U. SHAH UNIVERSITY

WADHWAN CITY

FACULTY OF SCIENCES

B.Sc.(PHYSIC

SEM –V

Syllabi (CBCS) of Physics
WEF June 2016

C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

DEPARTMENT OF PHYSICS

COURSE: B.Sc. **SEMESTER: V**

SUBJECT NAME: Mathematical Physics and Classical Mechanics

SUBJECT CODE: 4SC05MPC1

Teaching & Evaluation Scheme:-

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

Objectives:-The general purpose of this course is

- To expose the student knowledge of Mathematical Physics andClassical Mechanics.

Prerequisites:-Fundamental knowledge of Mathematical Physics and Classical Mechanics.

Course outline:-

Sr. No.	Course Contents	Hours
1	**Frobenius Method and Special Functions** Singular Points of Second Order Linear Differential Equations and their importance, Frobenius method and its applications to differential equations, Legendre, Bessel, Hermite and Laguerre Differential Equations, Properties of Legendre Polynomials: Rodrigues Formula, Orthogonality, Simple recurrence relations. **Some Special Integrals** Beta and Gamma Functions and Relation between them, Expression of Integrals in terms of Gamma Functions, Error Function (ProbabilityIntegral).	20
2	**Fourier Series** Periodic functions, Orthogonality of sine and cosine functions, DirichletConditions (Statement only), Expansion of periodic functions in a series of sine andcosine functions and determination of Fourier coefficients, Complex representation ofFourier series, Expansion of functions with arbitrary period, Expansion of non-periodicfunctions over an interval, Even and odd functions and their Fourier expansions, Application, Summing of Infinite Series.	10
3	**Lagrangian Formulation** Introduction, Constraints, holonomic and non-holonomic constraints, scleronomous and rheonomous constraints, generalized coordinates, D'Alembert's principle, Lagrange's equations, a general expression for kinetic energy, Symmetries and the laws of conservation, Cyclic or ignorable coordinates (including illustrations), Velocity dependent potential of electromagnetic field, Rayleigh's dissipation function.	15

4	**Variational Principle** Lagrange's and Hamilton's Equations, Configuration space, Hamilton's principle, Equivalence of Lagrange's and Newton's equations, Advantages of the Lagrangian formulation-electro-mechanical analogies, Lagrange's undetermined multipliers, Applications of the Lagrangian method of undetermined multiplies, Hamilton's equations of motion, Some applications of the Hamiltonian formulation, Phase space, Problems.	15

Learning Outcomes:-After successful completion of this course, students have:

- Knowledge of Mathematical Physics andClassical Mechanics.

Books Recommended:-

1. 'Mathematical Physics', **B. D. Gupta**, 2nd Revised Ed., *Vikas Publishing House Pvt. Ltd*.
2. 'Mathematical Physics', **B. S.Rajput**, *Pragati Prakashan*.
3. 'Mathematical Methods for Physics',**George B. Arfken and Hans J. Weber**, 4th Ed.,*Academic Press, Inc*.
4. 'Mathematical Methods in the Physical Sciences', **Mary L. Boas**, *Wiley India Pvt. Ltd*.
5. 'Fourier Analysis', **M.R. Spiegel**,*Tata McGraw Hill*.
6. 'Mathematics for Physicists', **Susan M. Lea**, *Thomson Brooks/Cole*.
7. 'Essential Mathematical Methods', **K.F. Riley and M.P. Hobson**, *Cambridge Univ. Press*.
8. 'Mathematical Methods for Scientists and Engineers', **D.A. McQuarrie**, *Viva Books*.
9. 'Introduction to Classical Mechanics', **R. G. Takwale and P. S. Puranik**, *Tata McGraw Hill*.
10. 'Classical Mechanics', **H. Goldstein**, *Addison Wesley*.
11. 'Classical Mechanics', **Gupta, Kumar and Sharma**, *Pragati Prakashan*.

