

Barshi Shikshan Prasarak Mandal's

# Shriman Bhausahab Zadbuke Mahavidyalaya, Barshi

Zadbuke Marg, Latur Road, Barshi, Dist - Solapur, Maharashtra, India - 413401

## Department of Physics

### Profile

#### About the Department

The Department of Physics was started in 1969. The first faculty of the department was Shri S.B. Shinde. There had been a single Full-time faculty. We as a department run B.Sc. Physics as a regular course. Apart from the course we have Active MoU to organize different kinds of activities programmes and events. As well we have few certificate courses. The faculty member is actively involved in research, extension and community services.

#### 1) Courses :

	Courses	Duration	Required Qualification
Degree	B.Sc.	3 Years	H.Sc.
Certificate	Certificate/Add on Course	3 months	H.Sc.

#### 2) Faculty and Staff :

Sr. No.	Name	Designation	Qualification
1	Dr. R.M. Mohite	Head and Assistant Professor	M.Sc., Ph.D.
2	Mr. A.D. Pawar	Lab. Attendant	H.Sc.

#### 3) MoU's :

Sr. No.	MoU with	Purpose	Duration
1	Marathi Vidnyan Parishad	To exchange the knowledge and conduct activities in collaboration	5 years

#### 4. Memberships: Editorial and Advisory Board member of :

1. *Condensed Matter Physics Report, Whioce Publishing Pte. Ltd., Singapore*
2. *"International Journal of Emerging Technology and Advanced Engineering"*.
3. *Int. J. of Sim. in Phys.*
4. *International Journal of Recent Development in Engineering and Technology.*

#### Reviewer of :

1. *Science International, Dubai, UAE.*
2. *International Journal of Scientific Research & Nano-Technology*

### 5) Faculty Development Programmes (FDPs)

Sr. No.	Course	Name of the Institute	Date	Grade
1	Faculty Induction Programme	Indian Institute of Science, Education and Research	30 Oct to 23 Nov. 2019	A
2	Faculty Development Programme	Indian Institute of Technology Roorkee	8 Week	A
3	Faculty Development Programme	Indian Institute of Technology Roorkee	4 Week	A
4	Faculty Development Programme	Ramanujan College, Delhi University. PMMM National Mission on Teachers and Teaching	2 Week	---
5	Faculty Development Programme	Swami Ramanand Terth Marathwada University, Nanded	1 Week	---
8	Faculty Development Programme	Shrimati Indira Mahadev Beharay College of Arts, Shriman Chandulal Sheth College of Commerce, Shrimati Shobhatai Chadulal Sheth College of Science, Khed-Ratnagiri.	5 days	---

### 6) Courses

Sr. No.	Course	Institute/Organization	Date of Completion
1	BSAFE (English)	UN & UN agencies	21/04/20
2	Introduction to Nutrition	UNICEF	22/04/20
3	Prevention of Sexual exploitation & abuse (PSEA)	UNICEF	21/04/20
4	Children & Climate Change	UNICEF & UN CC : Learn	21/04/20
5	Socio-Economic Policies for Child Right with Equity	UNICEF	21/04/20

### 7) Course Outcomes :

Sr. No.	Course	Outcomes
1	B.Sc. I Paper I	<p><b>CO1:</b> Understanding the concept of Moment of Inertia and applying them in calculations of the moment of inertia of various systems.</p> <p><b>CO2.</b> Understand the physics and mathematics of oscillations and to solve the equations of motion for simple harmonic and damped oscillators</p> <p><b>CO3.</b> Understand the concepts of energy, work, power, the concepts of conservation of energy and be able to perform calculations using them.</p>

