

## Syllabus template

<b>Semester: 2</b>	
<b>Course:</b> Multi Dis-2	
<b>Paper Title:</b> Introduction to 'Central Dogma of Life'	
<b>Paper code:</b> M1BT230211P	<b>Credits: 3</b>
<b>Hours/week: 3</b>	
<b>Category: Core/MDC/SEC/VAC: MDC</b>	
<b>Theory / Practical / Composite: Practical</b>	
<b>Course Overview:</b>	
<ol style="list-style-type: none"> <li>1. Gaining a fundamental concept on “Central Dogma of Life”, which is conventionally regarded as the flow of genetic information from DNA to RNA to proteins.</li> <li>2. Gaining a comprehensive idea about the different cellular biomolecules and their basic chemistry.</li> <li>3. Understanding the concept of pKa values of the amino acids which are essential for understanding many fundamental reactions in chemistry.</li> <li>4. Acquisition of a basic understanding of enzymes.</li> <li>5. Being familiarized with fundamental Practical modules on all these basic topics.</li> </ol>	
<b>Course Outcome:</b>	
<ol style="list-style-type: none"> <li>1. Understand the basic principle of the Central Dogma of Molecular Biology, the details of bio- macromolecules, Recombinant DNA Technology (RDT) and Microscopy.</li> <li>2. Analyze prokaryotic and eukaryotic cell structures through microscopic observation of samples.</li> <li>3. Interpret protein and DNA separation patterns by polyacrylamide and agarose gel electrophoresis respectively.</li> <li>4. Measure pH of buffer solutions and understand the importance of buffering action in biological systems.</li> <li>5. Analyze the buffering behaviour of amino acids by determining their buffering capacity across different pH ranges.</li> <li>6. Evaluate the enzymatic activity through ATPase assay.</li> <li>7. Understand the basic principle of Immobilization of whole microbial cells through hands-on training.</li> </ol>	
<b>SYLLABUS</b>	
<b>CONTENT</b>	<b>HOURS or NUMBER OF CLASSES</b>
Definition of Biotechnology Structural & Functional Unit of a Living Object – A Cell: components & management – analogy with a corporate house Practical: Microscopic observation of cells Central Dogma Chemistry of the Cell – biological Macromolecules: (a) DNA, RNA, Proteins, Lipids with special reference to biological membrane, & Carbohydrates Practical: SDS-PAGE, Agarose gel electrophoresis Preparation of buffers. Determination of buffering capacity of amino acids (b) Wonder molecule of the cell – Enzymes: a special mention of their superiority over inorganic catalysts Practical: Enzyme assay Recombinant DNA Technology (RDT) – an outcome of accumulated basic knowledge in Cellular Biochemistry:	3

<p>(a) Basic protocol  (b) Applications – overproduction of commercially important substances  Practical: Blue-white screening to distinguish recombinant and non-recombinant DNA  Biotechnology with whole microbial cells and enzymes – immobilization technique  Future Prospects:  (a) Without disturbing the ecological balance how we can bring nutritious food to the mouth of every living object on our planet earth.  (b) How we can alleviate the suffering of people affected with various diseases.</p>	
<p><b>Text Books:</b>  Experiments in Microbiology, Plant Pathology, Tissue culture and Microbial Biotechnology – K. R. Aneja. 6th Edition (2022). New Age International Private Limited.</p>	
<p><b>Evaluation (50 marks):</b>  Practical CA: 48 marks Continuous Assessment  Attendance: 2 marks</p>	