ISTAR

M. SC. PHYSICS

COURSE OBJECTIVE AND OUTCOME

FIRST SEMESTER

101510101: PRINCIPLES OF PHYSICAL TRANSDUCERS
Faculty:
Mr. Krunal Suthar

Description: To introduce different types of transducers and its operational principles as it is the base for any further signal processing and applications.

Outcome: Students will be able to know how basic signal is acquired with different transducers having different sensing mechanism and circuit design.

101510102: MICROPROCESSOR & MICROCONTROLLER SYSTEMS
Faculty:
Mr. Sameep Dave

Description: To introduce 8-bit microprocessor, microcontrollers and embedded systems with its interfacing circuits and assembly language programming.

Outcome: Students will understand hardware architecture of 8085 microprocessor, 8051 microcontroller and its programming for interfacing.

101510103: MATHEMATICAL PHYSICS
Faculty: (Visiting)
Dr. Navin Agrawal

Description: To study the different topics based on mathematical aspects like Vector space, quantum states, integrals and contours, integral transforms and tensors etc.

Outcome: Student will gain ability to apply mathematical solution to physical problem. They will be able to apply calculus of variations to diverse problems in physics

101510107: ANALOG CIRCUITS
Faculty:
Mr. Sameep Dave

Description: This course consists of important applications of Op-amps including filter circuits.

Outcome: This will enable the student to learn Op-amp circuits with wide applications in all fields.

101510108: ELEMENTS OF SOLID STATE PHYSICS & ERROR ANALYSIS
Faculty: (Visiting)
Dr. Himanshu Trivedi

Description: This is an introduction to the principles of solid state physics and error analysis. It involves lattice structures, Elastic properties and determinants of Gaussian distribution.

Outcome: Students will gain knowledge of Lattice parameters and transformation theory. Able to learn crystal structures and determination of standard deviation for Gaussian distribution & problems

101510109: NON LINEAR DYNAMICS, RELATIVITY & COSMOLOGY
Faculty: (Visiting)
Dr. Himanshu Trivedi

Description: This course consist of space, time relativity and large scale structures of the universe.

Outcome: Learning aspect of universe and relativity theory. Knowledge of expansion of universe.

SECOND SEMESTER

101510201: SPECTROSCOPIC TECHNIQUES & ANALYSIS
Faculty:
Dr. Himanshu Kapse

Description: The course covers theory operation and working principles of different analytical and spectroscopic instruments used for various applications.

Outcome: This course has wide applicability in the market. Different instruments operation and working concept will help students to understand its operating principles..

101510102: OPTICAL FIBERS & DEVICES
Faculty: Mr. Sameep Dave

Description: This course is specifically designed for science of optical devices and light propagation through optical fibres.

Outcome: Students will be able to learn working principles of LASER and LED and its applications in various fields through light propagation in optical fibres.

101510203: CLASSICAL & QUANTUM MECHANICS
Faculty: (Visiting) Dr. Mehul Dave

Description: This course consists of different aspect on Classical theories and Quantum mechanics.

Outcome: Learning this will give clear idea about the computation for future predictions. Classical study will give macroscopic particle determination while quantum will imbibe microscopic particle knowledge.

101510207: SEMICONDUCTOR POWER DEVICES & APPLICATIONS
Faculty: Mr. Krunal Suthar

Description: This course consists of theory, working principles of various power semiconductor devices and their switching characteristics.

Outcome: Students will learn about power electronics their switching characteristics in industrial applications including motors and drives.

101510208 : MAGNETIC & OPTICAL PROPERTIES OF CONDENSED MATTER
Faculty: (Visiting) Dr. Himanshu Trivedi

Description: This course is blend of Optical and Magnetic properties. Luminescence study and its associated phenomena are covered. While type of magnetic effects also has been covered.

Outcome: This will enable student to understand clearly optical aspects and its interaction with matter. It also will help to learn Magnetic properties, concepts of resonance in it.

101510209 : METEOROLOGICAL INSTRUMENTATION
Faculty: (Visiting) Dr. Dhananjay Dhruv

Description: This course consists of Meteorological transducers and its types and application. Also concept of Radar and its applications is included.

Outcome: This will enable student to understand operational mechanisms of different types of Meteorological instruments and radar principles for different applications.

