

**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**DEPARTMENT OF MICROBIOLOGY**  
**COURSE CURRICULUM**

<b>PART – A: Introduction</b>			
<b>Program: Bachelor in Life Science (Diploma/Degree/Honors)</b>		<b>Semester - III</b>	
		<b>Session: 2024-25</b>	
1	<b>Course Code</b>	MBSC-03 T	
2	<b>Course Title</b>	Cell Biology and Biochemistry	
3	<b>Course Type</b>	DSC	
4	<b>Prerequisite (If Any)</b>	As per program	
5	<b>Course Learning Outcomes (CLO)</b>	<b>At the end of this course, the student will able to –</b> <ul style="list-style-type: none"> <li>➤ illustrate the structural organization of eukaryotic and prokaryotic cells</li> <li>➤ interpret cell division</li> <li>➤ classify the biomolecules and compare their characteristics</li> <li>➤ relate structure and functions of nucleic acids</li> <li>➤ interpret the mechanism of enzyme action</li> </ul>	
6	<b>Credit Value</b>	<b>03 Credits</b>	<b>Credit = 15 Hours - Learning &amp; Observation</b>
7	<b>Total Marks</b>	<b>Max. Marks: 100</b>	<b>Minimum Passing marks: 40</b>
<b>PART – B: Content of the Course</b>			
<b>Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)</b>			
Unit	Topics (Course contents)		No. of Period
I	<b>History of Cell Biology:</b> Contribution of Indian Cell biologists and Biochemists: Ramakrishnan Nagaraj, Joyoti Basu, Veena Krishnaji Parnaik. <b>Cell Structure:</b> Prokaryotic and Eukaryotic cell, cellular organelles; Plasma membrane, Mitochondria, Golgi body, Nucleus, Ribosome, Lysosome, Endoplasmic reticulum. Cell division.		12
II	<b>Carbohydrate:</b> Structure, properties & classification of carbohydrates; Monosaccharides, Disaccharides and Polysaccharides. <b>Proteins:</b> Structure, properties & classification of amino acids. Structure & Classification of Protein- Primary, secondary; salient of $\alpha$ helix, $\beta$ sheet, tertiary and quaternary.		11
III	<b>Lipid:</b> Structure, properties and classification of lipids. <b>Nucleic acids:</b> Structure of purine and pyrimidine bases, nucleoside and nucleotide; DNA structure and types: A, B, Z form; RNA - Structure, types and functions.		11
IV	<b>Enzymes:</b> Classification of enzymes, mechanisms of enzyme action; Lock and key hypothesis, induced fit hypothesis. Active site and activation energy, coenzyme, Isoenzyme, metal cofactors.; Allosteric enzymes. Enzyme inhibition; competitive, noncompetitive, uncompetitive.		11
<b>Key Words</b>	Cell structure, Carbohydrates, Protein, Lipids, Enzymes, DNA, RNA		

**Name and Signature of Convener and Members of CBoS**

Plall 10/6/24      Jenu. 10.6.24      Rashmi 10.6.24      [Signature] 10.6.24      [Signature]      [Signature] DR. K. S. Patel  
 NAGAR 10/6/24      [Signature] 10/6/24      [Signature] 10.6.24      [Signature] Dr. Nelsonke

## Part – C: Learning Resources

### Text Books, Reference Books and Others

#### Text Books Recommended:

1. Cell and molecular biology; P. K. Gupta
2. Cell biology; C B Pawar
3. Biochemistry; U Satyanarayan and U Chakrapani
4. Fundamentals of Biochemistry; J L Jain, Sanjay Jain and Nitin Jain

#### Reference Books:

1. Lehninger's principles of Biochemistry; M.M. Cox, D. L. Nelson and W H Freeman.
2. Quick Review Biochemistry; Arun Kumar Singhal, AITBS Pub. India

### Online Resources – e-Resources/ e-Books and e- learning portals

- <https://www.khanacademy.org/science/biology/structure-of-a-cell>
- <https://microbenotes-com.webpkgcache.com/doc/-/s/microbenotes.com/carbohydrates-classification-structure-functions/>
- <https://microbenotes.com/carbohydrates-structure-properties-classification-and-functions/>
- <https://www.onlinebiologynotes.com/classification-of-protein-on-the-basis-of-structure-composition-and-function/>

