Remarks | | | 1 |
| | | | | | | | **25** |

| SEMESTER: II | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **Course** | **Hours of Instruction / week** | **Exam Duration** | **CIE** | **SEE** | **Total** | **Credits** |
| Part- I | | | | | | | |
| 17ULCEN02 | Functional English - II | 3 | 3 | 40 | 60 | 100 | 3 |
| Part- II | | | | | | | |
| 17UPHCC03 | **Core 2:** Classical Physics | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDA05 | **DSE Allied 3:** Mathematics - 2 | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDA06 | **DSE Allied 4:** Chemistry -2 | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHCC04 | **Core Practical 2:** Physics-II Practical | 5 | 4 | 40 | 60 | 100 | 3 |
| 17UPHDA07 | **DSE Allied Practical 3:** Mathematics-II Practical | 5 | 3 | 40 | 60 | 100 | 3 |
| 17UPHDA08 | **DSE Allied Practical 4:** Chemistry-II Practical | 5 | 5 | 40 | 60 | 100 | 3 |
| | **TOTAL** | **30** | | | | **700** | **24** |
| Part- III | | | | | | | |
| 17UAE01 | **AECC – I :** Environmental Sciences | 1 | - | Remarks | | | 2 |
| 17UVE02 | **SEC-II:** Value Education – II | 1 | - | Remarks | | | 1 |
| | | | | | | | **27** |

| SEMESTER: III | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **Course** | **Hours of Instruction / week** | **Exam Duration** | **CIE** | **SEE** | **Total** | **Credits** |
| Part- I | | | | | | | |
| 17ULCEN03 | Advanced English Language – I | 3 | 3 | 40 | 60 | 100 | 3 |
| Part- II | | | | | | | |
| 17UPHCC05 | **Core 3:** Optics & Relativity | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDA09 | **DSE Allied 5:** Mathematics - 3 | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDA10 | **DSE Allied 6:** Chemistry -3 | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHCC06 | **Core Practical 3:** Physics-III Practical | 5 | 4 | 40 | 60 | 100 | 3 |
| 17UPHDA11 | **DSE Allied Practical 5:** Mathematics-III Practical | 5 | 3 | 40 | 60 | 100 | 3 |
| 17UPHDA12 | **DSE Allied Practical 6:** Chemistry -III Practical | 5 | 5 | 40 | 60 | 100 | 3 |
| | **TOTAL** | **30** | | | | **700** | **24** |

| SEMESTER: IV | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **Course** | **Hours of Instruction / week** | **Exam Duration** | **CIE** | **SEE** | **Total** | **Credits** |
| Part- I | | | | | | | |
| 17ULCEN04 | Advanced English Language – II | 3 | 3 | 40 | 60 | 100 | 3 |
| Part- II | | | | | | | |
| 17UPHCC07 | **Core 4:** Heat & Electronics | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDA13 | **DSE Allied 7 :** Mathematics - 4 | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDA14 | **DSE Allied 8:** Chemistry -4 | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHCC08 | **Core Practical 4:** Physics-IV Practical | 5 | 4 | 40 | 60 | 100 | 3 |
| 17UPHDA15 | **DSE Allied Practical 7:** Mathematics-IV Practical | 5 | 3 | 40 | 60 | 100 | 3 |
| 17UPHDA16 | **DSE Allied Practical 8:** Chemistry-IV Practical | 5 | 5 | 40 | 60 | 100 | 3 |
| | **TOTAL** | **30** | | | | **700** | **24** |

