



**ANNAVARAM SATHYAVATHI DEVI GOVERNMENT DEGREE COLLEGE
FOR WOMEN**

(An Autonomous Institute accredited with NAC C with "B" Grade in Cycle III)
Church Square Park, Jagannaickpur, Kakinada, Andhra Pradesh

Department of Physics
SYLLABUS-AY 2024-25

S. No.	Semester	Paper	Title of the Paper
1	1	C-1	Essentials and Applications in Mathematical, Physical & Chemical Sciences(Course code: BSCM24101)
2	1	C-2	Advances in Mathematical, Physical & Chemical Sciences(Course code: BSCM24102)
3	2	C-3 & M-1	Mechanics & Properties of Matter(Course code: PHY 24201)
4	2	C-4	Waves & Oscillations(Course code : PHY 24202)
5	3	C-5 & M-2	Optics(Course code : PHY 23301)
6	3	C-6	Heat and Thermodynamics(Course code : PHY 23302)
7	3	C-7	Electronic Devices and Circuits(Course code: PHY 23303)
8	3	C-8	Analog and Digital Electronics(Course code: PHY 23304)
9	4	C-9 & M-3	Electricity, Magnetism & Electronics (Course code: PHY 23401)
10	4	C-10 & M-4	Modern Physics (Course code :PHY 23402)
11	4	C-11	Introduction to Nuclear and Particle Physics (Course code : PHY23403)
12	5	VIB	Low Temperature Physics & Refrigeration (Course code: PHY 205303-6B)
13	5	VIIB	Solar Energy & Applications (Course code : PHY 205304-7B)
10	6		Long Internship

Semester 1		
Course code: BSCM24101		
Essentials and applications of Mathematical, Physical, chemical and computer science		
S. No.	CO	Description
1	1	To Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures
2	2	To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations
3	3	Understand the interplay and connections between mathematics, physics, and chemistry in various applications.
4	4	Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts
5	5	To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures

Semester 1		
Course code: BSCM24102		
Advances in Mathematical, Physical and Chemical sciences		
S. No.	CO	Description
1	1	Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems
2	2	To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.
3	3	Understand the different sources of renewable energy and their generation and advances in nano materials. To study the emerging field of quantum communication and biophysics.
4	4	Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications
5	5	Understand and convert between different number systems, Differentiate between analog and digital signals and understand their characteristics. Gain knowledge of different types of transmission media.



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DEPARTMENT OF PHYSICS

2024-25

B.Sc. Honours Course Syllabus (Single Major) (w.e.f:2023-24A.B)

SEMESTER-I

COURSE I: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCE

Course Code: BSCM24101

Theory Credits: 3

3 hrs./week

UNIT I: ESSENTIALS OF MATHEMATICS: Complex Numbers: Introduction of the new symbol i – 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- Behavior 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, Biomolecules- 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 and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

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
- 6) Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
- 7) Physics for Technology and Engineering" by John Bird
- 8) Chemistry in daily life by Kirpal Singh

- 9) Chemistry of bio molecules by S. P. Bhutan 1
- 10) Fundamentals of Computers by V. Raja Raman
- 11) Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

SEMESTER-I

COURSE 2: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Course Code: BSCM24102

Theory Credits: 3

3 hrs./week

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 a function – Problems on product rule and 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 & CHEMISTRY Mathematical Modelling applications in physics and chemistry Application of Renewable energy: Grid Integration and Smart Grids, Application of nanotechnology: Nanomedicine, 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.

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.