





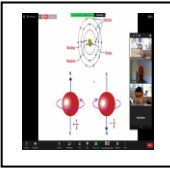


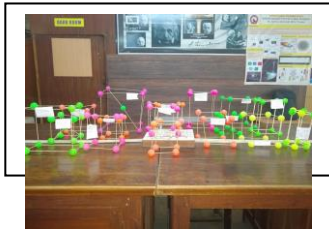




## Departmental Profile

Department	Physics		
Department Profile	College Vision and Mission		
	Departmental Goals/Aims/Objective	To develop proactive qualities among the students so as to be competitive and successful in career building	
	Introduction	Department offers course at undergraduate level. Faculty members are actively involved in the teaching and research field. Department completed UGC sanction minor and major project. Department have well equipped two laboratory and one dark room for B.Sc. practical.	
	Brief History	Physics Department established in 1971.The department was headed by Prof. G.T.Sawarkar with three retired faculty Prof.P.N.Gosavi, Prof. H.G.Ghime and Dr. Y.D.Tembhurkar	
	Facilities	Two laboratory and one Dark room for B.Sc. Practical's	
	Departmental Achievements		
	Best Practices of the department	Well equipped Laboratory	
	Placement if any after PG too		
	NET/SET Students Prominent students		
	Departmental Awards		
	Collaborations and MOU		
Academic Courses / Programmes	Programs :-B.Sc. Group Available PHY,CHE,MATH PHY,COM. SCIENCE,MATH	Course Outcome (See word file) <sup>i</sup>	Syllabus Link <a href="https://www.nagpurniversity.ac.in/links/Syl">https://www.nagpurniversity.ac.in/links/Syl</a>
Opportunities	PG Certifications Diploma PG Any other	PG Admission Links to such courses Link to other group syllabus	Link To Syllabi of RTMNU Nagpur
Faculties	<b>Head</b> Dr.Rajendra A. Mungmode <b>Other faculties</b> Dr.Priyanka.D. Bhoyar <b>CHB Faculties</b> Dr.Anil Meshram, Dr.Ranjita Shriwas	Message from Head of the Department	
	Retired staff of the Department with period and their contribution to the	Prof. G.T. Sawarkar Prof.P.N.Gosavi Prof.H.G.Ghime Dr. Y.D.Tembhurkar	1971 to 2007 1971 to 2009 1979 to 2016 1987 to 2019

	department				
	Approved Certificate Courses and Vocational Courses				
Research Foe each Teacher Separately	Research Profile of Department	Dr. Y.D. Tembhurkar	Dr. Rajendra A. Mungmode	Dr. Priyanka. D. Bhoyar	
	Minor Major Research Projects in Department Completed, Ongoing etc.	1)One Major Project (Completed) UGC File No 42.808/2013(SR ) 12,50,800/- 2) Minor Project Dated 6/3/2009.(100000 -)	Nil	Nil	
	Publications	60	04	13	
	List of Research Scholars for Ph. D.	02	Nil	Nil	
	List of Research Scholars for M. Phil.	Nil	Nil	Nil	
Admissions and Results	Students Strength	Year wise strength / See table bellow			
	Result statistics	See table bellow			
	Students Progression	See table bellow			
Students	Students Achievements Placements of the students if any	Placemnts 1) Ghazala Parveen 2) Hina Mansuri 3) Trupti Sharma 4) Shalini Nande 5) Gausia Kausar 6) Shazia Anjum 7) Ankita Sakharkar 8) Sweta Sakhare 9) Saurabh Khandelwar			
Students Corner					
	Student Committees				
Alumni	Alumni Association of department if any				
News and Events	Events, and Activities, etc Invited lecturers	1)One day webinar on LASER organized on 6 <sup>th</sup> August 2020 2)One Day webinar on interview skills organized on 8 <sup>th</sup> Agust 2020 3)Model making activity			

		<p>organized on 27<sup>th</sup> Jan. 2020</p> <p>4)One Day Webinar on Magnetism and Superconductor organized on 27<sup>th</sup> July 2021</p> <p>5)One day webinar on The story of X-Ray organized on 5<sup>th</sup> August 2021</p> <p>6) Activity :-Seminar competition Know your Scientists</p>	
Contacts			
Photo gallery	  	     	  
Any other specific achievements of department			

Guest speakers

Name of the Guest Speakers	Topic Covered	Date	Number of Students Attended	Outcome
			Attach sign list of Students	
1)Dr.Shahin Anjum K. Sayyad	LASER	6 <sup>th</sup> August 2020	298	Students learn about properties of laser, types of laser and application of laser.
2)Dr.Dilip S. Choudhary	Interview Skills	8 <sup>th</sup> August 2020	273	Students learn various techniques to prepare for an interview.
3) Dr.S.R.Jigajeni	Magnetism and Superconductor	27 <sup>th</sup> July 2021	50	Students learn about Magnetism and

				types of Superconductor.
4)Dr.K.V. Dabre	The story of X-Ray	5 <sup>th</sup> August 2021	54	Students understood about Application of x-ray in various fields.

