Generic Electives (GE):

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Integrative Biology	**4**	**3**	**0**	**1**	**PASS IN XII**	**NIL**

Learning Objectives

This course would make students understand the nature and evolution of genetic material and transfer of information in living systems. It will introduce the design of living systems.

Learning outcomes

After completion of the course the student will be able to;

- Comprehend current research in different streams of Biological Sciences
- Get in depth knowledge of how living system functions (regulation, communication)
- Know about different model system and their utilization in biology
- Apprehend study design in biology
- Get an idea of career prospects in bioscience

To design small innovative research projects in biosciences.

Syllabus

Unit I: Demystifying living state, Choice of the genetic material, RNA world, Evolution of DNA and Proteins **(15 hours)**

Unit II: Designing living systems, Nature of biological processes, Approaches to study Biology: Observational and Experimental, Synthetic cell and beyond **(15 hours)** Unit III: The regulated activities: Communication (external & internal) as the basis of regulation, Circuits and regulations in living systems, Interaction of biological components Model organisms in study of Biology **(15 hours)**

Practical Exercises: **(30 hours)**

- Isolation of DNA from bacteria and eukaryotic tissue and separation on agarose gel
- Isolation and separation of RNA from eukaryotic cells
- Isolation and separation of proteins from tissues and bacteria
- Evolution networks and cellular networks

References:

- An Introduction to Systems Biology: Design Principles of Biological Circuits, Uri Alon, Chapman & Hall, 2nd edition, 2013.
- Physical Biology of the Cell, Phillips et al., Garland Science, 2nd edition, 2012.
- Molecular Cell Biology, Lodish et al., W. H. Freeman & Company, 7th edition, 2012.
- Biochemistry, Berg, Tymoczko and Stryer, W H Freeman & Company, 7th edition, 2011.