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NutanVidyalayaSevabhavi Education Society, Umri

LATE BABASAHEB DESHMUKH GORTHEKAR MAHAVIDYALAYA, UMRI
Dist. Nanded, (Maharashtra)-431807
(Arts, Commerce & Science)
(Affiliated to Swami RamanandTeerthMarathwada University, Nanded)
(A UGC 2(F) & 12(B) Recognized)

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Ref. No. LBDGMU/2019-20/ Date :

B. Sc. First Year Physics

CCP I - (Section A) P-I Core Course: Mechanics and Properties of Matter

Learning Outcomes: The objective of this course is to introduce the students to the world of mechanics and properties of the matter that exists in different phases i.e., solid, liquid and gas. Laws of motion and its applications to various systems studied in this paper is of fundamental nature and enable the students to handle different types of problems and is the pre-requisite for several other advanced courses in physics and chemistry. The pre-requisite for this course is knowledge of calculus, wave theory and modern physics. This course is the core course and every student pursuing B. Sc. with physics as one of the optional is required to study this course.

CCP I - (Section B) P-II Core Course: Mathematical Methods in Physics

Learning Outcomes: This course is also aimed to develop knowledge in mathematical physics and its applications, to develop expertise in mathematical methods required in the study of Physics, to develop critical thinking and problem solving skill. After completion of this course students will be able to apply the concept of vectors and complex variables to various physical quantities. This course will also enable the students to solve the problems related to partial differentiation. Fourier analysis unit will enable the students to analyze the periodic functions.

CCP II - (Section A) P-III Core Course: Heat and Thermodynamics

Learning Outcomes: This course will introduce the students to the world of heat and thermodynamics and the behavior of the physical systems at different thermo dynamical conditions. After completing this

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course students will understand the difference in the behavior of the ideal and real gases, transport phenomenon in gases. Students will also understand the working of various heat engines and the ways to increase their working efficiency.

CCP II - (Section B) P-IV Core Course: Electricity and Magnetism

Learning Outcomes: The objective of this course is to introduce the students to the concepts of static and dynamical electrical magnetic fields, the sources for generating such fields, polarization and induction effects, understand the basic difference between the DC and AC circuits and their functioning. This course is of most applied nature and will enable the students to understand the role of electricity in everyday life, relate electrical conduction, vlate using Ohm's law and will also enable the students to understand the working principles of various electrical components and gadgets.

B. Sc. Second Year Physics

CCP III - (Section A) P-VI Core Paper: Waves and Oscillations

Learning Outcomes: The objective of this course is to introduce the students to the concepts of mechanical waves, their properties, propagation and reflection properties, formation of standing waves, their applications in resonance tubes, energy distribution in the standing waves, free and forced vibrations, acoustics and acoustical designs and also introduces the students to the concepts of ultrasonic waves and their applications. This course is the pre-requisite for several advanced courses in physics and chemistry and is necessary for understanding the behavior of the mater when mechanical waves passes through them. Pre-requisite for this course is the knowledge of elementary mathematics and calculus, wave theory, etc. This forms the core course of the programmes and every student pursuing B Sc with physics as one of the optional is required to study this course.

CCP III - (Section B) P-VII Core Paper: Statistical Physics, Electromagnetics and Theory of Relativity

Learning Outcomes: The objective of this course is to introduce the students to the concepts of macroscopic world, statistical approaches for understanding properties of the macroscopic bodies, ensembles, their classification on the basic of macroscopic and microscopic basis, their applications to photonic and electronic gases, electromagnetism, Maxwell's equations and their applications in the electromagnetic waves, energy carried by the EM waves and theory of relativity. This course is the prerequisite for several advanced courses in physics, chemistry, life sciences and the modern

communication systems. Pre-requisite for this course is the knowledge of elementary mathematics and calculus. This forms the core course of the programmes and every student pursuing B Sc with physics as one of the optional is required to study this course.

CCP IV - (Section A) P-VIII Core Paper: Optics and Lasers

Learning Outcomes: This course is aimed to introduce the students to important core subject optics and its applications. This course begins with the introduction to the concepts of geometrical optics, properties of optical instruments, interference and diffraction of light, polarization of light and finally introduces to the advanced source like LASERS and conditions for the lasing action. This course is the advanced course having applications in nearly all the branches of science. Pre-requisite for this course is the knowledge of light waves and their properties in different media and requires the knowledge of EM waves. This forms the core course of the programmes and every student pursuing B Sc with physics as one of the optional is required to study this course.

CCP IV - (Section B) P-IX Core Paper: Basic Electronics

Learning Outcome: After completing this course students will be able to

1. Identify and understand construction and properties of different types of P-N junction diodes

2. Apply knowledge of semiconductor devices to use them in different combinations to see their applications as amplifiers and oscillators

3. Design different circuits using semiconductor devices and demonstrate their usage.

CCPS I - (Section B) SEC-II Skill Enhancement Course

II A. Electronic Devices and Equipment's

Learning Outcomes: This is a skill based course and is aimed to educate students about the working and usage of electrical appliances and other electrical devices. This course enables the students to know the behavior of active and passive devices under ac and dc conditions and also to use them for designing various circuits such as signal generators and amplifiers. As this is a skill based course, therefore, after completing this course the students will be able to acquire skills and apply them in daily hood purpose. As this course is of doit-yourself nature, therefore, the students are required to spend more than half of the time in laboratory. This course is the pre-requisite for several advanced courses in physics, chemistry, and in almost all other disciplines. Pre-requisite for this course is the knowledge of semiconductor physics, knowledge of the semiconductor devices and their characteristics.

