	PVKN Govt. College (Autonomous) Chittoor			**Program** I B.Sc. Physics Honours		
Course Code **23-MPC-1C1**	**TITLE OF THE COURSE** **Course – 1: Essentials and applications of Mathematical, Physical and Chemical science**			**Semester-I**		
Teaching	Hours Allocated: 45 Hrs (**Theory**) (**4 Hrs./wk.**) Hours Allocated: 15 Hrs (**Student Activity**) (**1 Hrs./wk.**)	L	T	P	C	
Pre-requisites	Basic knowledge in concepts of mathematics, physics, chemistry and computer science	4	-	-	4	

Syllabus:	45 hrs

UNIT I: ESSENTIALS OF MATHEMATICS: 9hrs

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: 9hrs

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics-Newton Laws and relativistic mechanics perspective: Lorentz Transformation equations (elementary treatment only), Length contraction, Time dilation, variation of mass with velocity (elementary treatment only), Postulates, Derivation of $E = mc^2$, Laws of Thermodynamics: Zeroth law, First law and Second law (statements and significance). Acoustic waves and electromagnetic waves: Characteristics and their applications, Electric and Magnetic fields and their interactions: Electric field due to a point charge, Lorentz force law, Biot and Savart's law (statements only), magnetic field due to current loop, Behaviour of atomic and nuclear particles: Elementary particles, Wave-particle duality-Debroglie wave equation, the uncertainty principle, examples, uncertainty in Time –energy, Theories and understanding of universe: Evolution theory and five eras of evolution

UNIT III: ESSENTIALS OF CHEMISTRY: 9hrs

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 based on physical properties and chemical composition, Biomolecules- carbohydrates, proteins, fats and vitamins (classification and biological importance)

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY: 9hrs
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, Environmental Monitoring and Sustainable Technologies.

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

UNIT V: ESSENTIALS OF COMPUTER SCIENCE: **9hrs**

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

List of Reference 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 biomolecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson.