



**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**

<b>Academic Year</b>	<b>Meeting Number</b>	<b>Date</b>
2022-23	9	12/11/2022

**Shree Manibhai Virani & Smt. Navalben Virani Science College, Rajkot**  
**(Autonomous)**  
**Affiliated to Saurashtra University, Rajkot**  
**Department of Physics**

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<b>S.No.</b>	<b>Title</b>	<b>Content</b>
1	Agenda of BOS	Minutes of the Meeting
2	Enclosure-I	Revision of syllabi for DSE-cluster courses of Semester-4 UG Programs.
4	Enclosure-II	Revision of list of Examiners and Paper Setters.

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

**(Autonomous)**

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**BOARD OF STUDIES- PHYSICS**

**Date: 12/11/2022**

**Time: 12:30**

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

**(Autonomous)**

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**BOARD OF STUDIES- PHYSICS**

**Agenda:**

- 1) **Introductory remarks by Chairperson**
  - **Confirmation of MoM & ATR of previous BoS held on 30/06/2022**
  - **Departmental activities and updates**
- 2) **Syllabi of DSE cluster courses for Sem.-4 of B.Sc. (All other departments) Programs**
- 3) **Question paper pattern for DSE cluster courses for Sem.-4 of B.Sc. (All other departments) Programs.**
- 4) **Syllabi and evaluation norms of part II – Trans Disciplinary Elective (TDE) course offered by the department.**
- 5) **List of paper setters and examiners for DSE cluster courses for Sem.-4 of B.Sc. (All other departments) Programs**
- 6) **Any other agenda with permission of the Chair**

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.	Dr. B S Trivedi	B.S. Trivedi
2.	Dr. B A Joshi	absent
3.	Dr Dipak Dave	D. J. Dave
4.	Dr. H.C.Mandavia (Subject expert)	online
5.	Dr. H H Joshi (V. C. Nominee)	online
6.	Dr. Ashish Kothari	Ashish

## 1. Welcome and introductory remarks by Chairman

Welcome to all the members of the Board of Studies to the second meeting after conferment of extension of the autonomous status (up to 2023-24) to the college by UGC.

I, as Chairperson of the BoS place on record the gratitude of the department to the previous members of this BoS for their kind and able contribution towards the effective implementation of academic autonomy.

Due to C-19 pandemic first national lockdown was observed on 22<sup>nd</sup> March 2020 followed by circumstances developed then onwards; following activities have been carried out by the department.

### Revised syllabi framed for the bellow stated -Allied courses of Semester-3 for UG Programs. - Enclosure-I

Sr. No.	Course	Hours of Instruction/ Week	Credit	Offered to	Semester
1	<b>DSE-Cluster 2: Physics-4</b>	03 Hrs/WK	3	B. Sc. (All other Departments) Programs	4
2	<b>DSE-Cluster 2 Practical</b>	6 Hrs /week	2	B. Sc. (All other Departments) Programs	4

## Annexure I

Department: Physics

Programs: **B.Sc. (Other Departments)**

Semester – IV		
Course Code	Course Title	Credits
<b>21UPHIDE401</b>	<b>Laser, Magnetism and Mathematical Physocs</b>	3

### Course Description:

This course covers some of fundamental concepts of different topics of Electronics and Mathematical physics which are useful for B.Sc. (Other Departments) students.

### Course Purpose:

As this course is design for study B.Sc. (Other Departments) students as DSE Cluster subject different fundamental concepts of electronics and mathematical physics are covered in such a way that it can be helpful to them in future study.

**Course Outcomes:** Upon completion of this course, the learner will be able to

CO No.	CO Statement	Blooms taxonomy Level (K <sub>1</sub> to K <sub>6</sub> )
CO <sub>1</sub>	Fourier Analysis	K3
CO <sub>2</sub>	Relativity	K3
CO <sub>3</sub>	Laser	K2
CO <sub>4</sub>	Magnetostatics	K2
CO <sub>5</sub>	Electronics	K1, K3

Course Content	Hours
<b>Module-I : Fourier Analysis</b> <ul style="list-style-type: none"><li>● Introduction</li><li>● Definition and derivation of the coefficients of Fourier series.</li><li>● Triple products and product of four vectors</li><li>● Exponential form of Fourier series and evaluation of its constant.</li><li>● Odd and even series.</li><li>● Applications of Fourier analysis.</li></ul>	<b>06 hrs</b>
<b>Module-II: Relativity</b> <ul style="list-style-type: none"><li>● Introduction</li><li>● Galilean transformations.</li><li>● Ether hypothesis and Michelson Morley experiment.</li><li>● Special theory of Relativity</li><li>● Lorentz transformations and its consequences.</li></ul>	<b>07 hrs</b>