		<p><b>CO4.</b> Understand the concepts of elasticity and be able to perform calculations using them.</p> <p><b>CO5.</b> Understand the concepts of surface tension and viscosity and be able to perform calculations using them.</p> <p><b>CO6.</b> Understand the concepts of viscosity &amp; fluid dynamics and its application in real life problems.</p> <p><b>CO7.</b> Demonstrate quantitative problem solving skills in all the topics covered</p>
2	B.Sc. I Paper II	<p><b>CO1:</b> Understand technical applications of simple optical instruments.</p> <p><b>CO2:</b> Understand and explain the different optical method of testing and measuring of various physical parameters</p> <p><b>CO3:</b> Understand Fermat's principle, explain about different aberrations in lenses and discuss the method to minimize them.</p> <p><b>CO4:</b> Understand the types of eyepieces and construction and working of spectrometer and optical bench for determining various optical values.</p> <p><b>CO5:</b> Understand the phenomenon of interference of light and its formation in thin film, Newton's ring, wedge shaped film etc. due to division of amplitude.</p> <p><b>CO6:</b> Explain Schuster method, Distinguish between diffraction and interference patterns, prism and grating spectra</p> <p><b>CO7:</b> Comprehended the basic principle of laser and its parts, the construction and working of He-Ne and Ruby laser.</p> <p><b>CO8:</b> Solve problems using suitable assumptions and formulae as well as able to assess the results</p>
3	B.Sc. I Paper III	<p><b>CO1:</b> Determination of Coefficient of Viscosity, Thermal Conductivity and Diffusion.</p> <p><b>CO2:</b> Understand Liquefaction of gases by various methods and Properties of Liquid He-II.</p> <p><b>CO3:</b> Apply the laws of thermodynamics to formulate the relations necessary to analyze a thermodynamic process.</p> <p><b>CO4:</b> Analyse the heat engines and calculate thermal efficiency.</p> <p><b>CO5:</b> Analyze the refrigerators and calculate coefficient of performance.</p> <p><b>CO6:</b> Understand property 'entropy' and derive some thermo dynamical relations using entropy concept</p>
4	B.Sc. I Paper IV	<p><b>CO1:</b> Understand the concept of Varying Current and applying them in charging and discharging of capacitor and time constant.</p> <p><b>CO2:</b> Understand the concept of AC circuits and different AC bridges.</p> <p><b>CO3:</b> Understand the concepts Magnetostatics and applying them to determine magnetic induction and also understand Ballistic Galvanometer theory and its constants.</p> <p><b>CO4:</b> Understand the rectifiers specially Bridge rectifier with filters also different wave shaping circuits.</p> <p><b>CO5:</b> Understand BJT include its output characteristics under CE and CB mode with application of transistor amplifier</p>
5	B.Sc. II Paper V	<p>Students will able to learn :</p> <p><b>CO1:</b> Scalar and vector triple product, Scalar and vector fields, Del operator, Gradient and Divergence</p> <p><b>CO2:</b> curl of vector and their physical significance</p> <p><b>CO3:</b> Concept of Precession, Gyroscope, Nutation, Lanchester's rules, Gyrostatic pendulum</p> <p><b>CO4:</b> Gyroscopic applications in brief</p>