THIRD SEMESTER

101510301: SEMICONDUCTOR SCIENCE
Faculty: (Visiting) Dr. Dhananjay Dhruv

Description: This course is meant for semiconducting aspects and its interaction in different materials for formation of devices for applications.

Outcome: Student will gain knowledge of various aspects of semiconductor principles, able to separate out difference between metal, semiconductor and insulators. Device fabrication principles and interactions of MOS, CMOS etc.

101510302: DIGITAL COMMUNICATION
Faculty: Dr. Himanshu Kapse

Description: This course is for the concepts of hardware and software used in different communication system. Also includes Industrial standard communication protocols.

Outcome: Students will be aware about and implement the different protocols for communications meant for data transmission as well as industrial applications to control different operations.

101510306: CONTROL SYSTEMS
Faculty: Dr. Himanshu Kapse

Description: This course introduces students to theory and applications of different control systems and modelling methods.

Outcome: Students will be able to learn the role of feedback system in control mechanism and various methods to analyse in Laplace, time and frequency domain modes.

101510307: PLC – DCS - SCADA

Description: This course is to impart knowledge about Programmable logic controller, distributed control systems and supervisory systems

Faculty: (Visiting) **Mr. Bhavesh Hindocha**	concepts. **Outcome**: Student will thoroughly learn PLC programming its application, DCS utilization and SCADA implementation in plants.
101510308: **BIOPHYSICS AND MEDICAL INSTRUMENTATION** **Faculty:** **Dr. Himanshu Kapse**	**Description:** The focus is to provide theory and operating principles of Biomedical measuring and monitoring instruments. **Outcome**: Student will gain knowledge of various measuring and monitoring instruments used in Hospitals. Also learn safety measures to handle instruments.
101510309: **THEORITICAL AND CONDENSED MATTER PHYSICS** **Faculty: (Visiting)** **Dr. Himanshu Trivedi**	**Description:** This course includes quantum states and degeneracy, dielectrics, superconductivity, general covariance. **Outcome**: It will help to understand the concepts for Superconducting principles, its effects and dielectric properties. It gives the knowledge about White dwarfs and neutron stars.
101510310: **CRYSTALLOGRAPHY & MATERIAL SCIENCE** **Faculty: (Visiting)** **Dr. Mehul Dave**	**Description:** This course includes principles of X-ray scattering, crystallography, its quantum interferences as well as amorphous properties. **Outcome**: Student will gain knowledge about Braggs' law, X-ray diffraction and concepts of ferroelectric crystals. They will learn Raman effect in crystals and tunnelling phenomenon as well as Amorphous characteristics of devices.
101510311: **NANOSCIENCE & NANOELECTRONICS** **Faculty: (Visiting)** **Dr. Dhananjay Dhruv**	**Description:** This course is based on advanced technology and its concept of nanoscience. Semiconductor quantum structures and carbon nano tubes are included. **Outcome**: On completion of basic idea about nano science and electronics will be cleared. Aspects of carbon nano tubes and Graphene in nano tubes will be understood.
101510312: **ELECTRODYNAMICS & ANTENNA** **Faculty: (Visiting)** **Dr. Navin Agrwal**	**Description:** This course provides the basics of electrodynamics principles and different types of antenna. **Outcome**: On completion student will gain knowledge of basic concepts of electrodynamics theory and its applications. With different types of antenna study.
101510313: **MICROWAVE & SATELLITE COMMUNICATION** **Faculty:** **Mr. Sameep Dave**	**Description:** This course provides the basics of Microwave techniques and Satellite communication systems. **Outcome**: On completion student will gain know how about the up link and down link of microwave signals and functions of transponders. Also learn calculations of signal attenuation and orbital dynamics.
101510314: **DIGITAL SIGNAL PROCESSING** **Faculty: (Visiting)** **Ms. Heena Kher**	**Description:** This course is to provide concepts on design, processing signal algorithm and implementation for applications. **Outcome**: It will help to learn signals and system, different mathematical algorithm and its importance for different circuit design and applications.
	FOURTH SEMESTER
101510401 : **PROGRAMMING IN C** **Faculty:** **Mr. Krunal Suthar**	**Description:** Introductory subject to high level procedural programming using C with examples. **Outcome**: At the completion of this course student will learn design and development of program for solving problems. Also will enable them to understand programming concepts and interfacing hardware.