<ul style="list-style-type: none"> <li>● Energy – Mass relationship.</li> </ul>	
<b>Module III: Optics (Laser)</b> <ul style="list-style-type: none"> <li>● Lasers: Interaction of radiation with matter (Spontaneous and stimulated emission)</li> <li>● Einstein's relations.</li> <li>● Light amplification &amp; conditions.</li> <li>● Population inversion, pumping.</li> <li>● Metastable states.</li> <li>● The principal pumping schemes.</li> <li>● Optical resonator.</li> <li>● Types of LASERs (only operation and working): Ruby LASER, Nd-YAG LASER, He-Ne LASER, Semiconductor LASER,</li> <li>● Applications of LASER.</li> </ul>	<b>07 hrs</b>
<b>Module IV: Magnetostatics</b> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Magnetic field.</li> <li>● Magnetic forces.</li> <li>● Cyclotron motion.</li> <li>● Current and equation of continuity.</li> <li>● Magnetic field of a steady current.(Biot Savart's law)</li> <li>● Application of Biot Savart's law.</li> <li>● Divergence of magnetic field.</li> <li>● Curl of magnetic field.</li> </ul>	<b>07 hrs</b>
<b>Module V: Electronics.</b> <ul style="list-style-type: none"> <li>● Oscillators. (Feedback and condition for sustained oscillators)</li> <li>● RC and LC oscillators.</li> <li>● Special devices.</li> <li>● FET characteristic, parameters and working.</li> <li>● MOSFET characteristic and working</li> <li>● UJT characteristic and working.</li> <li>● Solar cell and its characteristics.</li> <li>● CRO</li> </ul>	<b>06 hrs</b>

**Text Book:**

1. R.Murugeshan & Kiruthiga Sivaprasath (2010). *Modern Physics*. S.Chand Comp. (For unit III to V)
2. R.K.Gaur, S.L.Gupta (2012). *Engineering Physics*. Dhanpat Rai Publications. (For unit I)
3. V.K.Mehta & Rohit Mehta(2014). *Principles of Electronics*. S.Chand Comp. (For unit II)
4. N Subrahmanyam, B. Lal and M. Avadhanulu (2013) A text book of Optics, S. Chand Publication
5. B.LTheraja (2002). *Modern Physics*. S Chand Publication.

**Reference Books:**

1. A.S. Vasudeva (2013). *Modern Engineering Physics*, S.Chand Company.
2. David Halliday, Robert Resnick, Jearl Walker (2013), *Halliday and Resnick Physics*, John Wiley publication.
3. Brij Lal and Subrahmaniam (2007), *Heat and Thermodynamics*. S Chand & Company Pvt Ltd

**DSE Cluster Practical  
Physics Practical – Electricity and Mechanics**

<b>21UPHIDE402</b>	<b>physics Practical</b>	<b>6 Hrs/Week</b>	<b>2 Credits</b>
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**Course Description:**

The practical course includes all fundamental practical of measurement , mechanics and electricity and different circuit fabrication

**Course Purpose:**

The course of practical is develop to make student well verge to electricity tools , circuit fabrication and measurement methodology



<b>Course Outcomes:</b> Upon completion of this course, the learner will be able to		
<b>CO No.</b>	<b>CO Statement</b>	<b>Blooms taxonomy Level (S<sub>1</sub> to S<sub>6</sub>)</b>
CO <sub>1</sub>	Basic measurement methods	S1
CO <sub>2</sub>	Basic circuit analysis	S1
CO <sub>3</sub>	Current – Voltage characteristics of different electronics components	S1 & S3
CO <sub>4</sub>	Optical properties of body	S2
CO <sub>5</sub>	Circuit fabrication	S2 & S3

### ***List of Practical***

- Modulus of rigidity.
- MI of fly wheel.
- Determine of a Young's modulus of a wooden bar used as a cantilever.
- Determine of a Young's modulus of a steel bar by banding.
- Magnetic field of a solenoid. (Constant distance)
- Magnetic field of a solenoid. (Variable distance).
- Determination of figure of merit and volt sensitivity of B.G.
- Comparison of capacitance by De Sauty's bridge.
- Characteristic of solar cell.
- Output characteristic of FET and determination of its parameters.
- Transfer characteristic of FET.
- Characteristic of UJT
- FET as voltmeter.
- Band width of RC coupled amplifier.
- Study of Bridge rectifier.
- Study of transformer.
- Load characteristic of Zener diode (i).
- Load characteristic of Zener diode (ii).

### **Text books :**

- V.K.Mehta & Rohit Mehta., Principles of Electronics S.Chand Comp.
- Fundamentals Of Physics By Halliday, Resnick & Walker, Welly Publication.

