

Shikshak Sanchalit Shikshan Sanstha's

D.S.D.D.Arts College & Commerce and Science College ,Wada



Departmental Profile

1. Name of the Department- Department of Physics

2. Date of establishment- 2013

3. Nature of the Department in brief- Physics lies at the core of all scientific and technical disciplines. Our department has a mission –

i) To provide high quality physics education, producing well prepared graduates who are confident in their abilities and understanding of physics.

ii) To provide students who will make a wide range of career choices with an outstanding learning experience in which they develop strong analytical, quantitative and problem solving skills with a deep appreciation of the role physics plays in technical innovations.

iii) To impart education which may provide innovative skills in their respective area of specialization for society at large and to generate and disseminate/propagate innovative knowledge and differential thinking in the field of Physics essential to the local and global need.

iv) To develop competent man power with deep awareness in human values and ethics - creating globally acceptable high quality skilled, potential, professional individuals for Industries, Academics and Society at large.

4. Program & Course Details Of Department- till -2022,

5. Program Name- B.Sc. PHYSICS Program Code:

6. Program Specific Name- PHYSICS

Sr. No	Course Name	Course Code	Class
1	Physics Paper I Classical physics	USPH-101	1.F.Y.BSc Semester I
2	Physics paper-II-Electricity- Magnetism-Electronics-Atomic- nuclear physics	USPH-102	1.F.Y.BSc Semester I
3	Practical	USPH-P-01	1.F.Y.BSc Semester I
4	Physics paper I-Mechanics- properties-of-	USPH-201	1. F.Y.B.Sc Semester II

	Matter, Heat, sound, and, optics		
5	Physics-paper-II-Electricity-Magnetism-Electronics-Atomic-nuclear-Physics	USPH-202	1. F.Y.B.Sc Semester II
6	Practical	USPH-P-02	1. F.Y.B.Sc Semester II
7	Physics-paper I- Matematical-Methods-Mechanics- properties-of-Matter,soun,an,optics	USPH-301	2. S.Y.B.Sc Semester III
8	Physics paper II-Electricity-an-Magnetism	USPH-302	2. S.Y.B.Sc Semester III
9	Physics paper Thermodynamics	USPH-303	2. S.Y.B.Sc Semester III
10	Practical-Course-3	USPH-P-03P	2. S.Y.B.Sc Semester III
11	Physics paper I-Optics	USPH-401	2. S.Y.B.Sc Semester IV
12	Physics paper II-Electronics	USPH-402	2. S.Y.B.Sc Semester IV
13	Physics paper III-Cosmology-an-Quantum-Mechanics	USPH-403	2. S.Y.B.Sc Semester IV
14	Practical-practical-course-4 ABC D	USPH-P-04	2. S.Y.B.Sc Semester IV
15	Physics paper-I Mathematical Methods in physics	USPH-501	3.T.Y.B.Sc Semester V
16	Physics Paper II solid-state-physics	USPH-502	3.T.Y.B.Sc Semester V
17	Physics paper III\ Atomic-an-molecular-physics	USPH-503	3.T.Y.B.Sc Semester V
18	Physics Paper IV Electrodynamics'	USPH-504	3.T.Y.B.Sc Semester V
19	Practical Physics paper I	USPH-05	3.T.Y.B.Sc Semester V
20	Practical Physics Paper I	USPH-06	3.T.Y.B.Sc Semester V
21	Physics paper I -Classical-Mechanics	USPH-601	3.T.Y.B.Sc Semester VI
22	Physics Paper II	USPH-602	3.T.Y.B.Sc



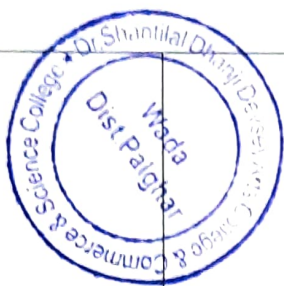
	Electronics		Semester VI
23	Physics paper III Nuclear—physics	USPH-603	3.T.Y.B.Sc Semester VI
24	Physics Paper IV Relativity	USPH-604	3.T.Y.B.Sc Semester VI
25	Practical Physics paper I	USPH-07	3.T.Y.B.Sc Semester VI
26	Practical Physics Paper I	USPH-08	3.T.Y.B.Sc Semester VI