| SEMESTER: V | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **Course** | **Hours of Instruction / week** | **Exam Duration** | **CIE** | **SEE** | **Total** | **Credits** |
| **Part: II** | | | | | | | |
| 17UPHCC09 | **Core 5:** Mechanics | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHCC10 | **Core 6:** Recent Trends in Physics (Self Study) | 1 | 3 | 15 | 35 | 50 | 4 |
| 17UPHDC01 / 17UPHDC02 | **DSE Core 1:** Optical Science/ Solid State Physics | 4 | 4 | 30 | 70 | 100 | 4 |
| 17UPHCC11 | **Core 7:** CBT | - | - | 50 | - | 50 | 2 |
| 17UPHCC12 | **Core Practical 5:** Physics-V Practical | 9 | 4 | 40 | 60 | 100 | 3 |
| 17UPHDC03 / 17UPHDC04 | **DSE Core Practical 1 :** Optical Science Practical / Solid State Physics Practical | 6 | 4 | 20 | 30 | 50 | 2 |
| | **Project/Internship/ Training** | 4 | - | - | - | - | - |
| | **Generic Elective –I** From pool of UG Courses | 2 | - | 100 | - | 100 | 1 |
| | **TOTAL** | **30** | | | | **550** | **20** |

| SEMESTER: VI | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **Course** | **Hours of Instruction / week** | **Exam Duration** | **CIE** | **SEE** | **Total** | **Credits** |
| Part: II | | | | | | | |
| 17UPHCC13 | **Core 8:** Electrodynamics and Nuclear Physics | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHDC05 / 17UPHDC06 | **DSE Core 2:** Electronics/ Electronic Communication | 4 | 3 | 30 | 70 | 100 | 4 |
| 17UPHCC14 | **Core Practical 6 :** Physics-VI Practical | 9 | 4 | 40 | 60 | 100 | 3 |
| 17UPHDC07 / 17UPHDC08 | **DSE Core Practical 2 :** Electronics Practical / Electronic Communication Practical | 5 | 4 | 20 | 30 | 50 | 2 |
| 17UPHCC15 | **Core 9 :** Project/Internship/ Training | 6 | 3 | 60 | 40 | 100 | 2 |
| | **Generic Elective –II** From pool of UG Courses | 2 | - | 100 | - | 100 | 1 |
| | **TOTAL** | **30** | | | | **550** | **16** |

**Part III**

| Course Code | Semester | Particulars | Hrs of instruction/week | No. of Courses | Credit/Course | Total Credits |
|---|---|---|---|---|---|---|
| ***Ability Enhancement Compulsory Course (AECC)*** | | | | | | |
| As per common list | I & II | **AECC-I** Environment Science | 1 | 1 | 2 | 2 |
| | IV & V | **AECC-II** Communication Skill/Soft Skills | 2 | 2 | 1 | 2 |
| | | | | | **Sub Total** | **4** |
| ***Skill Enhancement Course (SEC)*** | | | | | | |
| As per common list | I | **SEC-I** Value Education-I | 1 | 1 | 1 | 1 |
| | II | Value Education-II | 1 | 1 | 1 | 1 |
| | Any Sem between II - V | **SEC-II** *Co-Curricular Course | > 40 hours in total | 1 | 1 | 1 |
| | Any Sem between II - V | **SEC-III** **Value Added Courses | 40 hours in total | 1 | 1 | 1 |
| | | | | | **Sub Total** | 4 |
| | | | | | **Grand Total** | 8 |

***Co-Curricular Courses** - Option to students to choose 1 from a list of courses offered by the college, such as Add on Courses, Gandhian Studies Certificate Course, Women Studies Course, etc.
****Value Added Courses** - Option to student to choose at least 1 from a list of courses offered by UG departments.

## TOTAL MARKS & CREDIT DISTRIBUTION

| S.No | PART | Total Marks | Total Credits |
|---|---|---|---|
| 1. | **PART I:** Language Course | 400 | 12 |
| 2. | **PART II :** Core, DSE Allied, DSE Elective, Generic Elective | 3500 | 120 |
| 3. | **PART III:** AECC- I & II, SEC- I,II & III | Remarks | 08 |
| **TOTAL** | | **3900** | **140** |

- **PART- I: LANGUAGE COURSE**

The following are compulsory courses offered in First to Fourth semesters

| S.No | Semester | Course Code | Course |
|---|---|---|---|
| 1. | **I** | 16ULCEN01 | Functional English- I |
| 2. | **II** | 16ULCEN02 | Functional English- II |
| 3. | **III** | 16ULCEN03 | Advanced English Language -I |
| 4. | **IV** | 16ULCEN04 | Advanced English Language -II |

