


**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**Department of Biochemistry**  
**Course Curriculum**

<b>PART- A: Introduction</b>			
<b>Program: Bachelor in Science</b> <i>(Degree/Honors)</i>		<b>Semester - VI</b>	<b>Session: 2024-2025</b>
1	<b>Course Code</b>	BCSC- 06T	
2	<b>Course Title</b>	Biochemistry and Function of Hormones	
3	<b>Course Type</b>	Discipline Specific Course (Theory)	
4	<b>Pre-requisite (if, any)</b>	As Per The Program	
5	<b>Course Learning Outcomes (CLO)</b>	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> <li>➤ Understand the different modes of communication between cells including signal reception, transduction, amplification and response.</li> <li>➤ Understand the role of endocrine system in maintaining ionic and glucose homeostasis and the communications that regulate growth appetite, metabolism and reproduction in humans.</li> <li>➤ Decipher molecular and biochemical mechanisms of all hormones and will be in a position to interpret hormonal levels in individuals with health and disease conditions. Besides,</li> <li>➤ Understand the role of various plant hormones in growth and development of plants.</li> </ul>	
6	<b>Credit Value</b>	<b>3 Credits</b>	<b>Credit = 15 Hours - learning &amp; Observation</b>
7	<b>Total Marks</b>	<b>Max. Marks: 100</b>	<b>Min 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>			
<b>Unit</b>	<b>Topics (Course contents)</b>		<b>No. of Period</b>
<b>I</b>	<p><b>Hormones:</b> Chemical classification of hormones, Functions of hormones and their regulation. Chemical signaling - endocrine, paracrine, autocrine, intracrine and neuroendocrine mechanisms. General introduction to Endocrinology. Hormone receptors - extracellular and intracellular. Receptor - hormone binding.</p> <p><b>Hypothalamic-Hypophysial system, Pituitary:</b> anatomy, histology, vasculature and secretions. Physiological and biochemical actions of hypothalamic hormones and anterior pituitary hormones; Feed- back regulation. Posterior pituitary hormones – structure, physiology and biochemical actions of AVP and Oxytocin.</p>		<b>12</b>
<b>II</b>	<p><b>Thyroid gland - Histology;</b> Biosynthesis of thyroid hormone and its regulation: Role of TRH and TSH in T4 synthesis and response. Physiological and biochemical action of Thyroxine. Pathophysiology of thyroxine secretion: Hyper and hypothyroidism, Goiter, Graves' disease, Cretinism, Myxoedema.</p> <p><b>Regulation of calcium homeostasis:</b> PTH, Vitamin D and calcitonin. Mechanism of Ca<sup>2+</sup> regulation. Regulation of Growth: growth hormone and somatomedin, Endocrine disorders - gigantism, acromegaly, dwarfism, pygmies. Physiology and biochemical actions of Growth factors- EGF, PDGF and Erythropoietin.</p>		<b>11</b>
<b>III</b>	<p><b>Hormones of adrenal gland:</b> Physiology and action of Aldosterone; the Renin Angiotensin System. Physiology and Biochemical actions of Cortisol. Adrenal medullary Hormones: Epinephrine and Norepinephrine. General adaptation syndrome: acute and chronic stress response. Pathophysiology – Addison's disease, Conn's</p>		<b>11</b>

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	syndrome.	
<b>IV</b>	<b>Cells involved in the release of gastrointestinal hormones;</b> The gastrin family of hormones and CCK: the secretin family of hormones; Incretins; Ghrelin; Summary of hormone metabolite control of GI function. Hormones of the Pancreas: Structure, synthesis, physiology and biochemical actions of insulin and glucagon. Adipocyte hormones: Adiponectin and leptin; Appetite and satiety control. <b>Male and female sex hormones.</b> Hormones during ovarian and uterine phases of menstrual cycle; Placental hormones; role of hormones during parturition and lactation.	<b>11</b>
<b>Key words</b>	Cell Organelles, Cell Biology, Circulatory System, Respiratory System, Digestive System, Endocrine system, Excretory System.	

### PART-C: Learning Resources

#### Text Books, Reference Books and Others

##### Text Books Recommended –

- Lehninger: Principles of Biochemistry (2017) 7th ed., Nelson, D.L. and Cox, M.M. W.H. Freeman & Company (New York)
- Vander's Human Physiology (2019) 15th ed., Widmaier, E.P., Raff, H. and Strang, K.T. McGraw Hill International Publications (USA)
- Endocrinology (2007) 6th ed., Hadley, M.C. and Levine, J.E. Pearson Education (New Delhi), Inc.
- The Cell: A Molecular Approach (2009) 5th Ed. Cooper, G.M. and Hausman, R.E. ASM Press & Sunderland, (Washington DC), Sinauer Associates. (MA).