7. Program & Program Specific Outcome (Year 2021)

Program Name Code	Outcome
Program Specific Name Code –B.Sc PHYSICS	On completion of the B. Sc. (Physics) program, 1. Students will be able to understand theories & principles of physics, which include mathematical methods, electromagnetism, Atomic and molecular spectra, Electrodynamics, electronics, thermodynamics, & Nuclear physics, quantum mechanics solid state. 2. Learn the Concept of Quantum Mechanics, Relativity, introduced at degree level in order to understand nature at atomic levels. Provide knowledge about material properties and its application for developing technology to ease the problems related to society.. 3. Understand physical properties chemical bonds in crystallography its structures and dynamics. 5. Analyze the application of mathematics to problem in physics & development of mathematical method suitable for such application & for formulation of physical theories. 6. Learn the structure of solid materials & their different physical properties along with mechanics, Dynamics, electronics, optics & material science. On completion of the B. Sc. Practical's program, students will be able to 1. Understand Basic Circuits using Active Devices, Analog Circuits and their applications using Active Devices. 2. Learn basic test instruments such as power supply, function generator, CRO and their construction and working principle. understand Basic differential amplifier and their applications in linear Integrated circuits



		Knowledge The student has acquired knowledge of 1. Electromagnetism (electric and magnetic force and field, circuits, induction), semiconductors and electromagnetic waves. 2. Light (reflection, refraction, interference), the wave nature of light and the particle-wave duality. 3. The atom, the atomic core, nuclear power, ionizing radiation and radioactivity.
Practical	USPH-P-01	Learning Outcomes On successful completion of this course students will be able to: i) To demonstrate their practical skills. ii) To understand and practice the skills while doing physics practical. iii) To understand the use of apparatus and their use without fear. iv) To correlate their physics theory concepts through practical. v) Understand the concepts of errors and their estimation
Physics paper I- Mechanics- and, Thermodynamics	USPH-201	1: Learn the basics of mechanics specially types of pendulums i.e. compound pendulum, katers pendulum its period's .Practical on these topics enjoyed by students. 2: Learn the fundamentals of center of mass, types of momentums, applications of momentum principle. 3. Learn simple harmonic oscillator, relation between SHM and UCM, including damped and forced oscillators and grasp the significance of terms like quality factor and damping-coefficient-, energy-of---oscillators, phase angles etc. 3. Study the Ideal heat Engine, steamEngine, combustion-engine, Otto-engine, dieselengine, Carnot'scycle, ranking cycle and its Effects, laws of thermodynamics and different types of numericals.



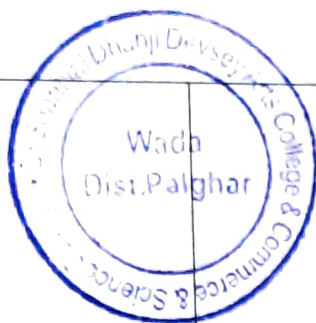
		4. Students are able to understand Entropy using exchange of Heat, path functions and conversion of change in energy. 5. Study low temperature physics, different methods of liquefaction of helium, gases. Study of freezings many types of numerical solved by students.
Physics-paper-II -Electricity-Magnetism- Electronics -Atomic-nuclear-Physics	USPH-202	Learning Outcomes On completion of the course The student should have the following learning outcomes defined in terms of knowledge, skills and general competence: Knowledge The student has acquired knowledge of 1. Electromagnetism (electric and magnetic force and field, circuits, induction), semiconductors and electromagnetic waves. 2. Light (reflection, refraction, interference), the wave nature of light and the particle-wave duality. 3. The atom, the atomic core, nuclear power, ionizing radiation and radioactivity.
Practical	USPH-P-02	Learning Outcomes On successful completion of this course students will be able to: i) To demonstrate their practical skills. ii) To understand and practice the skills while doing physics practical. iii) To understand the use of apparatus and their use without fear. iv) To correlate their physics theory concepts through practical. v) Understand the concepts of errors and their estimation
Physics-paper -I Mechanics and thermodynamics	USPH-301	On successful completion of this course, students will be able to : i) Understand the concepts of mechanics & properties of matter & to apply them to