		<p><b>CO5:</b> concepts of Elasticity, Bending of a beam, Bending moment, Cantilever, Centrally loaded beam</p> <p><b>CO6:</b> Viscosity of liquid by rotating cylinder method, Searle's viscometer, Ostwald's viscometer</p> <p><b>CO7:</b> Concepts of Sound, Acoustic transducers, Pressure microphone, Moving coil loudspeaker, Sabine's formula.</p>
6	B.Sc. II Paper VI	<p>The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments, Semiconductor diodes and transistors.</p> <p><b>CO1:</b> Knowledge about semiconductors since it is a basic materials used in many electronic components like diode, transistors FET, UJT etc.</p> <p><b>CO2:</b> Characteristics and working of operational amplifiers which are useful in various medical and scientific investigations to amplify the signals.</p> <p><b>CO3:</b> Generation of high frequency signals using oscillator circuits and their applications in radio and TV communication</p> <p><b>CO4:</b> Concepts of regulated power supply, rectifiers, filters and regulators.</p> <p><b>CO5:</b> An introduction to digital electronics which is useful in digital computers. Also logic gates and their applications. Sequential Logic Circuits, Flip- Flop</p> <p><b>CO6:</b> Special Purpose diodes like LED, photodiode, Varactor, Optocoupler</p> <p><b>CO7:</b> Operational Amplifiers its parameters, characteristics and applications</p> <p><b>CO8:</b> Junction Field Effect Transistor and MOS Field Effect Transistor, Working and applications</p> <p><b>CO9:</b> Operational Amplifiers its parameters, characteristics and applications</p> <p><b>CO10:</b> Regulated power supply using IC 723</p>
7	B.Sc. II Paper VII	<p>The students would gain the knowledge of</p> <p><b>CO1:</b> Image formation related to geometrical optics, Deviation, Magnification, Concept for Equivalent lens and Cardinal Points</p> <p><b>CO2:</b> Different types of monochromatic and chromatic aberrations and Achromatism in lenses</p> <p><b>CO3:</b> Construction and working of Simple Microscope, Compound Microscope, Ramsden's Eyepiece and Huygen's Eyepiece</p> <p><b>CO4:</b> Interference and diffraction of light, Formation of fringes, Resolution</p> <p><b>CO5:</b> Concept of Polarization, Double refraction, Construction and working of Nicol Prism</p>
8	B.Sc. II Paper VIII	<p><b>CO1:</b> Students would know about the basic principles in the development of modern physics.</p> <p><b>CO2:</b> The topics covered in the course build a basic foundation of undergraduate physics students to study the advance branches: quantum physics, nuclear physics, particle physics and high energy physics.</p> <p><b>CO3:</b> The course contains the study of theory of relativity, Planck's hypothesis, photoelectric effect, Compton effect, matter waves, atomic models, Schrodinger wave equations, and brief idea of nuclear physics.</p>

## 8) Syllabus :

Sr. No.	Course	Syllabus Link
1	B.Sc. I	<a href="https://su.digitaluniversity.ac/WebFiles/B%20Sc%20I%20%20Physics%20Syllabus%20CBCS%202019-20.pdf">https://su.digitaluniversity.ac/WebFiles/B%20Sc%20I%20%20Physics%20Syllabus%20CBCS%202019-20.pdf</a>
2	B.Sc. II	<a href="https://su.digitaluniversity.ac/WebFiles/BSc%20II%20Physics%20Syllabus%2008072020.pdf">https://su.digitaluniversity.ac/WebFiles/BSc%20II%20Physics%20Syllabus%2008072020.pdf</a>
3	B.Sc. III	<a href="https://su.digitaluniversity.ac/WebFiles/BSc%20III%20%20Physics%20Structure%20%20and%20Syllabus%20Rev.pdf">https://su.digitaluniversity.ac/WebFiles/BSc%20III%20%20Physics%20Structure%20%20and%20Syllabus%20Rev.pdf</a>