## Part- D: Assessment and Evaluation

### Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

<b>Continuous Internal Assessment (CIA):</b> (By Course Teacher)	Internal Test / Quiz – (2): 20+20	Better marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against <b>30</b> Marks
	Assignment/ Seminar – 10	
	Total Marks – 30	
<b>End Semester Exam (ESE):</b>	<b>Two Section – A &amp; B</b> Section A: Q1. Objective 10 X 1 = 10 Mark; Q2. Short answer type – 5X4= 20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit – 4X10 = 40 Marks	

Name and Signature of Convener and Members of CBoS

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10-6-24

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10.6.24

*Rashmi*  
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D. Satyanarayan

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Dr. Nelson

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Dr. Rachana  
Chowdhary

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<b>PART – A: Introduction</b>			
<b>Program: Bachelor in Life Science (Diploma/Degree/Honors)</b>		<b>Semester III</b>	
		<b>Session: 2024-25</b>	
1	<b>Course Code</b>	<b>MBSC - 03 P</b>	
2	<b>Course Title</b>	<b>Lab. Course – MBSC-03</b>	
3	<b>Course Type</b>	<b>Laboratory Course</b>	
4	<b>Prerequisite (If Any)</b>	<b>As per program</b>	
5	<b>Course Learning Outcomes (CLO)</b>	<b>At the end of this course, students will be able to –</b> <ul style="list-style-type: none"> <li>➤ identify the various stages of cell division</li> <li>➤ quantify the carbohydrates and protein in any sample</li> <li>➤ determine the Vmax and Km value of enzymes</li> <li>➤ analyse the effect of environmental factors on enzyme activity.</li> </ul>	
6	<b>Credit Value</b>	<b>1 Credit</b>	<b>Credit = 30 Hours. Laboratory or Field learning/ Training</b>
7	<b>Total Marks</b>	<b>Max. Marks: 50</b>	<b>Min. Passing marks: 20</b>

**PART – B: Content of the Course**

**Total No. of learning-Training/ Performance Periods: 30 Periods (30 Hours)**

<b>Module</b>	<b>Topics (Course contents)</b>	<b>No. of Period</b>
<b>Lab./ Field Training/ Experiment contents of Course</b>	1. Identification of different stages of mitosis in onion root tips. 2. Staining and visualisation of mitochondria by Janus green stain. 3. Qualitative tests for carbohydrates, reducing sugars, non-reducing sugars. 4. Qualitative tests for lipids and proteins. 5. Quantitative estimation of proteins by Folin Lawry method. 6. Study of protein secondary and tertiary structures with the help of models. 7. Study of enzyme kinetics – calculation of Vmax, Km values. 8. Study effect of temperature, pH and heavy metals on enzyme activity.	<b>30</b>

**PART – C: Learning Resources**

**Text Books, Reference Books and Others**

**Books Recommended:**

1. Practical microbiology: R C Dubey and D K Maheshwari.
2. An introduction to practical biochemistry: David T Plummer.
3. Basic concepts in clinical Biochemistry: A practical guide: Vijay Kumar, Kiran Dip Gill

**Online Resources:**

- <https://www.youtube.com/watch?v=hqbt7wtznrs>
- <https://www.youtube.com/watch?v=QacQmS3aaTI>

**PART – D: Assessment and Evaluation**

**Suggested Continuous Evaluation Methods:**

**Maximum Marks: 50 Marks**

**Continuous Internal Assessment (CIA): 15 Marks**

**End Semester Exam (ESE): 35 Marks**

<b>Continuous Internal Assessment (CIA): (By Course Teacher)</b>	<b>Internal Test/ Quiz – (2): 10 &amp; 10</b> <b>Assignment/ Seminar + Attendance: 05</b> <b>Total Marks – 15</b>	<b>Better Marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against 15 Marks</b>
<b>End Semester Exam (ESE):</b>	<b>Laboratory/ Field Skill Performance: On spot Assessment</b> <b>A. Performed the Task based on lab. work – 20 Marks</b> <b>B. Spotting based on tools &amp; technology (written) - 10 Marks</b> <b>Viva-voce (based on principle/ technology) – 05 Marks</b>	<b>Managed by course teacher as per lab. status</b>

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