#### Student Strengths

Year	Course			Intake Capacity	Eligibility	Link to syllabus
	Part I	Part II	Final			<a href="https://www.nagpuruniversity.ac.in/links/Syllabus">https://www.nagpuruniversity.ac.in/links/Syllabus</a>
2016-17	110	69	52		12 <sup>th</sup> Passing	
2017-18	100	91	52			
2018-19	101	74	59			
2019-20	100	83	64			
2020-21	79	92	122			
2021-22	74	73	87			

#### Student Progression

Year	PG Degree/P.G.Diploma	PG Degree	Other Courses	
2016-17	M.Sc.	22.4%		
2017-18	M.Sc.	17.30%		
2018-19	M.Sc.	16.94%		
2019-20	M.Sc.	10.93%		
2020-21	M.Sc.	7.83%		
2021-22	M.Sc.	6.5%		

#### Result Analysis for Department

Year	Number of Student Admitted in batch		Appeared in In Final Year	Number in Final Years		Number of Students in final Year		Drop out ratio	College Result in Percent age	Univ ersity Result in Percent	Number of Students in			
	Frist Year	Final year		Boys	Gir ls	Pass ed	Fail ed				Disti nction	1 <sup>st</sup> Cla ss	2 <sup>nd</sup> Cla ss	Pas s Cla ss
2016-17	98	50	50	6	46	41	9	00	80%					
2017-18	100	52	52	17	35	46	12	00	60%					
2018-19	101	59	59	18	41	52	13	00	78%					
2019-20	103	64	64	18	46	52	12	00	81%					
2020-21	78	122	121	52	86	121	00	01%	99%					
21-22	74	87	87	37	50	87	00	00	100					

Faculties

	Name	Specialisation	Area of Research	Link to Profile	
Head	Dr.Rajendra A.Mungmode	Electronics	Luminescence	<a href="https://docs.google.com/document/d/1IotZU3y5du4alu4tsr5zDM7guXEVJMaW/edit?usp=sharing&amp;oid=115756071674439933398&amp;rtpof=true&amp;sd=true">https://docs.google.com/document/d/1IotZU3y5du4alu4tsr5zDM7guXEVJMaW/edit?usp=sharing&amp;oid=115756071674439933398&amp;rtpof=true&amp;sd=true</a>	
Faculties	Dr.Priyanka D. Bhoyar	Material Science	Nonlinear dynamics, Computational Physics, Condensed matter, Luminescence	<a href="https://docs.google.com/document/d/1WssZCJH6eVe1JVvY5-OOmAaoZ11Jb4en/edit?usp=sharing&amp;oid=104206505749130558698&amp;rtpof=true&amp;sd=true">https://docs.google.com/document/d/1WssZCJH6eVe1JVvY5-OOmAaoZ11Jb4en/edit?usp=sharing&amp;oid=104206505749130558698&amp;rtpof=true&amp;sd=true</a>	
Ex-Head	Name	Duration			
	Prof.G.T. Sawarkar	1971 to 2007			
	Prof.P.N. Gosavi	2007 to 2009			
	Prof. H.G.Ghime	2009 to 2016			
	Dr.Y.D. Tembhurkar	2016 to 2019			
Ex-Faculties					

List of Research Scholars for Ph. D.

Name of the Researcher	Title of Thesis	Date of Registration	Date of Award of Degree	University
Mr. Anil Meshram (Supervisor Dr.Y.D.Tembhurkar)	Preparation of I,II and III Chalcopyrite semiconducting thin film by spray pyrolysis and study their electrical ,optical and structural properties	15/01/2014	21/08/2018	R.T.M. Nagpur University
Mrs.Shobha Gaikwad (Supervisor Dr.Y.D.Tembhurkar)	Preparation of some semiconducting thin film by spray pyrolysis and study their electrical ,optical and structural properties	13/01/2012	12/01/2018	R.T.M. Nagpur University

List of Research Scholars for M. Phil.