E-Resources:-

1. http://pms.iitk.ernet.in/wiki/index.php/Physics
2. www.wikipedia encyclopaedia
3. www.physic.about.com
4. www.physic.org
5. www.Physicsclassroom.com
6. www.howstuffwork.com
7. www.colorado.edu/physics/2000
8. www.ndrs.org. physic.com
9. www.physlinc.com
10. www.fearophysic.com
11. www.hyperphysics.com

Useful CD Rom for e-learning:-

1. Hyper Physics.
2. Encyclopaedia of Science (D.K. Multimedia).
3. Physics Encyclopaedia.
4. Virtual Physics Junior (Original PC CD Rom).
5. Encyclopaedia Britannica-2008.

C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

DEPARTMENT OF PHYSICS

COURSE: B.Sc. **SEMESTER: V**

SUBJECT NAME: Solid State Physics **SUBJECT CODE: 4SC05SSP1**

Teaching & Evaluation Scheme:-

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	Total Marks
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

Objectives:-The general purpose of this course is

- To expose the student knowledge of Solid State Physics.

Prerequisites:-Fundamental knowledge of Solid State Physics.

Course outline:-

Sr. No.	Course Contents	Hours
1	**Crystal Structure** Solids: Amorphous and Crystalline Materials, Lattice TranslationVectors, Lattice with a Basis-Central and Non-Central Elements, Unit Cell, MillerIndices, Reciprocal Lattice, Types of Lattices, Brillouin Zones. **Elementary Lattice Dynamics** Lattice Vibrations and Phonons: Linear Monoatomicand Diatomic Chains, Acoustical and Optical Phonons, Qualitative Description of thePhonon Spectrum in Solids, Dulong and Petit's Law, Einstein and Debye theories ofspecific heat of solids, T^3 law.	18
2	**Elementary Band Theory** Kronig Penny model. Band Gaps. Conductors,Semiconductors and insulators,p and n type Semiconductors, Conductivity ofSemiconductors, mobility, Hall Effect, Hall coefficient.	12
3	**Dielectric Properties of Materials** Polarization, Local Electric Field at an Atom, Depolarization Field, Electric Susceptibility, Polarizability, Clausius-Mosotti Equation, Classical Theory of Electric Polarizability, Normal and Anomalous Dispersion, Cauchyand Sellmeir relations, Langevin-Debye equation, Complex Dielectric Constant, OpticalPhenomena, Application: Plasma Oscillations, Plasma Frequency, Plasmons.	15
4	**Superconductivity** Flux exclusion-The Meissner Effect, Thermal Properties, The Energy Gap, Isotope Effect, Mechanical Effect, The Penetration Depth, Types of Superconductors, Experimental Aspects, Influence of external agents on Superconductivity, Critical field of Small Specimens, Thermodynamic of Superconducting transition, Alloys & Compounds, London's theory, Josephson effects, BCS theory, Applications of Superconductivity, SQUID.	15

Learning Outcomes:-After successful completion of this course, students have:

- Knowledge of Solid State Physics.

Books Recommended:-

1. 'Solid State Physics', **S. O. Pillai**, *New Age International Pub*.
2. 'Solid State Physics', **M. A. Wahab**, *Narosa Publishing House*.
3. 'Elements of Solid State Physics', **J. P. Srivastava**, *PrenticeHall of India*.
4. 'Introduction to Solid State Physics', **C. Kittel**, 8th Ed.,*Wiley Eastern Ltd*.
5. 'Solid State Physics' **A. J. Dekker**, *MacMillan India Ltd*.
6. 'Introduction to Solids', **Leonid V. Azaroff**, *Tata McGraw Hill*.
7. 'Solid State Physics', **Neil W. Ashcroft and N. David Mermin**, *Cengage Learning*.
8. 'Solid State Physics', **Rita John**, *McGraw Hill*.
9. 'Solid-state Physics', **H. Ibach and H. Luth**, *Springer*.
10. 'Elementary Solid State Physics', **M. Ali Omar**, *Pearson India*.