- **PART-II: CORE, DSE ALLIED, DSE CORE, GE**

**CORE COURSES [Theory]**

| S.No | Semester | Course Code | Course |
|---|---|---|---|
| 1. | I | 17UPHCC01 | **Core 1 :** Modern Physics |
| 2. | II | 17UPHCC03 | **Core 2 :** Classical Physics |
| 3. | III | 17UPHCC05 | **Core 3 :** Optics & Relativity |
| 4. | IV | 17UPHCC07 | **Core 4 :** Heat & Electronics |
| 5. | V | 17UPHCC09 | **Core 5 :** Mechanics |
| 6. | | 17UPHCC10 | **Core 6 :** Recent Trends in Physics (Self Study) |
| 7. | | 17UPHCC11 | **Core 7 :** CBT |
| 8. | VI | 17UPHCC13 | **Core 8 :** Electrodynamics and Nuclear Physics |
| 10. | | 17UPHCC15 | **Core 9 :** Project/Internship/Training |

- **CORE COURSE [Practical]**

| S.No | Semester | Course Code | Course |
|---|---|---|---|
| 1. | I | 17UPHCC02 | **Core Practical 1 :** Physics -I Practical |
| 2. | II | 17UPHCC04 | **Core Practical 2 :** Physics -II Practical |
| 3. | III | 17UPHCC06 | **Core Practical 3 :** Physics -III Practical |
| 4. | IV | 17UPHCC08 | **Core Practical 4 :** Physics -IV Practical |
| 5. | V | 17UPHCC12 | **Core Practical 5 :** Physics -V Practical |
| 6. | VI | 17UPHCC14 | **Core Practical 6 :** Physics -VI Practical |

**DSE CORE COURSE (Theory & Practical)**

Students are required to opt for any one of the courses offered in the Fifth and Sixth semester respectively

| S. No | Semester | Theory | | Practical | |
|---|---|---|---|---|---|
| | | **Course Code** | **Course** | **Course Code** | **Course** |
| 1. | V | 17UPHDC01 / 17UPHDC02 | DSE Core 1: Optical Science / Solid State Physics | 17UPHDC03 / 17UPHDC04 | DSE Core Practical 1: Optical Science Practical / Solid State Physics Practical |
| 2. | VI | 17UPHDC05 / 17UPHDC06 | DSE Core 2: Electronics / Electronic Communication | 17UPHDC07 / 17UPHDC08 | DSE Core Practical 2: Electronics Practical / Electronic Communication Practical |

**DSE ALLIED COURSES (Theory)**

| Sr.No | Semester | Course Code | Course |
|---|---|---|---|
| 1. | I | 17UPHDA01 | Mathematics –I |
| | | 17UPHDA02 | Chemistry – I |
| 2. | II | 17UPHDA05 | Mathematics – II |
| | | 17UPHDA06 | Chemistry-II |
| 3. | III | 17UPHDA09 | Mathematics – III |
| | | 17UPHDA10 | Chemistry-III |
| 4. | IV | 17UPHDA13 | Mathematics – IV |
| | | 17UPHDA14 | Chemistry-IV |

- **DSE ALLIED SUBJECT [Practical]**

| Sr.No | Semester | Course Code | Course |
|---|---|---|---|
| 1. | I | 17UPHDA03 | **DSE Allied Practical 1:** Mathematics-I Practical |
| | | 17UPHDA04 | **DSE Allied Practical 2:** Chemistry-I Practical |
| 2. | II | 17UPHDA07 | **DSE Allied Practical 3:** Mathematics-II Practical |
| | | 17UPHDA08 | **DSE Allied Practical 4:** Chemistry-II Practical |
| 3. | III | 17UPHDA11 | **DSE Allied Practical 5:** Mathematics-III Practical |
| | | 17 UPHDA12 | **DSE Allied Practical 6:** Chemistry-III Practical |
| 4. | IV | 17UPHDA15 | **DSE Allied Practical 7:** Mathematics-IV Practical |
| | | 17UPHDA16 | **DSE Allied Practical 8:** Chemistry-IV Practical |

