

AC ITEM NO. : AC/MAR-22/3-PHY



Celebrating 63 Years of Glory

*Parle Tilak Vidyalaya Association's*  
**SATHAYE COLLEGE (AUTONOMOUS)**

NAAC accredited 'A' Grade (3<sup>rd</sup> Cycle)

Dixit Road, Vile Parle (E), Mumbai-57

Affiliated to  
**University of Mumbai**

**SYLLABUS FOR**  
**F. Y. B. Sc. (PHYSICS)**

As per **Choice Based Credit System** pattern of UGC  
To be implemented from Academic Year: 2022-2023

**PREAMBLE:**

PTVA's Sathaye College (Autonomous) believes in implementing several measures to bring equity, efficiency and excellence in higher education system in conformity to the guidelines laid down by the University Grants Commission (UGC). In order to achieve these goals, all efforts are made to ensure high standards of education by implementing several steps to enhance the teaching-learning process, examination and evaluation techniques and ensuring the all-round development of students.

The three year course in B. Sc. Physics has been designed to have a progressive and innovative curriculum in order to equip our students to face the future challenges in the field of higher education. In semesters I and II students are introduced to the basic areas of physics such as mechanics, optics, electricity and modern physics.

In semesters III and IV the course content is made more rigorous by introducing the details of each of the above area. In semesters V and VI, course are designed to help in specialization in the core areas of Physics such as Mathematical and Statistical Physics, Atomic & Molecular Physics, Solid State Physics, Electronics, Microprocessors and Microcontrollers, C++ language etc. The practical course has been designed to help the student have a firm grip on the theoretical concepts through relevant experiments in each course.

**OBJECTIVES:**

- To foster scientific attitude, provide in-depth knowledge of scientific and technological concepts of Physics.
- To enrich knowledge through problem solving, minor/major projects, seminars, tutorials, review of research articles/papers, participation in scientific events, study visits, etc.
- To familiarize with recent scientific and technological developments.
- To create foundation for research and development in Physics.
- To help students to learn various experimental and computational tools thereby developing analytical abilities to address real world problems.
- To train students in skills related to research, education, industry, and market.
- To help students to build-up a progressive and successful career in Physics.

**Structure of the Course:**

The Board of Studies in Physics in its meeting held on 2<sup>nd</sup> March 2022 has discussed, finalized and unanimously accepted the revised syllabus (as per CBCS pattern) prepared by committee.

The titles of the papers for F.Y.B.Sc. (Physics) areas given below;

| <b>Semester</b> | <b>Course Code</b> | <b>Course Title</b>                                    | <b>No of Credits</b> | <b>No of Lectures</b> |
|-----------------|--------------------|--|----------------------|-----------------------|
| I               | UGSC1PHY0122       | Physics Paper I<br>Introduction to Mechanics           | 2                    | 45                    |
|                 | UGSC1PHY0222       | Physics Paper II<br>Basic Electricity and Electronics  | 2                    | 45                    |
|                 | UGSC1PHYP122       | LAB –I<br>Practical Course on Paper I & II             | 2                    | 90                    |
| II              | UGSC2PHY0122       | Physics Paper I<br>Geometrical Optics and Applications | 2                    | 45                    |
|                 | UGSC2PHY0222       | Physics Paper II<br>Modern Physics                     | 2                    | 45                    |
|                 | UGSC2PHYP122       | LAB –II<br>Practical Course on Paper I & II            | 2                    | 90                    |

**SEMISTER-I****Physics Paper I****Course code: UGSC1PHY0122****Title: - Introduction to Mechanics****Pre-requisites:**

Knowledge of Basic Concepts of Mechanics from XII standard level

**Course Objectives:**

1. To develop analytical abilities towards real world problems related to motion of objects
2. To familiarize with current and recent Scientific and Technological Developments
3. To enrich knowledge through problem solving, hands on activities, projects etc.

**Course Outcomes:** On successful completion of this course students will be able to:

1. Understand Newton's laws, the Rotational Motion, Gravitation and oscillatory motion.
2. Apply the concepts to solve the problems to carry out the calculations of the motion of simple systems in day to day life.