E-Resources:-

1. http://pms.iitk.ernet.in/wiki/index.php/Physics
2. www.wikipedia encyclopaedia
3. www.physic.about.com
4. www.physic.org
5. www.Physicsclassroom.com
6. www.howstuffwork.com
7. www.colorado.edu/physics/2000
8. www.ndrs.org. physic.com
9. www.physlinc.com
10. www.fearophysic.com
11. www.hyperphysics.com

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FACULTY OF SCIENCES

DEPARTMENT OF PHYSICS

COURSE: B.Sc. **SEMESTER: V**

SUBJECT NAME: Atomic and MolecularSpectroscopy

SUBJECT CODE: 4SC05AMS1

Teaching & Evaluation Scheme:-

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	Total Marks
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

Objectives:-The general purpose of this course is

- To expose the student knowledge of Atomic spectroscopy.
- To expose the student knowledge of Molecular Spectroscopy.

Prerequisites:-Fundamental knowledge of Atomic and Molecular Spectroscopy.

Course outline:-

Sr. No.	Course Contents	Hours
1	**Types of Molecular Spectra and Molecular Energy States** Separation of electronic and nuclear motion, The Born Oppenheimer approximation, types of molecular spectra.	08
2	**Pure Rotational Spectra** Salient features of rotational spectra, molecular requirement for rotation spectra, experimental arrangement, molecule as a rigid rotator, explanation of rotational spectra (without the process of solving Schrodinger equation to get energy formula), the non-rigid rotator, Isotope effect on rotational spectrum, tunable laser and pulse laser-introduction **Vibrational-Rotational Spectra** Salient features of vibrational-rotational spectra, molecule as a harmonic oscillator, molecule as anharmonic oscillator, vibrational frequency and force constant for anharmonic oscillator, fine structure of Infrared bands: molecule as vibrating rotator, diatomic molecule as symmetric top, thermal distribution of vibrational and rotational levels.	20
3	**Atomic Spectroscopy** The spinning electron, space quantization, quantum numbers and their physical interpretations, Zeeman effect and experimental study of Zeeman effect, classical interpretation of normal Zeeman effect, vector atom model and normal Zeeman effect, vector atom model and anomalous Zeeman effect, Paschen-Back effect, Stark effect.	15

4	**Raman Spectra** Nature of the Raman spectra, experimental arrangement for Raman spectra, classical theory of Raman effect, quantum theory of Raman effect, Raman spectra and molecular structure, Infrared spectra versus Raman spectra, Laser as intense source. **Classification of Molecular Electronic States** Molecular electronic states, symmetry properties of electronic Eigenfunctions (symmetry classification of electronic states) **Fluorescence and Phosphorescence** Luminescence, mechanism of fluorescent emission, mechanism of phosphorescent emission, fluorescence spectrum compared with Raman spectrum.	17

Learning Outcomes:-After successful completion of this course, students have:

- Knowledge of Atomic and Molecular Spectroscopy.

Books Recommended:-

1. 'Elements of Spectroscopy', **S. L. Gupta, V. Kumar and R. C. Sharma**, *Pragati Prakashan*.
2. 'Atomic Physics',**J. B. Rajam,** *S. Chand and Company Ltd.*
3. 'Optics and Spectroscopy', **R.Murugeshan and K. Sivaprashatha,** *S. Chand and Company Ltd.*

E-Resources:-

1. http://pms.iitk.ernet.in/wiki/index.php/Physics
2. www.wikipedia encyclopaedia
3. www.physic.about.com
4. www.physic.org
5. www.Physicsclassroom.com
6. www.howstuffwork.com
7. www.colorado.edu/physics/2000
8. www.ndrs.org. physic.com
9. www.physlinc.com
10. www.fearophysic.com
11. www.hyperphysics.com

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C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

DEPARTMENT OF PHYSICS

COURSE: B.Sc. **SEMESTER: V**

SUBJECT NAME: Nuclear Physics and Electromagnetism

SUBJECT CODE: 4SC05NPE1

Teaching & Evaluation Scheme:-

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	Total Marks
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

Objectives:-The general purpose of this course is

- To expose the student knowledge of Nuclear Physics andElectromagnetism.