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

- <https://www.nature.com/scitable/topic/cell-biology-13906536/>
- <https://www.sciencedirect.com/topics/medicine-and-dentistry/endocrinology>
- <https://www.webmd.com/lung/how-we-breathe> <https://www.britannica.com/science/circulatory-system>
- <https://www.niddk.nih.gov/health-information/digestive-diseases/digestive-system-how-it-works>

### 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): (By Course Teacher)</b>	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 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 x1= 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	

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<b>Program: Bachelor in Science</b> <i>(Degree/ Honors)</i>		<b>Semester - VI</b>	<b>Session: 2024-2025</b>
1	<b>Course Code</b>	BCSC -6P	
2	<b>Course Title</b>	Biochemistry and Function of Hormones	
3	<b>Course Type</b>	Discipline Specific Course (Practical)	
4	<b>Pre-requisite (if, any)</b>	As Per The Program	
5	<b>Course Learning Outcomes (CLO)</b>	<i>On successful completion of the course, the student shall be able to:</i> <ul style="list-style-type: none"> <li>➤ Students will acquire practical training to undertake clinical tests like Glucose Tolerance test, estimation of serum Ca<sup>2+</sup>, serumT<sub>4</sub>, serumelectrolytes and HCG based pregnancy test.</li> <li>➤ Interpret hormonal level with clinical conditions of the individuals.</li> </ul>	
6	<b>Credit Value</b>	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	<b>Total Marks</b>	<b>Max. Marks: 50</b>	<b>Min Passing Marks: 20</b>
<b>PART -B: Content of the Course</b>			
<b>Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)</b>			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> <li>➤ Estimation of serum Ca<sup>2+</sup>.</li> <li>➤ Estimation of serum T<sub>4</sub></li> <li>➤ HCG based pregnancy test.</li> <li>➤ Estimation of serum electrolytes.</li> <li>➤ Case studies</li> </ul>		<b>30</b>
<b>Keywords</b>	Glucose Tolerance test, estimation of serum Ca <sup>2+</sup> , serumT <sub>4</sub> , serumelectrolytes , HCG based pregnancy test		

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<b>PART-C: Learning Resources</b>		
<b>Text Books, Reference Books and Others</b>		
<b>Text Books Recommended –</b>		
<ul style="list-style-type: none"> <li>➤ Lehninger: Principles of Biochemistry (2017) 7th ed., Nelson, D.L. and Cox, M.M. W.H. Freeman &amp; Company (New York)</li> <li>➤ Vander's Human Physiology (2019) 15th ed., Widmaier, E.P., Raff, H. and Strang, K.T. McGraw Hill</li> <li>➤ International Publications (USA)</li> <li>➤ Endocrinology (2007) 6th ed., Hadley, M.C. and Levine, J.E. Pearson Education (New Delhi), Inc.</li> <li>➤ The Cell: A Molecular Approach (2009) 5th Ed. Cooper, G.M. and Hausman, R.E. ASM Press &amp; Sunderland, (Washington DC), Sinauer Associates. (MA).</li> </ul>		
<b>Online Resources–</b>		
<b>e-Resources / e-books and e-learning portals</b>		
<ul style="list-style-type: none"> <li>➤ <a href="https://www.nature.com/scitable/topic/cell-biology-13906536/">https://www.nature.com/scitable/topic/cell-biology-13906536/</a></li> <li>➤ <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/endocrinology">https://www.sciencedirect.com/topics/medicine-and-dentistry/endocrinology</a></li> <li>➤ <a href="https://www.webmd.com/lung/how-we-breathe">https://www.webmd.com/lung/how-we-breathe</a></li> <li>➤ <a href="https://www.britannica.com/science/circulatory-system">https://www.britannica.com/science/circulatory-system</a></li> <li>➤ <a href="https://www.niddk.nih.gov/health-information/digestive-diseases/digestive-system-how-it-works">https://www.niddk.nih.gov/health-information/digestive-diseases/digestive-system-how-it-works</a></li> </ul>		
<b>PART -D: Assessment and Evaluation</b>		
<b>Suggested Continuous Evaluation Methods:</b>		
<b>Maximum Marks:</b>		<b>50 Marks</b>
<b>Continuous Internal Assessment (CIA):</b>		<b>15 Marks</b>
<b>End Semester Exam (ESE):</b>		<b>35 Marks</b>
<b>Continuous Internal Assessment (CIA):</b> (By Course Teacher)	Internal Test / Quiz-(2): <b>10 &amp; 10</b> Assignment/Seminar + Attendance - <b>05</b> Total Marks - <b>15</b>	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against <b>15 Marks</b>
<b>End Semester Exam (ESE):</b>	<b>Laboratory / Field Skill Performance: On spot Assessment</b> Performed the Task based on lab. work - <b>20 Marks</b> Spotting based on tools & technology (written) – <b>10 Marks</b> Viva-voce (based on principle/technology) - <b>05 Marks</b>	<b>Managed by Course teacher as per lab. status</b>

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