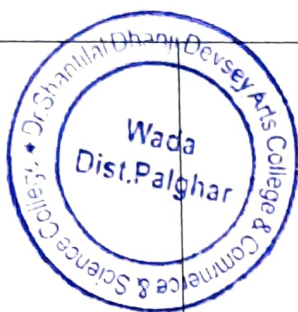
		iii) Correlate the physics theory concepts to practical application. iv) Understand the concept of errors and their estimation.
Physics paper I-Optics and Digital electronics	USPH-401	1. After the background knowledge devoted for light, students are able to understand interference, diffraction, polarization. 2. The elements in model teaching with prism, polaroid's, gratings, lenses given good response from students. 3. Types of Diffraction, Fresnel and Fraunhofer diffractions were studied. 4. Learn types of crystals like calcite, positive, negative, quarter wave plates, and retarders. Polarizer's, Analyzers and Grating theory. Law of Malus, Brewers law, Applications of polarized light. 5. A Unit of Digital Electronics created quiet interest to the students. Students are able to solve conversion in binary to decimal, hexadecimal, compliments, and adders. Types of Flip Flops, registers, counters are studied.
Physics paper II-Electronics	USPH-402	Learning Outcomes: On successful completion of this course students will be able to: 1. Understand the basic s of transistor biasing, operational amplifiers, their applications. 2. Understand the basic concepts of oscillators and be able to perform calculations using them. 3. Understand the working of digital circuits. 4. Use IC 555 timer for various timing applications. 5. Demonstrate quantitative problem solving skills in all the topics covered.
Applied Physics III Geophysics, Microprocessor and Radiation Physics	USPH-403	1. Understand the concept of Mechanics and properties of Matter and to apply them to problems 2. Students are able to understand Geology and Geophysics and Geoenvironmental sciences, with solar system, geophysical evidences, planetary evaluation etc.



		problems. ii) Comprehend the basic concepts of thermodynamics & its applications in physical situation. iii) Learn about situations in low temperature. iv) Demonstrate tentative problem solving skills in all above areas.
Physics paper II- Electricity-an-Magnetism	USPH-302	Objectives: 1.To develop analytical abilities towards real world problems 2.To familiarize with current and recent scientific and technological developments 3.To enrich knowledge through problem solving, hands on activities, study visits, projects etc. Learning Outcomes: On successful completion of this course students will be able to: 1. Understand the basic mathematical physics concept s and applications of them in Physical situations. 2. Understand the basic laws of electrostatics and magneto statics and applications of them and be able to perform calculations using them. Demonstrate quantitative problem solving skills in all the topics covered.
Physics paper III Applied Physics-I	USPH-303	Learning Outcomes : On completion of this, it is expected that i) Students will be exposed to contextual real life situations. ii) Students will appreciate the role of Physics in 'interdisciplinary areas related to materials, Bio Physics, Acoustics etc. iii) The learner will understand the scope of the subject in Industry & Research. iv) Experimental learning opportunities will foster creative thinking & a spirit of inquiry
Practical-Course-3	USPH-P-03P	Learning outcomes : On successful completion of this course students will be able to : i) Understand & practice the skills while performing experiments. ii) Understand the use of apparatus and their use without fear& hesitation.