**Course Content**

| <b>UNIT</b> | <b>Description</b>  | <b>Lectures</b> |
|-------------|---|-----------------|
| <b>I</b>    | <b>Newton's Laws of Motions and It's Applications</b>   | <b>15</b>       |
|             | Newton's Laws of Motion   |                 |
|             | Free Body Diagrams  |                 |
|             | Solving Differential Equations  |                 |
|             | Projectile Motion   |                 |
|             | Motion in a Plane and Polar Coordinates   |                 |
|             | Problems Based on Newton's Laws of Motion   |                 |
|             | <b>Reference Book: Introduction to Classical Mechanics<br/>By David Morin (Cambridge University Press)<br/>( 2.1,2.2, 2.3, 2.4, 2.5 )</b>             |                 |
| <b>II</b>   | <b>Dynamics of Rotational Motion</b>  | <b>15</b>       |
|             | Moment of Inertia and Angular Momentum about an axis  |                 |
|             | Rotational Kinetic Energy of Rigid Body   |                 |
|             | Determination of Moment of Inertia about an axis  |                 |
|             | Calculation of Moment of Inertia of some Rigid Body   |                 |
|             | Kinetic Energy of Rotating Body about an axis   |                 |
|             | Motion of Rolling down and Inclined Plane   |                 |
|             | Flywheel and It's Moment of Inertia   |                 |
|             | <b>Reference Book: University Physics-I ( Part-I )<br/>By J. C. Upadhyaya, Himalaya Publishing House<br/>( 6.5, 6.6, 6.8, 6.9, 6.10, 6.11, 6.12 )</b> |                 |
| <b>III</b>  | <b>Gravitational Field and Potential</b>  | <b>15</b>       |
|             | Newton's Law of Gravitation   |                 |

|  |  |           |
|--|--|-----------|
|  | Gravitational Fields and Potential   |           |
|  | Gravitational Potential energy of a System of Masses   |           |
|  | Equi-potential Surface   |           |
|  | Gravitational Potential and Field due to a Thin Spherical Shell  |           |
|  | Gravitational Potential and Field due to a Solid Sphere  |           |
|  | Gravitational Potential and Field due to a Thick Spherical Shell   |           |
|  | <b>Reference Book: University Physics-I ( Part-I )<br/>By J. C. Upadhyaya, Himalaya Publishing House<br/>( 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7 )</b> |           |
|  | <b>Total</b>   | <b>45</b> |
|  | <b>Additional Reference Books:</b>   |           |
|  | 1. University Physics by Sears and Zeemansky, Pearson Publications<br>2. Mechanics by D. S. Mathur, S.Chand Publishing                             |           |

### Physics Paper II

**Course code: UGSC1PHY0222**

**Title: - Basic Electricity and Electronics**

#### Pre-requisites:

Knowledge of Basic Concepts of Electricity and Magnetism from XII standard level

#### Course Objectives:

1. To develop analytical abilities towards real world problems related to electricity and magnetism
2. To familiarize with current and recent Scientific and Technological Developments
3. To enrich knowledge through problem solving, hands on activities, projects etc.

**Course Outcomes:** On successful completion of this course students will be able to:

1. Understand AC and DC circuits and understand the network of circuits.
2. To get introduced to digital electronics and to understand the basics of digital world around and the working principle behind digital circuits.
3. Apply the concepts to solve the problems to carry out the calculations of simple circuits in day to day life.

#### Course Content

| UNIT     | Description                                | Lectures  |
|----------|--|-----------|
| <b>I</b> | <b>Electric Currents A.C. and D.C.</b>     | <b>15</b> |
|          | Varying Currents-Transient                 |           |
|          | Rise and Decay of Current in LR circuit    |           |
|          | Rise and Decay of Current in CR circuit    |           |
|          | Discharge of Capacitor through Inductance  |           |
|          | AC circuit containing pure Resistance      |           |
|          | AC circuit containing pure Inductance only |           |