Prerequisites:-Fundamental knowledge of Nuclear Physics and Electromagnetism.

Course outline:-

Sr. No.	Course Contents	Hours
1	**General Properties of Nuclei** Constituents of nucleus and their Intrinsic properties, quantitative facts about size, mass, charge density (matter energy), binding energy, average binding energy and its variation with mass number, main features of binding energy versus mass number curve, N/A plot, angular momentum, parity, magnetic moment, electric moments, nuclear excites states.	15
2	**Nuclear Models** Liquid drop model approach, semi empirical mass formula and significance of various terms, condition of nuclear stability. Two nucleon separation energies, Fermi gas model (degenerate fermion gas, nuclear symmetry potential in Fermigas), evidence for nuclear shell structure, nuclear magic numbers, basic assumption of shell model, concept of mean field, residual interaction, concept of nuclear force.	15
3	**Electromagnetic induction** Hysteresis, Maxwell's equations, Decay of free charge, Potentials of electromagnetic fields, More about the Lorentz gauge condition, Field energy and Field momentum. **Electromagnetic waves** Plane waves in non-conducting media, Polarizations, Energy flux in a plane wave, Radiation pressure and Momentum, Plane waves in conducting medium, Skin effect.	15

5	**Electromagnetic Radiation** Retarded Potential, Radiation from an oscillating dipole, Linear Antenna, Lienaed-Wiechert Potentials, Potentials for a charge in uniform motion-Lorentz formula, Fields of an accelerated charge, Radiation from an acceleration charged particle at low velocity, Radiation when the velocity and acceleration of the particles are collinear, Radiation from a charged particle moving in a circular orbit, Elective quadrupole radiation.	15

Learning Outcomes:-After successful completion of this course, students have:

- Knowledge of Nuclear Physics andElectromagnetism.

Books Recommended:-

1. 'Electromagnetics', **B. B. Laud**, *2nd Edition, Wiley Eastern Ltd.*
2. 'Introduction to Electrodynamics', **David J. Griffiths**, *Prentice-Hall of India.*
3. 'Nuclear Physics - An Introduction',**S.B. Patel**, *New Age International*.
4. 'Introduction to Nuclear Physics', **H.Enge**, *Addison Wesley Pub. Com.*
5. 'Nuclear Physics', **D. C. Tayal**, *Himalaya Publisher.*
6. 'Modern Physics', **Kenneth Krane**, *John Wiley and Sons.*
7. 'Nuclear Physics', **Irvin Kaplan**, 2nd Edition, *Addison Wesley Pub. Com*.
8. 'Nuclear Physics', **S.N.Ghoshal**, *S. Chand & Company Ltd.*
9. 'Introductory nuclear Physics', **Kenneth S. Krane**, *Wiley India Pvt. Ltd*.
10. 'Concepts of nuclear physics', **Bernard L. Cohen**, *Tata McGraw Hill*.
11. 'Basic Ideas and Concepts in Nuclear Physics - An Introductory Approach'**K. Heyde**, *IOPPublishing*.
12. 'Theoretical Nuclear Physics',**J.M. Blatt and V.F.Weisskopf**,*Dover Pub.Inc*.

