AKKINENI NAGESWARA RAO COLLEGE :: GUDIVADA

Autonomous College under the jurisdiction of Krishna University, Machilipatnam

I B. Sc, I-Semester PHYSICS **Syllabus Paper: I**	Paper Code: **23EAMPC1**	Admitted Batch: 2023-24	No. of Teaching Hours/week:5 No. of Credits : 4
Year of Introduction:2023-24	Year of Offering:2023-24	Year of Revision: 2023-24	Percentage of Revision:100%
Course Delivery Method: Class Room/Blended Mode-Both	C.I.A:30 MARKS	S.E.E: 70 Marks	Total:100 MARKS

PAPER-I: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL,PHYSICAL AND CHEMICAL SCIENCES.

UNIT-I : ESSENTIALS OF MATHEMATICS

Complex Numbers: Introduction of the new symbol–General form of a complex number-Modulus-Amplitude form and conversions Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles

Vectors : Definition of vector addition – Cartesian form – Scalar and vector product and problems

Statistical Measures : Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS

Definition and Scope of Physics-Measurements and Units - Motion of objects-Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance-Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions-Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe.

UNIT III: ESSENTIALS OF CHEMISTRY

Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Bio-molecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Applications of Mathematics in Physics & Chemistry*:* Calculus , Differential Equations & Complex Analysis

Application of Physics in Industry and Technology*: *Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry

UNIT V: ESSENTIALS OF COMPUTER SCIENCE

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications. Ethical and social implications**:** Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric & Asymmetric, Malware, Firewalls, Fraud Techniques-Privacy & Data Protection.

Note: In Unit-IV, Bold and **Italic titles indicates Physics related syllabus.**

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd.
4.Basic Statistics by B.L.Agarwal, New age international Publishers
5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
8. Physics for Technology and Engineering" by John Bird
9. Chemistry in daily life by Kirpal Singh
10. Chemistry of bio molecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

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I B. Sc, I-Semester PHYSICS Syllabus Paper: II	Paper Code: 23AMPC2	Admitted Batch: 2023-24	No. of Teaching Hours/week:5 No. of Credits : 4
Year of Introduction:2023-24	Year of Offering: 2023-24	Year of Revision: 2023-24	Percentage of Revision:100%
Course Delivery Method: Class Room/Blended Mode-Both	C.I.A:30 Marks	S.E.E: 70 Marks	Total:100 MARKS

PAPER-II:ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

UNIT-I : ADVANCES IN BASICS MATHEMATICS

Straight Lines: Different forms-Reduction of general equation into various forms-Point of intersection of two straight lines Limits and Differentiation: Standard limits-Derivative of function –Problems on product rule & quotient rule

Integration: Integration as a reverse process of differentiation – Basic methods of integration

Matrices: Types of matrices-Scalar multiple of a matrix-Multiplication of matrices-Transpose of a matrix and determinants

UNIT-II: ADVANCES IN PHYSICS

Renewable energy: Generation, energy storage, and energy-efficient materials and devices.

Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT-III: ADVANCES IN CHEMISTRY

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT-IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS AND CHEMISTRY

Mathematical Modeling applications in physics and chemistry

Application of Renewable energy: Grid Integration and Smart Grids,

Application of nanotechnology: Nano-medicine

Application of biophysics: Biophysical Imaging, Biomechanics,

Neuro-physics, Application of medical physics: Radiation Therapy, Nuclear medicine

Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT-V: ADVANCED APPLICATIONS OF COMPUTER SCIENCE

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

Note: In Unit-IV, Bold and **Italic titles indicates Physics related syllabus.**

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah
11. Environmental Chemistry by Anil.K.D.E.
12. Digital Logic Design by Morris Mano
13. Data Communication & Networking by Bahrouz Forouzan.

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I B. Sc,II-Semester PHYSICS Syllabus Paper:2M	Paper Code: **23PHY2M**	Admitted Batch: 2023-24	No.of Teaching Hours/week:3 No. of Credits : 3
Year of Introduction:2023-24	Year of Offering:2023-24	Year of Revision: 2023-24	Percentage of Revision:100%
Course Delivery Method:Class Room/Blended Mode-Both	C.I.A:30 MARKS	S.E.E: 70 Marks	Total:100 MARKS

PAPER-2M: MECHANICS AND PROPERTIES OF MATTER

UNIT-I :VECTOR ANALYSIS

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.

UNIT-II : MECHANICS OF PARTICLES

Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.

UNIT-III: MECHANICS OF RIGID BODIES AND CONTINUOUS MEDIA

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, Precession of a top, Gyroscope, Precession of the equinoxes. Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio. Classification of beams, types of bending, point load, distributed load.

UNIT IV: CENTRAL FORCES

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equations of motion under a . Derivation of Kepler’s laws. Motion of satellites.

UNIT V: SPECIAL THEORY OF RELATIVITY

Galilean relativity, Absolute frames. Michelson-Morley experiment, The negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.

Recommended books:

1. BSc Physics -Telugu Akademy, Hyderabad
2. Mechanics - D.S. Mathur, Sulthan Chand & Co, New Delhi
3. Mechanics - J.C. Upadhyaya, Ramprasad & Co., Agra
4. Properties of Matter - D.S. Mathur, S.Chand& Co, New Delhi ,11th Edn., 2000
5. Physics Vol. I - Resnick-Halliday-Krane ,Wiley, 2001
6. Properties of Matter – Brijlal&Subrmanyam, S. Chand &Co. 1982
7. Dynamics of Particles and Rigid bodies– Anil Rao, Cambridge Univ Press, 2006
8. Mechanics-EM Purcell, Mc Graw Hill
9. University Physics-FW Sears, MW Zemansky& HD Young, Narosa Publications, Delhi
10. College Physics-I. T. Bhima sankaram and G. Prasad. Himalaya Publishing House.
11. Mechanics, S. G. Venkata chalapathy, Margham Publication, 2003.

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I B. Sc, II-Semester PHYSICS Practical Paper: 2M(P)	Paper Code: **23PHY2M(P)**	Admitted Batch: 2023-24	No. of Teaching Hours/week:2 No. of Credits : 1
Year of Introduction:2023-24	Year of Offering:2023-24	Year of Revision: 2023-24	Percentage of Revision:100%
Course Delivery Method: Class Room/Blended Mode-Both	C.I.A:25 MARKS	S.E.E: 25 Marks	Total:50 MARKS

PAPER-2M: MECHANICS AND PROPERTIES OF MATTER LAB

List of experiments

1. Viscosity of liquid by the flow method (Poiseuille's method)
2. Young's modulus of the material of a bar (scale) by uniform bending
3. Young's modulus of the material a bar (scale) by non- uniform bending
4. Surface tension of a liquid by capillary rise method
5. Determination of radius of capillary tube by Hg thread method
6. Viscosity of liquid by Searle's viscometer method
7. Bifilar suspension –moment of inertia of a regular rectangular body.
8. Determination of moment of inertia using Fly-wheel
9. Determination of the height of a building using a sextant.
10. Rigidity modulus of material of a wire-dynamic method (torisional pendulum).
11. Determination of the force constant of a spring by dynamic method.
12. Simple pendulum-estimation of errors -time period and gravity

- Minimum of 6 experiments to be done and recorded
- These experiments will be evaluated in C.I.A.