|            |  |           |
|------------|--|-----------|
|            | AC circuit containing pure Capacitance only  |           |
|            | AC networks  |           |
|            | Inductance and Resistance in Series  |           |
|            | Capacitance and Resistance in Series   |           |
|            | AC circuit containing Inductance, Capacitance and Resistance in Series   |           |
|            | Parallel Resonant Circuit-Rejecter Circuit   |           |
|            | <b>Reference Book: University Physics-I ( Part-II )<br/>By J. C. Upadhyaya, Himalaya Publishing House<br/>( 7.5, 7.6, 7.7, 7.8, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.16 )</b>  |           |
| <b>II</b>  | <b>Basic Electronic Devices</b>  | <b>15</b> |
|            | Semiconductor Diode  |           |
|            | Diode as a Rectifier   |           |
|            | Resistance of Crystal Diode  |           |
|            | Equivalent Circuit of Crystal Diode  |           |
|            | Important terms for Crystal Diode  |           |
|            | Half-wave Rectifier  |           |
|            | Efficient of Half-wave Rectifier   |           |
|            | Full-wave Rectifier  |           |
|            | Center-tape full Wave Rectifier  |           |
|            | Full-wave Bridge Rectifier   |           |
|            | Efficiency of Full-wave Rectifier  |           |
|            | Ripple Factor  |           |
|            | Zener Diode  |           |
|            | Zener Diode as Voltage Stabilizer  |           |
|            | Transistor   |           |
|            | Naming the Transistor terminal   |           |
|            | Transistor Action  |           |
|            | Transistor Symbol  |           |
|            | Transistor Circuit as Amplifier  |           |
|            | <b>Reference Book: Principles of Electronics<br/>By V. K. Mehta &amp; Rohit Mehta , S. Chand and Company<br/>( 6.1, 6.2, 6.3, 6.4, 6.6, 6.8, 6.10, 6.11, 6.12, 6.13, 6.15, 6.18, 6.25, 6.27,<br/>8.1, 8.2, 8.4, 8.5, 8.6 )</b> |           |
| <b>III</b> | <b>Fundamental Concepts of Digital Electronics</b>   | <b>15</b> |
|            | Transistor as a Switch   |           |

|  |           |
|--|-----------|
| Digital Signal   |           |
| Digital Switch   |           |
| Basic digital circuits   |           |
| NAND and NOR operation   |           |
| Ex-OR operation  |           |
| Boolean algebra  |           |
| Examples of IC gates   |           |
| Summery and Problems   |           |
| Introduction to Number systems   |           |
| Number systems   |           |
| Binary number system   |           |
| Signed binary numbers  |           |
| Binary arithmetic  |           |
| 2's Complement arithmetic  |           |
| Octal number system  |           |
| Hexadecimal number system  |           |
| <b>Reference Book: Modern Digital Electronics</b><br><b>By R. P. Jain, TMH publication</b><br><b>( 3.5.2, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8 )</b>   |           |
| <b>Total</b>   | <b>45</b> |
| <b>Additional Reference Books:</b>   |           |
| <ol style="list-style-type: none"> <li>1. Digital Principles and Applications by Malvino, Leach and Brown</li> <li>2. University Physics by Sears and Zeemanski, Pearson Publication</li> <li>3. Fundamentals of Magnetism and Electricity by D. N. Vasudeva , S. Chand</li> </ol> |           |

### Physics Practical

**Course code: UGSC1PHYP122**

**Title: - LAB –I (Practical Course on Paper I & II)**

#### Leaning Outcome:

1. To understand and practice the skills while doing physics practical.
2. To understand the use of apparatus and their use without fear.
3. To correlate their physics theory concepts through practical.
4. To understand the concepts of errors and their estimation.

**List of the experiments:**

|     |   |
|-----|---|
| 1.  | Moment of Inertia of Flywheel   |
| 2.  | Torsional Oscillation: To determine modulus of rigidity $\eta$ of a material of wire by torsional oscillations                                |
| 3.  | Y by Bending: To determine Y- Modulus of wooden beam by method of bending.  |
| 4.  | J by Electrical Method: To determine mechanical equivalent of heat (Radiation correction by graph method)                                     |
| 5.  | CR Circuit: To determine value of given capacitor and Phase angle /<br>LR Circuit: To determine the value of given inductance and phase angle |
| 6.  | LCR series Resonance: To determine resonance frequency of LCR series circuit.   |
| 7.  | To study NAND and NOR gates as Universal Building Blocks  |
| 8.  | To study EX-OR Gate, half adder and full adder and verify their truth tables  |
| 9.  | Study of Basic Logic Gates and De-Morgan's Theorem  |
| 10. | Forward Bias Characteristics of PN Junction diode and Zener diode.  |
|     | <b>Lab Skill:</b>   |
| 1   | Use of Vernier Calliper and Micrometre Screw gauge  |
| 2   | Use of Travelling Microscope  |
| 3   | Use of Digital Multi-meter.   |
| 4   | Charging & Discharging of Capacitor   |

**Minimum 8** experiments from the list should be completed in the first semester. All four skill experiments are to be reported in journal. Certified journal is a must to be eligible to appear for the semester end practical.