### **Reference books :**

- Modern Physics - R.Murugesan & Kiruthiga Sivaprasath, S.Chand Comp.
- . Engineering Physics - R.K.Gaur, S.L.Gupta, Dhanpat Rai Publications

### **Reference Book: ( For Practical)**

1. C.L.Arora Practical Physics, S. Chand Comp.
2. Chauhan & Singh Advanced Practical Physics. Pragati Prakashan.
3. Experimental Physics, University Granth Nirman Board, (Gujarati Medium)
4. A.K.Sawhney. A Course in Electronic Measurements and Instrumentation, DhanpatRai

and Co.

**Pedagogic tools:**

- Chalk and Board
- Power point presentation
- Seminar
- Videos

**Methods of Assessment & Tools:**

Components of CIE: 30 marks (Example as below)

Sr. No.	Component	Content	Duration (if any)	Marks	Sub Total
A	Test 1	1 <sup>st</sup> 2 units	1 <sup>1/2</sup> hours	5 (Set for 30)	20
	Test 2	All 5 units	3 hours	15 (Set for 70)	
B	Assignment	2		05	10
C	Assignment			05	
<b>Grand Total</b>					<b>30</b>
<b>Assignment</b>		<ul style="list-style-type: none"><li>● Abstract and executive summary</li><li>● Experimental design</li><li>● Concept mapping</li><li>● Student generated handbook</li><li>● Essay writing etc...</li></ul>			

**1. Practical**

- CIE - 40 marks  
SEE - 60 marks  
Total - 100 marks
- Components of CIE

S. No.	Component	Content	Duration, if any	Marks	Sub Total
a)	Test	50% to 60% of experiments	2 hrs/3hrs	30 (set for 30 marks)	30
b)	Observation book & record	-	-	10	10
<b>Grand Total</b>					<b>40 Marks</b>

**Note : Any other assessment tools or methods can be adopted as per requirement of the course.**

**Faculty of science  
Department of Physics**

<b>Part II</b>			
<b>Transdisciplinary Elective</b>			
For the students admitted from A.Y. 2021-22 onwards			
<b>Offering Department:</b> Physics		<b>Offered to:</b> Students of all B.Sc. Programs	
<b>Semesters: IV-V (3 year program)</b>			
Course Code	Course Title	Credit	Hr/Wk
<b>21UPHTD101</b>	<b>Renewable energy resources</b>	<b>2</b>	<b>2</b>

**Prerequisite:**

Specify prerequisite course name (with code) or prerequisite knowledge area, *if any*, to opt this course.

**Course Objective:**

The Student will learn the concepts about energy sources like solar energy, wind energy, energy from biomass, geothermal energy, energy from the ocean.

Recent advancements in energy generations like magneto hydrodynamic power generation, fuel cell technology, hydrogen energy and management of energy in the industries.

**Course Content:**

Modules	Hours
<b>Module-I: INTRODUCTION:</b> <ul style="list-style-type: none"> <li>● Various non-conventional energy resources- availability</li> <li>● classification</li> <li>● relative merits and demerits</li> </ul>	<b>6</b>
<b>Module-II: SOLAR CELLS AND SOLAR THERMAL ENERGY:</b> <ul style="list-style-type: none"> <li>● Theory of solar cells</li> <li>● solar cell materials</li> <li>● solar cell power plant</li> </ul>	<b>6</b>

<ul style="list-style-type: none"> <li>● limitations.</li> </ul>	
<b>Module-III: FUEL CELLS</b> <ul style="list-style-type: none"> <li>● Principle of working of various types of fuel cells</li> <li>● working of various types of fuel cells</li> <li>● performance</li> <li>● limitations.</li> </ul>	<b>6</b>
<ul style="list-style-type: none"> <li>● <b>Module-IV: WIND ENERGY</b></li> <li>● Principle of working</li> <li>● performance</li> <li>● limitations</li> </ul>	<b>6</b>
<b>Module-V: GEOTHERMAL ENERGY</b> <ul style="list-style-type: none"> <li>● Principle of working</li> <li>● performance</li> <li>● limitations</li> </ul>	<b>6</b>

**Pedagogic Tools:**

1. Chalk & Talk
2. PPTs & Videos
3. Assignments

**Suggested MOOCs:**

1. [https://onlinecourses.nptel.ac.in/noc20\\_me50/preview](https://onlinecourses.nptel.ac.in/noc20_me50/preview)
2. <https://www.coursera.org/learn/3d-printing-applications>
- 3.

**Methods of Assessment & Tools:**

Components of CIA: 100 marks

Sr.	Component	Content	Duration (if any)	Marks
1	Attendance	---	---	10
2	Assignment-1	---	---	10
3	Assignment-2	---	---	10
4	Test-1	Module I & II	1.5 Hours	20 (set for 30)
5	Test-2	Module I to V	2.5 Hours	50 (set for 50)
<b>Total</b>				<b>100</b>