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CCPS I - (Section B) SEC-II Skill Enhancement Course II B. Applied Optics

Learning Outcomes : This is a skill based course and is aimed to impart advanced skills related to the optical and photonic devices. This course also enables the students to verify various facts that they have learned in the theory course on optics. They will also be introduced and allowed to work on various optical devices including LASERS. After completing this course students will be able to understand the working properties of various optical and photonic devices. As this is a skill based course, therefore, students are required to spend more than half of the time in laboratory for doing hands-on activities. This course is of applied nature and helps the students to use this knowledge in optical and allied laboratories. Pre-requisite for this course is the knowledge of optics.

B. Sc. Third Year Physics

P-XII DSEP I (Section A) - Discipline Specific Compulsory Paper: Quantum Mechanics

Learning Outcomes : The objective of this course is to introduce the students to the world of microscopic particles such as molecules, atoms, atomic nuclei and elementary particles, study their dynamics employing wave analogy, and also to make the connections between the rules governing the microscopic particles with that of the macroscopic bodies around us. This course is the pre-requisite for several advanced courses in physics and chemistry and is necessary for understanding the behavior of molecules, atoms and elementary particles. The pre-requisite for this course is knowledge of calculus, wave theory and modern physics. This course is the core course and every student pursuing B Sc with physics as one of the optional is required to study this course.

P-XIII A - DSEP I (Section B) – Discipline Specific Elective Paper: A. Solid State Physics

Learning Outcomes : This course is designed to provide fundamental knowledge of the crystallography, principles behind the formation of matter, their structure and physical properties. This course also enables the students to understand the relationship between the internal structure and various properties of matter such as periodicity, structure and bonding in solids, making these solids an attractive material for the device applications. At the end of this course, students will be able to classify the materials in different classes based on their physical, thermal, electrical, and magnetic properties. This is an elective course of 02 credits offered at Semester V.

P-XIII (C) DSEP I (Section B) – Discipline Specific Elective Paper: B. Astrophysics

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Learning Outcomes : Astronomy and Astrophysics is the oldest branch of science, perhaps started with the origin of the humankind, and has evolved systematically with time. In the present era with the availability of the state-of-the-art observing facilities across the electromagnetic spectrum, thanks to the technological advancements, the scope of the study of the astronomical objects have became more interesting and challenging. This study involves the knowledge of Classical Mechanics, Quantum Mechanics, Nuclear physics, Statistical Mechanics, Electrodynamics, Spectroscopy, Mathematical Physics, Modern Electronics, Chemistry and even Biological sciences. At the end of course, the students will be able to understand the important concepts of astronomical objects and will be in a position to provide a fundamental connections between different fields of the science in general and physics in particular.

SEC III (A) Skill Enhancement Course: A. Renewable Energy and Harvesting

Learning Outcomes: Aim of this course is to introduce and create awareness among the students about use of the non-conventional energy sources such as solar energy, wind energy, tidal energy, biomass, etc. After completing this course the students will not only gain knowledge of various non-conventional energy sources but also get hands-on experience of utilizing them in real life. As this course is primarily of hands-on training type, therefore, the students will be trained to harvest these non-conventional energy sources and design their own gadgets to convert and use them for their house hold purposes.

SEC III (B) Skill Enhancement Course: B. Electrical Circuit Analysis Skill

Learning Outcomes: Aim of this course is to create awareness among the students about the electrical circuits, wiring of the electrical appliances and enable them to check for troubleshoots through hands-on exercises. This course introduces the students to various electrical components including their characteristics and power losses. As this course is of skill based, therefore, after completing this course students will not only be able to check the electrical connections at house-hold but will also learn the skill to repaire the electrical appliances for the general troubleshoots and wiring faults.

P-XIV DSCP II (Section A) - Discipline Specific Compulsory Paper: Atomic, Molecular & Nuclear Physics

Learning Outcomes: Aim of this course is to introduce the students to the world of physics of atoms, molecules and nuclei, their structures, emission of Gamma rays, X-rays, optical and microwave spectra from these systems, the interaction of atoms and molecules with electric and magnetic fields. This course

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also provides adequate knowledge on the nuclear energy sources and reactions with its application in establishing nuclear reactors.

P-XV A - DSEP II (Section B) - Discipline Specific Elective Paper A. Digital and Communication Electronics

Learning Outcomes: This course enabels the students to understand the importance and interconvertibility of various number systems, principles of digital gates, and working principle of communication systems. After completing this course students will be in a position to know the working of communication systems i.e., modulators, demodulators, transmitters and receivers, etc.

P-XV C - DSEP II (Section B) - Disciplne Specific Elective

Learning Outcomes: This course is aimed to offer a broad view on the fundamentals and salient features of the modern communication technique i.e., fiber optical communication, which revolutionized communication technology and has become integral part of the Engineering and related technologies. This course provides a deep understanding of the fiber optical communication and salient features of designing and developing different types of optical fibers to be used for specific purposes. Through this course the students will learn the concepts of propagation and behavior of light rays through the optical fibers of different refractive indices. The pre-requisite for this is that the students must know characteristics of different light sources including monochromatic sources like LASERS, and electromagnetic wave theory.

SEC IV (A) Skill Enhancement Course

Learning Outcomes: Aim of this course is to create awareness among the students about the mechanical, electrical and electronic tools through hands-on activities. This course introduces the students to the workshop skills like cutting, drilling, filing, different types of AC and DC generators, soldering desoldering of electrical and electronics components, constructing regulated power supplies, etc., therefore, after completing this course students will gain skills of using various workshop tools and also to find faults and general troubleshoots and wiring faults.

B. Semiconductor Devices Application Skill

Learning Outcomes: This course is aimed to introduce the students to the working characteristics comparing the performances of various types of semiconductor devices. Therefore, after completing this course they will gain experience of soldering of electronic circuits, constructing DC regulated power upplies, etc.

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