## 9) Publications

Sr. No.	Research Article/Book
1	Text book of material science (B.Sc. III) [ISBN-9789 3526 7881]
2	R.M. Mohite R. M., A.S. Roy, R.R. Kothawale, Significant enhancement in the conductivity of Al-doped zinc oxide thin films for TCO application, <i>International Journal of Nanoscience</i> , 15 (1) (2015), 1650011-1
3	R.M. Mohite, R.R. Kothawale, Al-doped zinc oxide nanostructures as transparent conductive window layer for photovoltaic application, <i>Indian Journal of Chemistry A</i> , 54A, (2015), 872-876.
4	R.R. Kothawale, R.M. Mohite, Morphological, Electrical and Optical properties of Al-doped zinc oxide nanorods, <i>Advanced materials research</i> , 1110, (2015), 218-221.
5	R.M. Mohite, S.S. Mule, Controlled Precipitation of Zinc Oxide by Chemical Bath Deposition, <i>ijiset</i> , 10(5), (2021), 4327-4330.
6	R.M. Mohite, R.R. Kothawale, Spray pyrolysis deposited ZnO nanostructures as transparent window layer for photovoltaic application, <i>ijsr</i> , 3 (12), (2014), 29-31.
6	R.M. Mohite, R.R. Kothawale, Synthesis and characterization of Al-doped zinc oxide nanorods for TCO application, <i>ijst</i> , 4 (6), (2014), 220-226.
7	R.M. Mohite, R.R. Kothawale, Fabrication of highly efficient and semitransparent ZnO nanomaterial for solar cells, <i>International Journal of Advanced Scientific and Technical Research[IJAST]</i> , 2 (5), (2012), 200-226.
9	R.R. Kothawale, R.M. Mohite, R. Nagrajan, Mossbauer Studies of <sup>151</sup> Eu Doped High Tc Superconducting Bi <sub>1.7</sub> Pb <sub>0.3</sub> Sr <sub>2</sub> Ca <sub>2-x</sub> Eu <sub>x</sub> Cu <sub>3</sub> O <sub>10+δ</sub> , <i>Int. Journal of Advanced Scientific and Technical Research</i> , 2 (3), (2012), 79-82.
10	R.M. Mohite, Noble Crystal Growth System for Production of Commercial Crystals Based on TRM., <i>Int. J. of Adv. Sci. and Tech. Res.</i> , 2 (1), (2012) 158-162.
11	R.M. Mohite, Single Crystal Growth Of K <sub>x</sub> Fe <sub>2</sub> Se <sub>2</sub> By Bridgman Method And Its Characterizations. <i>International Journal of Emerging Technologies in Sciences and Engineering</i> , 5 (1), (2011), 6-9.
12	R.M. Mohite, Rapid Growth Of KDP Crystal By Solution Growth Method With [EDTA, KCl] Additives And Its Characterizations. <i>IJETSE</i> , 3 (2), (2011), 14-17.
13	R.M. Mohite, R.R. Kothawale, Preparation and characterization of cuprous oxide thin films as an active layer for solar cells. <i>Proceedings International Conference on Functional Materials @ Nanoscale: Concerns and Challenges</i> , (2015), 146-147.

14	R.M. Mohite, R.R. Kothawale, <i>Proceedings International Conference on Nanomaterials for Sustainable Green Technology</i> , (2015), Chapter 16, Published.
15	Dr. R.M. Mohite, Dr. R.R. Kothawale, Dr. A.S. Roy, Low-Temperature Synthesis of Zinc Oxide Nanorods by Wet-Chemical method, <i>Int. Res. J. of Science &amp; Engineering</i> , A5,87-89,2018

#### 10) Conference Proceedings/ seminars/ workshops

Sr. No.	Name of the conference
1	R.R. Kothawale, R.M. Mohite, <i>7<sup>th</sup> International Conference on Advanced Materials Development &amp; Performance</i> , (AMDP-2014), 18-21 July 2014, Oral presentation, (Korea).
2	R.M. Mohite, R.R. Kothawale, <i>27<sup>th</sup> annual IAPT convention and seminar on recent trends in photonics</i> , 2-4 Nov 2012, Poster presented (Cochin).
3	R.M. Mohite, R.R. Kothawale, <i>Physics of Materials and Materials Based Device Fabrication (ICPM-MDF-2014)</i> , 13-15 Jan 2014, Poster presented (Kolhapur).
4	R.R. Kothawale, R.R. Mohite, <i>International Workshop on Nanotechnology and Advanced Functional Materials</i> , (NTAFM 2013), 24-25 July 2013, Poster presented (Pune).
5	R.M. Mohite, R.R. Kothawale, <i>1<sup>st</sup> International Conference on Physics, Mathematics, Geology and Engineering Sciences</i> , 2013, 18 March 2013, Oral presentation (Pune).
6	R.M. Mohite, <i>Avishkar 2008</i> , Ahmednagar College (Ahmednagar).
7	R.M. Mohite, R.R. Kothawale, <i>Emerging Horizons in Biochemical Sciences and Nanomaterials (EHBCSN-2013)</i> , 28-30 Nov 2013, Poster, (Barshi)
8	R.M. Mohite, R.R. Kothawale, <i>International conference on Functional Materials @ Nanoscale: Concerns and Challenges (ICFMNCC-2015)</i> , 9-11 March 2015, Poster presented (Pandharpur).
9	R.M. Mohite, R.R. Kothawale, <i>International conference on nanomaterials for sustainable green technology (ICNSGT 2015)</i> , 5-6 Jan 2015, (Mumbai).
10	R.M. Mohite, Workshop on New Syllabus of B.Sc. (III) Physics, March, 2016, (Akluj)
11	Two day state level workshop on E-content development, 27-28/10/2018, CT Bora college, Shirur.
12	Two day state level workshop on Advance Shaikshanik Video Nirmitti Karyshala, 17-18/11/2018, Angar, Solapur
13	Two day state level workshop on E-content development workshop, 24-25/11/2018, Walchand college of Arts and Science, Solapur.
14	Two day state level workshop 'Educational Video Creation', 12-13/01/2019, Shri Shivaji Mahavidyalaya, Barshi.
15	International conference on Recent Advances in Physical and Chemical Sciences, 22/01/2020, Sangola College Sangola.
16	National seminar on Recent Advances in Green Chemistry and Physics, 27/04/2018, Shri Chatrapati Shivaji College, Omerga.
17	International conference on Functional Eco-friendly Smart Emerging Materials, 10-12/03/2016, Baburaoji Gholap College, Sangvi, Pune.
18	National Conference on Advances in Condensed Matter Physics, 28/02/2019, D.B.F. Dayanand College of Arts and Science, Solapur.