E-Resources:-

1. http://pms.iitk.ernet.in/wiki/index.php/Physics
2. www.wikipedia encyclopaedia
3. www.physic.about.com
4. www.physic.org
5. www.Physicsclassroom.com
6. www.howstuffwork.com
7. www.colorado.edu/physics/2000
8. www.ndrs.org. physic.com
9. www.physlinc.com
10. www.fearophysic.com
11. www.hyperphysics.com

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C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

DEPARTMENT OF PHYSICS

COURSE: B.Sc. **SEMESTER: V**

SUBJECT NAME: Nanoscience and Nanotechnology

SUBJECT CODE: 4SC05NSN1

Teaching & Evaluation Scheme:-

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	Total Marks
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

Objectives:-The general purpose of this course is

- To expose the student knowledge of Nanoscience and Nanotechnology.
- To expose the student knowledge of applications of Nanoscience and Nanotechnology.

Prerequisites:-Fundamental knowledge of Nanoscience and Nanotechnology.

Course outline:-

Sr. No.	Course Contents	Hours
1	**Introduction toNanoscience** Introduction to Nanoscience, Some Nano Challenges, The fundamental Science Behind Nanotechnology, Tools for Measuring Nanostructures, Tools to Make Nanostructures, Point and Places of Interest (Sensors, Nanoscale Biostructures, Energy capture, Transformation and storage, Optics, Magnets, Fabrication, Electronics), Smart Materials (Self-Healing Structures, Recognition, Separation, Catalysts).	15
2	**Introduction to Nanomaterials** Introduction to nano-sized materials and structures, Definitions of nanomaterials, Brief history of Nanomaterials and challenges in Nanotechnology, Properties of Nanomaterials: Effect of reduction of dimensions, quantum size effects, Mechanical, Thermal, Optical and Magnetic properties of nanomaterials.	15
3	**Methods of Synthesis of Nanomaterials** Bottom-up and Top-down approaches-Mechanical method: High Energy Ball Milling, Methods based on evaporation (Physical Vapour Deposition), Chemical Vapour Deposition, Chemical Methods: Colloidal Method and Sol-gel Method. **Special Nanomaterials** Carbon Nanotubes (CNT), Types-Single walled, multiwalled CNT, Structures and properties of CNTs, Synthesis of carbon nanotubes.	15

4	**Analytical (Characterization) Technique** Microscopes: Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), X-ray diffraction. **Applications** Electronics, Biotechnology and Medical, Automobiles, Space, Defence, Sports, Cosmetics, Cloth Industry.	15

Learning Outcomes:-After successful completion of this course, students have

- Knowledge of Nanoscience and Nanotechnology.
- Knowledge aboutthe applications of Nanoscience and Nanotechnology.

Books Recommended:-

1. 'Nanotechnology A Gentle Introduction to the Next Big Idea', **Mark Ratner and Daniel Ratner**, *Pearson Education*.
2. 'Introduction to Nanotechnology', **C.P. Poole Jr. and F.J. Ownes**, *Wiley Publication.*
3. 'Nanoscience and Technology', **Eds. R.W.Kelsall, I.W. Hemley & M. Geoghehan**, *John Wiley and Sons*.
4. 'Introduction to Nanoscience and Nanotechnology', **K.K. Chattopadhyay and A.N. Banerjee**, *PHI Learning Pvt. Ltd*.
5. 'Origin and Development of Nanotechnology',**P.K.Sharma**, *Vista InternationalPub. House*.

E-Resources:-

1. http://pms.iitk.ernet.in/wiki/index.php/Physics
2. www.wikipedia encyclopaedia
3. www.physic.about.com
4. www.physic.org
5. www.Physicsclassroom.com
6. www.howstuffwork.com
7. www.colorado.edu/physics/2000
8. www.ndrs.org. physic.com
9. www.physlinc.com
10. www.fearophysic.com
11. www.hyperphysics.com

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3. Physics Encyclopaedia.
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C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

DEPARTMENT OF PHYSICS

COURSE: B.Sc. **SEMESTER: V**

SUBJECT NAME: Embedded System: Introduction to Microcontrollers

SUBJECT CODE: 4SC05EMS1

Teaching & Evaluation Scheme:-

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

Objectives:-The general purpose of this course is

- To expose the student knowledge of embedded system.
- To expose the student knowledge of applications of microcontrollers.