- **GENERIC ELECTIVE**

| S.No | Semester | Course |
|---|---|---|
| 1. | V | Generic Elective-1: From pool of UG Courses |
| 2. | VI | Generic Elective-2: From pool of UG Courses |

**Enclosure – III**

# B.Sc. PCM (Majoring in Physics)
## SEMESTER-1

| | | | |
|---|---|---|---|
| **17UPHCC01** | **Core 1** : Modern Physics | **4 hrs/wk** | **4 Credits** |

**OBJECTIVES OF THE PROGRAMME:**

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

- This programme will enable students to acquire knowledge on the fundamentals of Physics.
- The Program is intended to help the students to be the innovative and versatile personalities in the field of Physics with quality education and provide the skilled manpower required by Research and Development, Institutions of Higher Learning and Industry.

**UNIT I:** ***D.C.Circuits & A.C.Circuits & Network theorems*****:** ***(14 Hr)***

- Growth and decay of current in L-R circuit with D.C.source
- Charge and discharge of R-C. circuit with D.C. source , A.C.Circuits: (Review of Alternating currents, Cycle, Frequency, Phase)
- R.M.S value of Alternating currents
- L-C-R series A.C.source
- L-C-R series resonance , Parallel resonance
- Maximum power transfer theorem
- Thevenin's theorem
- Norton's theorem
- Multimeter.

**UNIT II:** ***Semiconductor*** ***(10Hr)***

- Semiconductor diode
- Half wave rectifier
- Efficiency of half wave rectifier
- Full wave rectifier
- Half wave bridge rectifier
- Efficiency of full wave rectifier, Ripple factor
- Filter circuit, Type of filter circuit
- Zener diode as voltage stabilizer.

**UNIT III: *Structure of The Atom*** ***(8 Hr)***

- Failure of Classical Mechanics
- Effect of Nuclear Motion on Atomic Spectra
- Correspondence Principle
- Critical Potentials
- Atomic Excitation
- Vector Model
- Quantum numbers (only definitions).

**UNIT IV: *Wave Mechanic*** ***(8 Hr)***

- De'Broglie wavelength & Phase velocity of De'Broglie's wave
- Expression for group velocity
- Group velocity of de Broglie's wave
- Relation between Phase velocity & Group velocity.

**UNIT V: Particle accelerators and cosmic rays** ***(10 Hr)***

- Introduction, Linear accelerator
- Cyclotron or Lawrence cyclotron
- Synchrocyclotron
- Discovery of cosmic rays
- Latitude effect
- The east west effect or the azimuth effect
- The altitude effect
- Primary cosmic rays
- Secondary cosmic rays
- Origin of cosmic rays**.**

**Text Book:**

1. *V.K.Mehta & Rohit Mehta,* **Principles of Electronics**, S.Chand Company

**Reference Books:**

1.*R.K.Gaur, S.L.Gupta*,**Engineering Physics** ,Dhanpat Rai Publications.

2.*R.Murugeshan & Kiruthiga Sivaprasath* ,**Modern Physics**, S.Chand Comp.

# B.Sc. PCM (Majoring in Physics)
## SEMESTER-1

| | | | |
|---|---|---|---|
| **17UPHCC02** | **Core Practical 1:** Physics-I Practical | **5 hrs/wk** | **3 Credits** |

Exp 1. Discharge of Capacitor and RC time constant.
Exp 2. Series Resonance.
Exp 3. Parallel Resonance.
Exp 4. Verification of Thevenin's theorem. (using PCB)
Exp 5. Verification of Maximum power transfer theorem. (using PCB)
Exp 6. Low resistance by Projection method.
Exp 7. Tangent galvanometer (Constant of T.G. & Verification of Ohm's law)
Exp 8. Low resistance by Potentiometer.
Exp 9. Fabrication I (Thevenin's Theorem)
Exp 10. Fabrication II (Norton's Theorem)
Exp 11. PN Junction Diode
Exp 12. Zener Diode