		3. Students are able to understand functions of Intel 8085 instruction set, Assembly language, and flow chart 4. Radiation physics. Types of Communication, concept of ASK, PSK, are understood.
Practical-practical-course-4 ABC D	USPH-P-04	Learning Outcomes : On successful completion of this course students will be able to : i) Understand & practice the skills while performing experiments. ii) Understand the use of apparatus and their use without fear & hesitation. iii) Correlate their physics theory concepts to practical application.
Physics paper-I Mathematical Methods in physics	USPH-501	Learning outcomes: From this course, the students are expected to learn 1. Some mathematical techniques required to understand the physical phenomena at the undergraduate level and get exposure to important ideas of statistical mechanics. 2. The students are expected to be able to solve simple problems in probability, 3. understand the concept of independent events and work with standard continuous distributions. 4. The students will have idea of the functions of complex variables. 5. Solve nonhomogeneous differential equations and partial differential equations using simple methods. 6. The units on statistical mechanics would introduce the students to the concept of microstates, Boltzmann distribution and statistical origins of entropy. It is also expected that the student will understand the difference between different statistics, classical as well as quantum.
Physics Paper II Solid-state-physics	USPH-502	1. Be able to account for interatomic forces and bonds, Have a basic knowledge of



		crystal systems and symmetries, crystalline materials are studied using diffraction, including concepts like structure factor, and scattering amplitude hkl value determination. 2. Be able to perform structure determination of simple structures, understand the concept of reciprocal space and be able to use it as a tool know the significance of Brillouin zones 3. Be able to calculate thermal and electrical properties in the free-electron model and know Bloch's theorem and energy band and distinction between metals, semiconductors and insulators 4. Be able to estimate the charge carrier mobility and density. Be able to account for what the Fermi surface is and how it can be measured. 5. To understand Lattice heat capacity and to compare Classical theory, Einstein's theory, Debye's theory of specific heat of solids. Students are able to understand crystal its systems, types 6. Semiconductors its types conduction and characteristics were understood by students. Semiconductors its various characteristics were verified practically. 7. Band theory periodic potential. Fermi energy, superconductivity understand by students 8. Number of numerical are solved like susceptibility, characteristics, Design of circuits etc
Physics paper III Atomic-an-molecular-physics	USPH-503	Learning Outcome: Upon successful completion of this course, the student will understand 1. the application of quantum mechanics in atomic physics 2. the importance of electron spin, symmetric and anti-symmetric wave functions and vector atom model 3. Effect of magnetic field on atoms and its application 4. Learn Molecular physics and its applications. This course will be useful to get an insight into spectroscopy.



1. Understand the significance of Michelson Morley experiment and failure of the existing theories to explain the null result.

2. Understand the importance of postulates of special relativity, Lorentz transformation equations and how it changed the way we look at space and time, Absolutism and relativity, Common sense versus Einstein concept of Space and time.

3. Understand the transformation equations for: Space and time, velocity, frequency, mass, momentum, force, Energy, Charge and current density, electric and magnetic fields.

4. Solve problems based on length contraction, time dilation, velocity addition, Doppler effect, mass energy relation and resolve paradoxes in relativity like twin paradox etc.

Practical Physics Paper I

USPH-
P06

Knowledge Outcomes:

Students able to understand fundamental knowledge of physics, including basic concepts and principles in thermodynamics & mathematical (analytic and numerical) methods, Solid state Physics, Atomic and Molecular Physics, electrodynamics, Classical Mechanics, Electronics, Nuclear Physics, Relativity and experimental methods for physics.

Professional Skills

Students will acquired the following professional skills to deal with representative physics problems and situations at the undergraduate level:

- (1) Identifying the key factors and applying appropriate principles and assumptions in the formulation of physics problems;
- (2) Applying appropriate analytical and approximation methods;
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Practical Physics Paper I