**SEMESTER-II****Physics Paper I****Course code: UGSC2PHY0122****Title: - Geometrical Optics and Applications****Pre-requisites:**

Knowledge of Basic Concepts of Geometrical Optics from XI standard level

**Course Objectives:**

1. To develop analytical abilities towards real world problems related to optics and its wide range applications
2. To familiarize with current and recent Scientific and Technological Developments
3. To enrich knowledge through problem solving, hands on activities, field visits, projects etc.

**Course Outcomes:** On successful completion of this course students will be able to:

1. Understand Geometrical Optics, Lens combinations and their applications in various optical instruments
2. Apply the concepts to understand the phenomena around.
3. To carry out the calculations by understanding the working principle of the optical devices in day to day life.



**Course Content**

| <b>UNIT</b> | <b>Description</b>  | <b>Lectures</b> |
|-------------|---|-----------------|
| <b>I</b>    | <b>Geometrical Optics</b>   | 15              |
|             | Introduction  |                 |
|             | Thin and Thick Lenses   |                 |
|             | Lens Equation   |                 |
|             | Lens Maker Formula  |                 |
|             | Cardinal Points of a Coaxially Optical System   |                 |
|             | Combination of two thin lenses  |                 |
|             | <b>Reference Book: Fundamentals of Optics by Devraj Singh, Eastern Economy Edition Publication (2.1, 2.2, 2.3, 2.4, 2.5, 2.6)</b> |                 |
| <b>II</b>   | <b>Lens Aberrations</b>   | 15              |
|             | Introduction  |                 |
|             | Types of Aberrations  |                 |
|             | Types of Monochromatic Aberrations and their reductions   |                 |
|             | Chromatic Aberrations   |                 |
|             | Aplantism and Aplannatic points   |                 |
|             | <b>Reference Book: Fundamentals of Optics by Devraj Singh, Eastern Economy Edition Publication (4.1, 4.2. 4.3. 4.4. 4.5)</b>      |                 |
| <b>III</b>  | <b>Optical Instruments</b>  | 15              |
|             | Introduction  |                 |
|             | Microscopes   |                 |
|             | Telescopes  |                 |
|             | Eyepieces or Oculars  |                 |
|             | Spectrometer  |                 |
|             | Electron Microscope   |                 |
|             | <b>Reference Book: Fundamentals of Optics by Devraj Singh, Eastern Economy Edition Publication (5.1, 5.2, 5.3, 5.4, 5.5, 5.6)</b> |                 |
|             | <b>Total</b>  | <b>45</b>       |

**Additional Reference Books:**

1. University Physics by Sears and Zeemaanski, Pearson Addison-Wesley
2. A Text Book Of Optics by Brijlal Subramanyam, S. Chand Publishing
3. Optics by Ajoy Ghatak, Tata McGraw-Hill Education

**Physics Paper II**

**Course code: UGSC2PHY0222**

**Title: - Modern Physics**

**Pre-requisites:**

Knowledge of Basic Concepts from Modern Physics from XII standard level

**Course Objectives:**

1. To develop analytical abilities towards real world problems related modern physics and understand the behavior of particles beyond macroscopic world.
2. To familiarize with current and recent Scientific and Technological Developments
3. To enrich knowledge through problem solving, hands on activities, field visits, projects etc.

**Course Outcomes:** On successful completion of this course students will be able to:

1. Understand atomic theories, wave properties of particles and their applications in nuclear physics
2. Apply the concepts to understand the phenomena around.
3. To carry out the calculations related to energy and mass of particles.

**Course Content**

| Unit     | Description   | Lectures |
|----------|---|----------|
| <b>I</b> | <b>Introduction to Quantum Theory</b>   | 15       |
|          | Inadequacy of Classical theory to explain Black-body radiation spectrum   |          |
|          | Planck law of Radiation   |          |
|          | Failure of Electromagnetic Wave Theory  |          |
|          | The Compton Effect : The experiment, Failure of Classical theory, Theory of Compton Effect  |          |
|          | The Wave-Particle duality   |          |
|          | Bohr's Theory of Hydrogen atom : Energy levels and origin of Spectral series  |          |
|          | Failure of Bohr's theory  |          |
|          | Franck-Hertz Experiment   |          |
|          | Limitations of old Quantum Theory   |          |
|          | <b>Reference Book: Perspective of Quantum Mechanics by S P Kuila<br/>Publisher New Central Book Agency<br/>( 1.1, 1.2, 1.3.3, 1.7, 1.9, 1.9.1, 1.9.2, 1.9.3, 1.11, 1.12, 1.12.1, 1.13.1, 1.15, 1.15.1, 1.16.5 )</b> |          |