19	B.Sc. III (Physics) CBCS Practical Course, 01/03/2019, D.B.F. Dayanand College of Arts and Science, Solapur.
20	National Seminar on Modern Approaches in Sciences, 28/01.2019, K.N. Bhise Arts, Commerce and Vinayakrao Patil Science College, Kurduwadi.
21	2 <sup>nd</sup> Mumbai-Pune Semiconductor Meeting , 12/03/2016, IISER Pune.
22	International Conference on Recent Advances in Physical and Chemical Sciences, Sangola College, Sangola, 22/01/2020, Sangola.

### 11) Meritorious Students

Sr. No.	Name	Course	Year	Percentage
1	Kawale Mahesh	B.Sc. III	2019-20	72.8
2	Dindore Priyanka	B.Sc. III	2019-20	72.42
3	Sonar Rohit Kumar	B.Sc. III	2021-22	86.68
4	Ghuge Vaibhav Rajendra	B.Sc. III	2021-22	77.59

### 12) Result Analysis

Sr. No.	Year	Percentage
1	2019-20	100
2	2020-21	100
3	2021-22	100

### 13) Parenting Policy

The department allocates the students among the faculty members equally. Every faculty member from every entry of the students takes care of the ward for Personal, Academic, Social, Psychological growth and development. It is a well-documented process as a part of IQAC's quality initiative.

#### 14. SWOC analysis of the department:

##### a. Strength

1. Subject is offered from the beginning of the college hence many past students are employed in Government at various level.
2. Brings awareness among students on various current issues of National and International importance.
3. Creates curiosity among students.
4. Helps in building good academicians and researchers.

##### b. Weakness

1. Student enrollment is less.
2. Not offered as a Core Compulsory subject.
3. Weak socio - economic background of the students.
4. Poor communicative skill of student.
5. Post of faculty lying vacant due to non-committal passive recruitment policy of Government.

**c. Opportunities**

1. Wide Scope for the students to build up their career.
2. Scope of higher education.
3. Good opportunities to make career in public and government sector.

**d. Challenges**

1. To complete syllabi in CBCS.
2. To make students aware of recent trends in Physics.
3. In adequate reference books in Vernacular language.

**1. Future plans of the department:**

1. Encourage students to pursue higher studies
2. To develop the basic concept of MORALITY among students
3. To organize national seminar and workshop
4. To organize poster presentation, Exhibition and science fair.
5. To start research center.

**15) Contact Details**

<b>Sr. No.</b>	<b>Faculty</b>	<b>Contact No</b>	<b>E-mail Id</b>	<b>Twitter/ Face book</b>
1	Dr. R.M. Mohite	7387950433	rajmohite07@gmail.com	NIL