USPH-
P06



		4. overall understanding of concepts of equations of motion, linear harmonic and nonlinear harmonic oscillator and their motions, chaos, dynamics kinematics of fluid intrigued fascinating interest to the students.
Physics Paper II Electronics	USPH-602	1. Understand the basics of semiconductor devices and their applications. About SCR, JFET, MOSFET, UJT, OPAMP. 2. Understand operational-Amplifier-as an instrumentation, comparator, filters of amplifier. Wave form generation. 3. understand the basic concept of timing pulse generation and regulated power supplies 4. Understand the basic of digital circuits, number of numerical are solved. good ideas and skill to solve numerical to design circuits.
Physics Paper III Nuclear Physics	USPH603	Learning Outcomes: 1. Upon successful completion of this course, the student will be able to Understand the fundamental principles and concepts governing classical nuclear and particle physics and have a knowledge of their applications interactions of ionizing radiation with matter the key techniques for particle accelerators the physical processes involved in nuclear power generation. Knowledge on elementary particles will help students to understand the fundamental constituents of matter and lay foundation for the understanding of unsolved questions about dark matter, antimatter and other research oriented topics
Physics Paper IV Relativity	USPH604	Learning outcomes: This course introduces students to the essence of special relativity which revolutionized the concept of physics in the last century by unifying space and time, mass and energy, electricity and magnetism. This course also gives a very brief introduction of general relativity. After the completion of the course the student should be able to



- (2) Applying appropriate analytical and approximation methods;
- (3) Applying general experimental and measurement skills with prescribed procedures;
- (4) Analyzing experimental data and their level of uncertainty, and relating the experimental results with theoretical expectations;
- (5) Applying appropriate scientific programming skills;
- (6) Reporting the solutions to physics problems, experimental or project studies either orally or in written format

Generic Competencies:

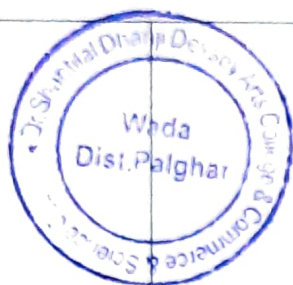
Graduates should have acquired some generic skills in their study, including the following

- (1) identifying the key issues and attempting different methods in dealing with general problems;
- (2) manipulating precise and intricate concepts to construct logical arguments;
- (3) paying attention to the details and their logical relationships when analysing an issue;
- (4) evaluating an issue critically based on evidence and scientific principles;
- (5) being comfortable with numbers and analysing an issue quantitatively;
- (6) acquiring knowledge effectively by self-study and work independently;
- (7) working effectively in a team;
- (8) presenting information in a clear, concise and logical manner; and
- (9) having good time management skills.

Physics paper I -Classical-Mechanics	USPH- 601	1.students are able to understand central force,keplers law,co-ordinate system and laws of motion with types of pendulum. 2.students are able to solve Lagrange's equations ,DAlemberts principle ,constraints and numericals,kinematics of moving fluids and eulers equation, tensor. 3.students are able to understand Duffings equations, Chaos and types of Harmonic Oscillator



		1. Understand the significance of Michelson Morley experiment and failure of the existing theories to explain the null result. 2. Understand the importance of postulates of special relativity, Lorentz transformation equations and how it changed the way we look at space and time, Absolutism and relativity, Common sense versus Einstein concept of Space and time. 3. Understand the transformation equations for: Space and time, velocity, frequency, mass, momentum, force, Energy, Charge and current density, electric and magnetic fields. 4. Solve problems based on length contraction, time dilation, velocity addition, Doppler effect, mass energy relation and resolve paradoxes in relativity like twin paradox etc.
Practical Physics Paper I	USPH-P06	Knowledge Outcomes: Students able to understand fundamental knowledge of physics, including basic concepts and principles in thermodynamics & mathematical (analytic and numerical) methods, Solid state Physics, Atomic and Molecular Physics, electrodynamics, Classical Mechanics, Electronics, Nuclear Physics, Relativity and experimental methods for physics. Professional Skills Students will acquired the following professional skills to deal with representative physics problems and situations at the undergraduate level: (1) Identifying the key factors and applying appropriate principles and assumptions in the formulation of physics problems; (2) Applying appropriate analytical and approximation methods; (3) Applying general experimental



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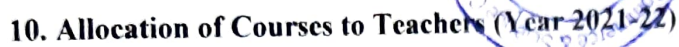
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- (9) having good time management skills.