|   |   |           |
|---|---|-----------|
| <b>II</b>   | <b>Wave Nature of Matter</b>  | 15        |
|   | Introduction and Origin of de-Broglie's theory of matter wave   |           |
|   | Phase and Group Velocity  |           |
|   | Relation Between Phase and Group Velocity   |           |
|   | Formation of Wave Packet  |           |
|   | De-Broglie's relation for a Photon  |           |
|   | Nature of de-Broglie's wave   |           |
|   | de-Broglie's wavelength of material particle  |           |
|   | Experimental Proof of de-Broglie's Hypothesis   |           |
|   | Davisson and Germer Experiment  |           |
|   | <b>Reference Book: Perspective of Quantum Mechanic by S P Kuila<br/>Publisher New Central Book Agency<br/>( 2.1, 2.2, 2.3, 2.3.1, 2.3.2, 2.3.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.13, 2.13.1, 2.13.2 )</b> |           |
| <b>III</b>  | <b>Heisenberg's Uncertainty Principle and It's Applications</b>   | 15        |
|   | The Uncertainty Principle   |           |
|   | Statement of Uncertainty Principle  |           |
|   | Elementary proof of Uncertainty Principle   |           |
|   | Conclusions from Uncertainty Principle  |           |
|   | Time-Energy uncertainty relation  |           |
|   | Elementary proof of Time-Energy uncertainty relation  |           |
|   | Heisenberg's Uncertainty Principle from de-Broglie's wave concept   |           |
|   | Concept of Bohr orbit in view of Uncertainty Principle  |           |
|   | Illustration of Heisenberg's Uncertainty Principle: Electron Diffraction through Single slit, Gama-ray Microscope experiment  |           |
|   | <b>Reference Book: Perspective of Quantum Mechanic by S P Kuila<br/>Publisher New Central Book Agency<br/>( 3.1, 3.2, 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.8, 3.4, 3.5, 3.5.1, 3.5.2 )</b>               |           |
|   | <b>Total</b>  | <b>45</b> |
| <b>Additional Reference Book:</b><br>Concepts of Modern Physics by Arthur Beiser, Tata McGraw-Hill, Higher Education. |   |           |

**Physics Practical****Course code: UGSC2PHYP122****Title: - LAB –II (Practical Course on Paper I & II)****Learning Outcome:**

1. To understand and practice the skills while doing physics practical.
2. To understand the use of apparatus and their use without fear.
3. To correlate their physics theory concepts through practical.
4. To understand the concepts of errors and their estimation.

**List of the experiments:**

|    |   |
|----|---|
| 1  | Combination of Lenses To determine equivalent focal length of a lens system by magnification method |
| 2  | Spectrometer: To determine refractive index $\mu$ of the material of prism                          |
| 3  | Spectrometer: To determine of angle of Prism  |
| 4  | Newton's Rings To determine radius of curvature of a given convex lens using Newton's rings.        |
| 5  | Frequency of AC Mains: To determine frequency of AC mains.  |
| 6  | LDR Characteristics: To study the dependence of LDR resistance on intensity of light                |
| 7  | To study working of a Bridge Rectifier  |
| 8  | Reverse Biased Characteristics of Zener Diode and its application to Voltage regulator              |
| 9  | Study of 1). Transistor as Switch.<br>2). Output Characteristics of Transistor                      |
| 10 | Y by vibrations: To determine Young's Modulus of a wire material by method of vibrations.           |
|    | <b>Lab Skills:</b>  |
| 1  | Adjustment of Spectrometer using Schuster's method.   |
| 2  | Study of diffraction of light using Grating.  |
| 3  | Plotting of Graphs.   |
| 4  | Focal length of Convex lens.  |

**Minimum 8** experiments from the list should be completed in the first semester. All four skill experiments are to be reported in journal. Certified journal is a must to be eligible to appear for the semester end practical.