Name of the Student	Title of Dissertation	Year of Award of Degree	University

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## Course outcome

### Department of Physics Course outcome B.Sc. Sem I

#### Title of paper :- Properties of matter and mechanics

After successful completion of the course the student is expected to learn the following objectives.

- Learn the basic properties of matter, how Young's modulus, bulk modulus and modulus of rigidity are defined.
- How modulus of elasticity are evaluated for different shapes of practical relevance such as cantilever, beams, torsional pendulum etc.
- Have a clear understanding of flow of fluid on a surface and find the coefficient of viscosity.
- Application of Bernoulli's theorem to practical application such as lift of aeroplane and atomisers.
- Learn the concept of terminal velocity and Stoke's law.
- Learn the fundamentals of surface tension and application of surface tension.
- How to calculate surface tension by Quinke's and capillary rise method.
- Introduction to Newton's law of motion and fundamental idea of different coordinate systems.
- Study the application of Coriolis force.
- Fundamental concept of center of mass and equation of motion.
- Concept of Conservation of momentum and energy and it's application to single stage and multistage rockets.
- Concept of moment of inertia and it's application to various shapes.

#### Title of paper :- Electrostatics, time varying field and electric currents

After successful completion of the course the student is expected to learn the following objectives.

- Have gained elaborated knowledge of electrostatics.
- Have the understanding of laws governing the charge distribution over various shapes.
- Become familiar with the concept of dielectrics.
- Study in depth about polarisation, bound charges and boundary conditions.
- Concept of capacitance and application of dielectric in capacitors.
- Fundamental idea of electromagnetism and it's application to transformers.
- Detailed Study of transformers.
- Students will be able to solve a variety of problems related to Faraday's law of induction.
- Study in depth the transient response of CR, LR, and LCR circuits which are essential in designing as well as understanding the working of electronic circuits.
- Solve complex problems involving linear electrical networks employing the symmetry concept together with various network theorems.

### B.Sc. Sem II

#### Title of paper:- Oscillations, kinetic theory of gases and thermodynamics

After successful completion of the course the student is expected to learn the following objectives.

- Learn the fundamentals of the harmonic oscillator model.
- Study of harmonic oscillations by lissajous's figures.

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- Concept of damped harmonic oscillator and grasp significant terms like power dissipation and sharpness of resonance and damping factor.
  - Concept of forced oscillations and idea of significant terms like power dissipation and sharpness of resonance and damping factor.
  - Fundamentals of kinetic theory of gases.
  - Learn the concept of molecular collision and mean free path.
  - Learn the fundamentals of transport of mass, momentum and energy in gases.
  - Basics of thermodynamics process and work done in each of these processes.
  - A clear understanding of reversible and irreversible process.
  - Understanding of First law of thermodynamics and its application to Carnot engines.
  - Fundamental understanding of the concept of entropy and the second law of thermodynamics.
  - Realise the importance of thermodynamic functions and application of Maxwell's relations.
  - Concept of liquefaction of gases and its application in air conditioning.

**Title of paper:- Gravitation, astrophysics, magnetism and magnetostatics**

After successful completion of the course the student is expected to learn the following objectives.

- Knowledge of Kepler's law of planetary motion.
- Fundamental knowledge of Newton's law of gravitation.
- Students will be able to solve gravitational potential and energy problems.
- Basic knowledge of constituents of the universe, solar system and structure of the sun.
- Able to estimate mass of earth and planets.
- Concept of cosmological theories of the universe.
- Basic knowledge of magnetic material and their applications.
- Study Langevin's theory of domains and its application to different types of magnetic materials.
- Learn the Concept of superconductors.
- Basic idea of behavior of charged particles in the magnetic field.
- Concept of magnetic dipole moment and gyromagnetic ratio.
- Application of Biot-Savart law and Ampere's law.

**B.Sc. Sem III**

**Title of paper:- Sound waves, applied acoustics, ultrasonics and power supply**

After successful completion of the course the student is expected to learn the following objectives.

- Study the general equation of wave motion and waves in strings.
- Fundamental understanding of sound and response of human ear.
- Physics of musical instruments.
- Concept of transducers such as crystal microphone and moving coil loudspeaker.
- The basic idea of recording and reproduction of sound.
- Study of acoustics of building and requirements for good acoustics.
- Fundamental understanding of ultrasonics waves and their generation.
- Application of ultrasonics in sea depth measurement, SONAR and medical sciences.
- Fundamental and working of the rectifiers and filters.
- Understand the need of regulated power supply.
- Learn various methods of regulations of voltage in power supply.