9. List of Teachers (Since 2015-2022)

Sr No	Name Of the Teacher	Designation	Qual ification	Year Of Joini ng	Year Of Leaving	Experience
1	Dr.Kailas Prabhakar Joshi	Assistant Professor	M.Sc Ph.D	2015	--	8years
2	Dr.Amardeep-Tulshiram Shende	Assistant Professor	M.Sc Ph.D	2015	--	8 years



Sr no	Name of the Teacher	Course code	Name of course Alloted
1	Dr. Kailas-Prabhakar Joshi	USPH-101	Physics Paper I Classical physics
2		USPH-P-01	Practical I
3		USPH-201	Physics paper I-Mechanics-properties-of-Matter,Heat,sound,and,optics
4		USPH-P-02	Practical II
5		USPH-301	Physics-paper I-Mechanics and Thermodynamics
6		USPH-P-03P	Practical-Course-3 A,B,C and skill
7		USPH-303	Applied Physics I
8		USPH-401	Optics and Digital Electronics
9		USPH-403	Applied Physics II
10		USPH-P-04	Practical-practical-course-4 ABC D and demo
11		USPH-502	Physics Paper II solid-state-physics
12		USPH-504	Physics Paper IV Electrodynamics'
13		USPH-05	Practical Physics paper I USPH 501 and USPH 502
14		USPH-06	Practical Physics Paper I USPH 503 and USPH 504
15		USPHPR1	Project of four courses
16		USPH-601	Physics paper I -Classical-Mechanics
17		USPH-602	Physics Paper II Electronics
18		USPH-07	Practical Physics paper I USPH 601 USPH 602
19		USPH-08	Practical Physics Paper I USPH 603 USPH 604
20		USPHPR2	Project of four courses



Sr no	Name of the Teacher	Course code	Name of course Alloted
1	Dr. Amardeep T. Shende	USPH-102	Physics Paper II Modern Physics
2		USPH-P-01	Practical I
3		USPH-201	Physics paper-II Electricity and Electronics
4		USPH-P-02	Practical II
5		USPH-302	Physics-paper II- Vector calculus ,Analog Electronics
6		USPH-P-03P	Practical-Course-3 A,B,C and skill
7		USPH-303	Physics-paper III Applied Physics I
8		USPH-402	Physics-paper II Quantum Mechanics
9		USPH-403	Physics-paper III Applied Physics II
10		USPH-P-04	Practical-practical-course-4 ABC D and demo
11		USPH-501	Physics Paper I Mathematical Methods in Physics, Thermal and Statistical Physics
12		USPH-503	Physics Paper III Atomic and Molecular Physics
13		USPH-05	Practical Physics paper I USPH 501 and USPH 502
14		USPH-06	Practical Physics Paper I USPH 503 and USPH 504
15		USPHPR1	Project of four courses
16		USPH-603	Physics paper III Nuclear Physics
17		USPH-604	Physics Paper IV Relativity
18		USPH-07	Practical Physics paper I USPH 601 USPH 602
19		USPH-08	Practical Physics Paper I USPH 603 USPH 604

20		USPHPR2	Project of four courses
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11. List of Non- Teaching Staff

Sr. No	Name Of The Staff	Designation
1.	Ajinkya Arvind Zamare	Lab Assistant
2.	Ganesh Balu Wagh	Lab Attendant

12.Details of Final Year Results:2021-22

Sr. No	O Grade	A Grade	B Grade	C Grade	D Grade	Year	Fail	Total	% of Success
1.	4	5	-	-	-	2021-22	---	09	100
2.	--	12	1	--	--	2020-21	---	13	100
3.	1	08	-	-	-	2019-20	-	09	100
4.	01	07	03	-	-	2018-19	04	15	74.00
5.	-	01	02	02	-	2017-18	07	12	41.60
6.	-	01	03	-	-	2016-17	01	05	80.00