**EXAMINATION PATTERN****A) Continuous Internal Assessment (40 Marks):**

| <b>Sr. No.</b> | <b>Particulars</b>   | <b>Marks</b> |
|----------------|--|--------------|
| 1              | One Assignment/Project work/Case study /Presentation /Seminar /Field visit reports/Book review etc. to be conducted in the given semester before Semester end examination. | 15           |
| 2              | One online/offline class test.   | 15           |
| 3              | Active participation in routine class instructional deliveries.  | 5            |
| 4              | Overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities                         | 5            |

**B) Semester End Examination (60 Marks):****Question Paper Pattern**

1. These examinations shall be of 2 Hours duration. Maximum marks 60.
2. There shall be four questions each of 15 marks. On each unit there will be one question and the fourth one will be based on entire syllabus or as per the directive of BOS.
3. All questions shall be compulsory with internal choice within the questions. (Each question will be of 20 to 23 marks with options.)
4. Question may be subdivided into sub-questions a, b, c. . . and the allocation of marks depend on the weightage of the topic.

**C) Semester End Practical Examination (100 marks):****Scheme of examination:**

- There will be no internal assessment for practical.
- A candidate will be allowed to appear for the semester end practical examination only if the candidate submits a certified journal at the time of practical examination of the semester or a certificate from the Head of the Department/Institute to the effect that the candidate has completed the practical course of that semester of F. Y. B. Sc. Physics as per the minimum requirement.
- The duration of the practical examination will be two hours per experiment.
- Students will be examined in two experiments one based on Paper I and other on Paper II.
- The questions on slips for the same should be framed in such a way that candidate will be able to complete the task and should be evaluated for its skill and understanding of physics.

**Board of Studies (BOS)**

| <b>Sr. No.</b> | <b>Name</b>                    | <b>Category</b>   | <b>Affiliation</b>  |
|----------------|--------------------------------|---|---|
| 1.             | Prof. Dattatray Mahadu Nerkar  | HOD Physics<br><b>Chairman</b>                              | Sathaye College, Autonomous   |
| 2.             | Dr. Milind Jog                 | Subject Expert<br>nominated by VC                           | Kirti M. Doongursee College,<br>Dadar (W), Mumbai - 400028  |
| 3.             | Prof. R. S. Patil              | Subject Expert<br>outside parent<br>university              | Principal, PSGVPM's ASC<br>College, Shahada Dist. Nandurbar<br>(KBCNMU Jalgaon)   |
| 4.             | Dr. Madhav K. Deore            | Subject Expert<br>outside parent<br>university              | KTHM College Nashik,<br>(SPPU Pune)   |
| 5.             | Mr. Shailendra Gokhale         | Industry/corporate/<br>allied area related to<br>placements | Managing Partner, Rosefield, DAA<br>International Consultancy LLP,<br>B-201,B-Wing, Pramukh Plaza,<br>Andheri (E), Mumbai |
| 6.             | Shri. Mayur Badge              | Post graduate<br>meritorious<br>alumnus                     | 6/78, Shivanand Society Chitrakar<br>Ketkar Marg, Vile Parle East,<br>Mumbai - 400057.                                    |
| 7.             | Prof. (Dr.) Ashok L. Sunatkari | Subject Expert  | Siddharth College, Fort, Mumbai -<br>400001   |
| 8.             | Dr. Gitesh Padhye              | Subject Expert  | Thakur College of Science &<br>Commerce, Kandivali (E), Mumbai  |
| 9.             | Dr. Yogesh Vitthal Gulwadi     | Internal Faculty  | Sathaye College, Autonomous   |
| 10.            | Dr. Madhav R. Rajwade          | Internal Faculty  | Principal,<br>Sathaye College, Autonomous   |
| 11.            | Dr. Sunil Premchand Patil      | Internal Faculty  | Sathaye College, Autonomous   |
| 12.            | Shri. Suryakant Eknath Jaware  | Internal Faculty  | Sathaye College, Autonomous   |
| 13.            | Smt. Sukruta Amar Pethe        | <b>Member secretary</b>                                     | Sathaye College, Autonomous   |
| 14.            | Shri.Jitendra Bhatu Bhadane    | Internal Faculty<br>(CB)                                    | Sathaye College, Autonomous   |
| 15.            | Shri.Arvind Shukla             | Internal Faculty<br>(CB)                                    | Sathaye College, Autonomous   |