# B.Sc. PCM (Majoring in Physics)
## SEMESTER-2

| | | | |
|---|---|---|---|
| **17UPHCC03** | **Core 2 :** Classical Physics | **4 hrs/wk** | **4 Credits** |

**OBJECTIVES OF THE PROGRAMME:**

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

- This programme will enable students to acquire knowledge on the fundamentals of Physics.
- The Program is intended to help the students to be the innovative and versatile personalities in the field of Physics with quality education and provide the skilled manpower required by Research and Development, Institutions of Higher Learning and Industry.

**UNIT I:** ***Conservation Laws:*** ***(8 Hr)***

- Work, Power
- Conservation of Force
- Kinetic energy-Work-Energy Principle
- Potential energy
- The law of Conservation of energy
- One dimensional Conservative system
- Conservation of linear momentum
- Centre of Mass
- Collision.

**UNIT II:** ***Dynamics of Rigid Bodies*** ***(10Hr)***

- Rotational motion (only definition)
- Torque acting on a particle
- Angular momentum,
- Relation between Torque and Angular momentum
- Moment of Inertia
- Expressions for Moment of Inertia
- Radius of Gyration
- Theorems on Moment of Inertia
- Moment of Inertia of a Rectangle
- Moment of Inertia of Circular ring
- Moment of Inertia of Circular disc.

**UNIT III:** ***Gravitation, Gravity and Satellites*** ***(12 Hr)***

- Newton's Gravitational law, Gravitations field & Potential
- Relation between Gravitational Potential and Field strength

- Potential and Field Due to a Solid Sphere
- Gravitational Potential Self Energy
- Escape Velocity
- Kepler's Laws of Planetary Motion
- Proof of Kepler's Laws
- Satellites
- Time Period of Satellite
- State of Weightlessness.

**UNIT IV:** ***Elasticity*** ***(8 Hr)***

- Introduction
- Stress and strain
- Hooke's Law (only definition)
- Young's Modulus , Bulk Modulus, Modulus of Rigidity
- Poisson's Ratio
- Equivalence of Shear to Compression & Extension
- Relation between Y, K,η & σ
- Determination of Young's modulus by Searls method.

**UNIT V:** ***Kinetic Theory of Gases and Temperature measurements*** ***(12 Hr)***

- Introduction
- Kinetic interpretation of temperature
- The law of equipartition of energy
- Mean free path and Mean free time Temperature
- Temperature measurements
- Platinum resistance thermometer
- Thermoelectric thermometer
- Pyrometers
- Specific heat
- Newton's law of cooling
- Specific heat of liquids by the method of cooling.

**Text Book**

*1.Resnick & Walker Halliday,* **Fundamental-Physics**, Welly Publications.
2. *D.S. Mathur* ,**Elements Of Properties Of Matter** , S. Chand Publications

**Reference Books**

1. *R.K.Gaur & S.L.Gupta,* **Engineering Physics** , Dhanpat Rai Publications, New Delhi.
2. *R.P.Feynman,* **Lectures on physics, Vol-1**

# B.Sc. PCM (Majoring in Physics)
## SEMESTER-2

| | | | |
|---|---|---|---|
| **17UPHCC04** | **Core Practical 2:** Physics-II Practical | **5 hrs/wk** | **3 Credits** |