**Title of paper :-Physical optics and electromagnetic waves**

After successful completion of the course the student is expected to learn the following objectives.

- Gain knowledge of interference mechanisms in thin films.
- Study Newton's ring and its applications.
- Study Michelson and Fabry Perot interferometer and their applications.

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- Have basic knowledge of fresnel's diffraction and it's application to narrow slit.
  - Knowledge of Fraunhofer diffraction and use of gratings in spectroscopy.
  - Able to Calculate resolving power of different optical instruments.
  - Study of polarisation and Brewster's law.
  - Nicol prism and it's application as analyser and polariser.
  - Basic knowledge of EM waves.
  - Able to understand the significance of Maxwell's equation.
  - Basic knowledge of Poynting's theorem.

#### **B.Sc. Sem IV**

##### **Title of paper :-Solid state physics, X-ray and laser**

After successful completion of the course the student is expected to learn the following objectives.

- Understand the crystal structure and clear understanding about X-ray diffraction.
- Study the crystal structure of NaCl,ZnS
- Awareness of brief history of physics, giving emphasis on the birth of X-ray.
- Study of Duan-Hunt law.
- Understand application of X-ray in various fields.
- Study of geometric relation between direct and reciprocal lattice.
- Understand Laue's theory of X-ray diffraction and Bragg's spectrometer to calculate the structure of material.
- Have gained basic knowledge of laser and working of different types of laser.

##### **Title of paper :-Solid state electronics and molecular physics**

After successful completion of the course the student is expected to learn the following objectives

- Study the basic electronics technology.
- Understand types of transistor and it's application.
- Understand hybrid parameters and solve problems based on it.
- Understand construction and working of JFET.
- Understand how to calculate parameters of FET.
- understand quantization of vibrational and rotational energy.
- Understand types of molecules based on moment of inertia.
- Study the Born-Oppenheimer approximation.
- Become familiar with molecular spectroscopy and have gained basic ideas regarding NMR and ESR and Raman spectroscopy.
- Study the Frank-Condon principle.

##### **Title of paper :-Atomic physics, free electron theory and statistical physics**

After successful completion of the course the student is expected to learn the following objectives

- Able to understand Stern-Gerlach experiment.
- Learn the concept of quantum numbers.
- Understand the difference between Zeeman and Stark effect.
- Understand the relation between electrical conductivity and thermal conductivity at particular temperature.
- Understand the Kroning Penny model and what are allowed and forbidden energy zones.
- Understand Hall effect and how charge carriers are calculated.
- Familiarise in depth about statistical distribution and basic idea of B-E, F-D and M-B statistics and their applications.

##### **Title of paper:- Quantum mechanics, nanomaterial and nanotechnology**

After successful completion of the course the student is expected to learn the following objectives.

- To become familiar with back body radiation,Plank's radiation laws and Compton effect.



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- How quantum theory emerges.
  - Grasped the idea of wave mechanics.
  - Concept of Eigen value and Eigen function.
  - Solution of Schrodinger equation in a box and it's application to free particles In one and three dimensions.
  - Gain some knowledge of nanotechnology.
  - Identify the difference between nanomaterial and bulk material.
  - Understand the different methods of synthesis of nanomaterial like sol-gel, wet chemical techniques.
  - Understand characterisation techniques like SEM and TEM.

**Title of paper :-Relativity,nuclear physics, and biophysics**

After successful completion of the course the student is expected to learn the following objectives.

- Gain a clear picture of Michelson Morley experiment.
- Have deep knowledge about different detectors such as GM counter, Wilson cloud chamber, cyclotron and linear accelerator.
- Gain basic knowledge of alpha,beta and gamma decay,nuclear fission and fusion
- Gain basic knowledge about ECG, EEG, ERG.
- Learn basic principles of bioinstruments and calorimeter
- Learn basics of spectrophotometer, ph-meter and centrifuge measurements.

**Title of paper :-Electronics,fibre optics, communication and digital electronics**

- Study basic electronic technology.
- Develop the idea of an operational amplifier and oscillator such as phase shift, Hartley oscillator.
- Understand basics of modern optics like fibre optics.
- Knowledge of various number systems and their applications.
- Realise the importance of different electronic communications systems.