Prerequisites:-Fundamental knowledge of Digital Electronics and Microcontrollers.

Course outline:-

Sr. No.	Course Contents	Hours
1	**Embedded system introduction** Introduction to embedded systems and general purpose computer systems, architecture of embedded system, classifications, applications and purpose of embedded systems, challenges and design issues in embedded systems, operational and non-operational quality attributes of embedded systems, elemental description of embedded processors and microcontrollers. **Review of microprocessors:**Organization of Microprocessor based system, 8085µp pin diagram and architecture, concept of data bus and address bus, 8085 programming model, instruction classification, subroutines.	10
2	**8051 microcontroller** Introduction and block diagram of 8051 microcontroller, architecture of 8051, overview of 8051 family, 8051 assembly language programming, Program Counter and ROM memory map, Data types and directives, Flag bits and Program Status Word (PSW) register, Jump, loop and call instructions.8051 I/O port programming: Introduction of I/O port programming, pin out diagram of 8051 microcontroller, I/O port pins description and their functions, I/O port programming in 8051, (Using Assembly Language), I/O programming: Bit manipulation.Programming of 8051: 8051addressing modes and accessing memory using various addressing modes, assembly language instructions using each addressing mode, arithmetic and logic instructions, 8051 programming in C:- for time delay and I/O operations and manipulation, for arithmetic and logic operations, for ASCII and BCD conversions.	28

3	**Timer and counter programming** Programming 8051 timers, counter programming, Serial port programming with and without interrupt: Introduction to 8051 interrupts, programming timer interrupts, programming external hardware interrupts and serial communication interrupt, interrupt priority in the 8051, Interfacing 8051 microcontroller to peripherals: Parallel and serial ADC, DAC interfacing, LCD interfacing.	11
4	**Programming Embedded Systems** Structure of embedded program, infinite loop, compiling, linking and locating, downloading and debugging. **Embedded system design and development:**Embedded system development environment, file types generated after cross compilation, disassembler/decompiler, simulator, emulator and debugging, embedded product development life-cycle, trends in embedded industry.	11

Learning Outcomes:-After successful completion of this course, students have:

- Knowledge of Digital Electronics and embedded system.
- Knowledge aboutthe applications of microcontrollers.

Books Recommended:-

1. 'Embedded Systems: Architecture, Programming and Design', **R. Kamal**,*Tata McGraw Hill*.
2. 'The 8051 Microcontroller and Embedded Systems Using Assembly and C'**, M.A. Mazidi, J.G. Mazidi and R.D. McKinlay**, 2nd Ed., *Pearson Education India*.
3. 'Embedded Microcomputer System: Real Time Interfacing', **J.W. Valvano**, *Brooks/Cole*.
4. 'Embedded Systems and Robots', **Subrata Ghoshal**, *Cengage Learning*.
5. 'Introduction to Embedded System', **K.V. Shibu**, 1st Ed., *McGraw Hill*.
6. 'Microcontrollers in Practice', **I.Susnea and M.Mitescu**, *Springer*.
7. 'Embedded Systems: Design andApplications', **S.F. Barrett**, *PearsonEducation India*.
8. 'Embedded Microcomputer Systems: Real Time Interfacing', **J.W.Valvano,** *Cengage Learning*.

E-Resources:-

1. http://pms.iitk.ernet.in/wiki/index.php/Physics
2. www.wikipedia encyclopaedia
3. www.physic.about.com
4. www.physic.org
5. www.Physicsclassroom.com
6. www.howstuffwork.com
7. www.colorado.edu/physics/2000
8. www.ndrs.org. physic.com
9. www.physlinc.com
10. www.fearophysic.com
11. www.hyperphysics.com

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5. Encyclopaedia Britannica-2008.