Exp 1. Study of errors in observation.
Exp 2. Bar Pendulum: Determination of 'K' and 'g'
Exp 3. Bifilar Suspension. (M.I. of rectangular body & law of perpendiculars)
Exp 4. Torsion pendulum (Moment of Inertia of disc )
Exp 5 Torsion pendulum( Modulus of rigidity)
Exp 6. Young's Modulus by Searl's method.
Exp 7. Poisson's ratio of rubber tube.
Exp 8. Newton's law of cooling and specific heat of liquid.
Exp 9. Fabrication : Designing, Mounting, Soldering, Analysing and testing of Parallel Resistors.
Exp10. Fabrication : Designing, Mounting, Soldering, Analysing and testing of Series Resistors.
Exp 11. Fabrication : Designing, Mounting, Soldering, Analysing and testing of Parallel capacitors
Exp 12. Fabrication : Designing, Mounting, Soldering, Analysing and testing of Series capacitors

**Enclosure – IV**

# Guidelines and Evaluation Norms for Courses

## UG Program

(For students admitted from 2017-2018 & onwards)

Assessment and evaluation of learning experiences of the students in various courses or components of the curriculum is an important part of measuring learning outcomes, besides others. The courses or components could be evaluated through continuous Internal Evaluation (CIE) or Semester End Examination (SEE) or both.

The following are the evaluation norms for some of the courses, especially that of the first two semesters of the UG program introduced from 2017-2018 onwards.

**1. Theory**

i. Generally CEE – 30 marks
SEE – 70 marks
Total – 100 marks
Unless otherwise mentioned.

**ii. Components of CIE**

| Sr. | Component | Content | Duration, if any | Marks | Sub Total |
|---|---|---|---|---|---|
| a) | Test – I<br>Test - II | 1st two units<br>All 5 units | 2 hrs.<br>3 hrs. | 5 ( set for 50)<br>10 ( set for 70) | 15 |
| b) | Assignment-I<br>Assignment-II<br>Assignment-III | -<br>-<br>- | -<br>-<br>- | 5 ( Marks on 20)<br>5 ( Marks on 20)<br>5 ( Marks on 20) | 15 |
| | | | | **Grand Total** | **30 Marks** |

**2. Practical**

**i.** CEE – 40 marks
SEE – 60 marks
Total – 100 marks

**ii. Components of CIE**

| Sr. | Component | Content | Duration, if any | Marks | Sub Total |
|---|---|---|---|---|---|
| a) | Test – I<br>Test - II | 50% of experiments<br>All experiments | 2 hrs./ 3 hrs.<br>2 hrs./ 3 hrs. | 10 ( set for 30)<br>20 ( set for 60) | 30 |
| b) | Observation and Records | - | - | 10 | 10 |
| | | | | **Grand Total** | **40 Marks** |

**Guidelines for CIE of Theory and Practical**

1. There is no passing minimum for CIE of theory and practical courses.
2. There is no provision for re-appearance of improvement of marks in CIE.
3. The candidate is permitted to appear for the SEE of the practical course only if he/she has completed at least 75% of the experiments in the syllabus.
4. In the event of non conformity of S.No.3 above, the candidate may make up for the deficit percentage of experiments, only in the ensuing semester, when being conducted.
5. A total of only 2 such attempts to make up the deficit is permitted.

**Enclosure – V**

## Question Paper Pattern

**Shree Manibhai Virani and Smt. Navalben Virani Science College**
**(Autonomous)**
**Affiliated to Saurashtra University, Rajkot**

**Model Question Paper for External Examination**

Program**:** **B.Sc. PCM (Majoring in Physics)**
Semester: **First /Second**
Max. Marks: **70**
Course code: **17UPHCC01/03 – Physics**
Duration: **3 Hrs.**

***Part A*** ***(10x1= 10 marks)***
Answer **ALL** questions (2 questions from each unit)

1.

10

***Part B (5X5 = 25 marks)***
Answer **ALL** questions (1 question with internal choice from each unit)

11a
**OR**
11b

15a
**OR**
15b

***Part C (5X7 = 35 marks)***
Answer **ALL** questions

16a
**OR**
16b

20a
**OR**
20b

**Enclosure – VI**

# Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot (Autonomous)
# Affiliated to Saurashtra University, Rajkot
# Department of Physics
# Students Admitted From A.Y. 2017-18& Onwards

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