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FACULTY OF SCIENCES

DEPARTMENT OF PHYSICS

COURSE: B.Sc. **SEMESTER: V**

SUBJECT NAME: Physics Practical-V **SUBJECT CODE: 4SC05PPR1**

Teaching & Evaluation Scheme:-

Teaching hours/week				Credit	Evaluation Scheme/semester							
					Theory				Practical			
Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	Total Marks
					Marks	Hrs	Marks	Hrs	Pr	TW		
0	0	6	6	3	--	--	--	--	20	10	70	100

Objectives:-The general purpose of this course is

- To expose the student knowledge of Practical related to theory.

Prerequisites:-Fundamentalknowledge of Physics Practical.

Course outline:-

Sr. No.	Course Contents
1	To determine the refractive index of the material of a given prism using sodium light.
2	To determine the dispersive power of the material of a given prism using mercury lamp.
3	To determine the value of Cauchy constants of a material of a prism.
4	Measurement of Susceptibility of paramagnetic solution (Quinck tube method).
5	To measure the dielectric constant of a dielectric material with frequency.
6	To study the PE-hysteresis loop of a ferromagnetic crystal.
7	To draw the BH-curve of iron using solenoid and to determine the energy loss from hysteresis.
8	To measure the resistivity of a semi-conductor (Ge) crystal with temperature by four probe method (from room temperature to 150 ^{0}C) and to determine its bandgap.
9	To determine the hall coefficient of a semiconductor sample.
10	Programme to glow first four LED's then next four using timer application.
11	To interface seven segment LED display with 8051 microcontroller and display 'HELP' in the seven segment LED display.
12	To find the factorial of a number.
13	To determine the wavelength of a monochromatic light using Michelson interferometer.
14	To determine the mutual induction of coils using ballistic galvanometer.
15	To study the characteristics of a solar cell.

* 15%ofnewexperimentscanbeintroducesAND/ORreplacedasperthe need,withthepermission oftheHead.

Learning Outcomes:-After successful completion of this course, students have:

- Knowledge of Physics Practical and its application in various fields.

Books Recommended:-

1. 'B. Sc. Practical Physics', **C. L. Arora**, *S. Chand and Company Ltd*.

2. 'Advanced Practical Physics', **M. S. Chauhan and S. P. Sing**, *Pragati Prakashan*.
3. 'Experimental Physics', **University Granth Nirman Board**, (Gujarati Medium).
4. 'Physics through experiments Vol. I & II', **B. Saraf et al.**, *Vikas Publishing House*.
5. 'Advanced Practical Physics', **S. L. Gupta and V. Kumar**,*Pragati Prakashan*.
6. 'An advanced course in practical Physics', **D. Chattopadhyay and P. C. Rakshit**,*New Central Book Agency Pvt. Ltd.*
7. 'Electronic Laboratory Primer', **Poorna Chandra and Sasikala**,*S. Chand and Company Ltd*.
8. 'Advanced Practical Physics for Students', **B. L. Wosnop and H. T. Flint**,*Asia Publishing House*.
9. 'Advanced Level Physics Practicals', **Michael Nelson and Jon M. Ogborn**, 4th Ed., *Heinemann Educational Publishers*.
10. 'Engineering Practical Physics', **S. Panigrahi and B. Mallick**, *Cengage Learning India Pvt. Ltd*.
11. 'A Text Book of Practical Physics', **Indu Prakash and Ramakrishna**, 11th Ed., *Kitab Mahal*.
12. 'A Laboratory Manual of Physics for Undergraduate Classes', **D. P. Khandelwal**, *Vani Publication*.
13. 'Basic Electronics: A Text Lab Manual, **P. B. Zbar, A. P. Malvino and M. A. Miller**, *McGraw Hill*.

E-Resources:-

1. http://pms.iitk.ernet.in/wiki/index.php/Physics
2. www.wikipedia encyclopaedia
3. www.physic.about.com
4. www.physic.org
5. www.Physicsclassroom.com
6. www.howstuffwork.com
7. www.colorado.edu/physics/2000
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9. www.physlinc.com
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