

GANPAT UNIVERSITY				
FACULTY OF DIPLOMA ENGINEERING				
Programme	Diploma in Biomedical Engineering			
Semester	I	Version	1.0.0.0	
Effective from Academic Year	2025-26	Effective for the batch Admitted in	JULY 2025	
Course code	IBS1105	Course Name	Basics of Biology	

I.TEACHING-LEARNING AND ASSESSMENT SCHEME																		
Course Type	Course Code	Learning Scheme						Assessment Scheme										
		Actual Contact Hrs/Week			SLH	NLH	Credits	Theory				Practical				Based on SL		Total Marks
		CL	TL	LL				FA-TH	SA-TH	TOTAL		FA-PR	SA-PR	TOTAL		SLA		
										MAX	MIN			MAX	MIN	MAX	MIN	
DSC	1BS1105	3	-	2	3	8	4	40	60	100	40	30	20	50	20	20	08	

Abbreviation:	CL- Classroom Learning	TL - Tutorial Learning	LL - Laboratory Learning
	SLH - Self Learning Hours	NLH - Notional Learning Hours	SLA - Self Learning Assessment
	FA - Formative Assessment (Term work +Mid Sem Exam +Attendance)		SA - Summative Assessment

II. PRE-REQUISITES
Basic knowledge of Class 10 science, biology and familiarity with the basic parts of the human body.
III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES
Industry/hospital employer expect the fundamental knowledge of human biology that helps the engineers to understand the applications and working principle of medical instruments. Also helps to understand the subsequent semester subjects in better way.
IV. COURSE LEARNING OUTCOMES
At the end of the course, students will be able to achieve the following course learning outcomes:
CO1. Explain the organization of a human body, homeostasis and its maintenance, basic structure and functions of tissues.
CO2. Explain about biomolecules its structure, function and their role in a living organism. How biomolecules are useful for human body.
CO3. Define the cells, its structure and functions, and different types of cells and basis for classification of living organisms.
CO4. Demonstrate the concept of biology and its uses in combination with different technologies.
V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:

Name of Unit	Theory Learning outcomes (TLO's) aligned to CO's	Learning Content mapped with Theory Learning outcomes (TLO's) & CO's	Marks	Hours
Unit-1 Body Environment & Control	<p>TLO1.1 Definition: Anatomy, Physiology.</p> <p>TLO1.2 Anatomical planes and directions, Level of structural complexity.</p> <p>TLO1.3 Homeostasis: Negative feedback mechanism, Positive feedback mechanism., Survival needs of the body, Introduction to study of illness.</p>	<p>1.1 Meaning of Human Anatomy & Physiology.</p> <p>1.2 Understand the location of body parts and its structure.</p> <p>1.3 How the body maintain its internal environment stable.</p>	10	05

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Unit-2 Biochemistry of Life	<p>TLO2.1 Overview different types of Macromolecules and Micro molecules: Protein, Carbohydrates, Lipids, Fat, Nucleic acids.</p> <p>TLO2.2 Importance of Vitamins, Hormones, Electrolytes.</p> <p>TLO2.3 Acid, alkalis and pH, Movement of substances in body, Body fluid.</p>	<p>2.1 Basics of Macromolecules and Micro molecules.</p> <p>2.2 Understand the structure and function of each Macromolecules and Micro molecules.</p> <p>2.3 Importance of Acid and Base balance in body and pH values of different biochemical.</p> <p>2.4 Types of body fluids and how its movement takes place.</p>	17	13
Unit-3 The Cell	<p>TLO3.1 Structure of cell.</p> <p>TLO3.2 Structure and Function of different organelles like cell membrane, nucleus, cytoplasm, endoplasmic reticulum, lysosomes, Golgi apparatus, mitochondria, ribosome.</p> <p>TLO3.3 Membrane Transport – Diffusion, osmosis, passive & active transport.</p>	<p>3.1 Understand the structure and function of human cell.</p> <p>3.2 Get the knowledge of structure and function of different organelles of the cell. List out home use medical devices, OPD and ICU equipment.</p> <p>3.3 Different methods and how the substances cross the cell membrane.</p>	17	14
Unit-4 The Tissue	<p>TLO4.1 Definition and classification of tissues.</p> <p>TLO4.2 Structure and functions of Epithelial tissue, Muscular tissue, Connective tissue, and Nervous Tissue</p>	<p>4.1 Get the clear idea about the tissue.</p> <p>4.2 Understand the structure and function of different types of tissues.</p>	16	13

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL

Sr. No.	Practical/Laboratory Learning Outcome (LLO)	Practical Titles	Relevant COs
1	LLO 1.1 Understanding the various parts of microscope with its operating procedure.	Study of micro scope	CO1
2	LLO 2.1. Study & Understand the various anatomical plane and location of various organs.	Study and define the anatomical plane of the given anatomical structure.	CO1
3	LLO 3.1 Study & Understand the various anatomical Direction and location of various organs.	Study and define the anatomical direction of the given anatomical parts.	CO1
4	LLO 4.1 Understand the various structures and its function of proteins.	To study the structure and function of protein.	CO2
5	LLO 5.1 Understand the various structures and its function of Carbohydrate.	To study the structure and function of Carbohydrate.	CO2

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6	LLO 6.1 Understand the basic structure of cell and its functions.	To study the gross structure of cell.	CO3
7	LLO 7.1 Study the structure of cell producing the protein and how it is packed to transport across the body.	To study the protein producing and packaging structure of the cell.	CO3
8	LLO 8.1 Study about the transportation of various substances across the membrane through passive transportation method.	To study the passive membrane transportation process across the cell membrane.	CO3
9	LLO 9.1 Study about the transportation of various substances across the membrane through active transportation method.	To study the active membrane transportation process across the cell membrane.	CO3
10	LLO 10.1 Understand the classification of tissues with their structure and function.	To study the structure and function of body tissues.	CO4

VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

- Prepare a chart or poster on the gross cell structure.
- Prepare the drawing chart of various cell organelles.
- Prepare the quiz model for various micro and macro molecules of human body.
- Prepare the chart indicating the structure and function of various micro and macro molecules.
- Prepare the chart model of different types of tissues.
- Prepare the model of cell transport system.
- Collect photographs from internet which is related to Anatomical structure of different systems.

Mini projects

- Prepare the 3D model of cell structure and its organelles from waste materials.

VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD

1	Microscope
2	Biology model
3	Educational chart

IX. LIST OF REFERENCE BOOKS

Sr.No.	Title	Author	Publication
1	Biology for Engineers	S. Thyaga Rajan	Tata McGraw-Hill
2	Human anatomy and physiology made easy	Dr. Padma Sanghani	Akshat
3	Anatomy and physiology in Health and Illness	Ross and Wilson	Churchill

X. LINK OF LEARNING WEB RESOURCE

1	https://www.edx.org/course/human-anatomy-hkpolyux-ana101x-1
2	BODY Software
3	Video Lecture & Presentation slides from physio.net

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XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE							
Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	Body Environment & Control	CO1	5	8	2	0	10
2	Biochemistry of Life	CO2	13	10	7	0	17
3	The Cell	CO2,CO3	14	10	7	0	17
4	The Tissue	CO3,CO4	13	10	6	0	16
Grand Total			45	38	22	0	60

XII. COs AND POs AND PSOs MAPPING										
Course outcome (Cos)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	1	0	0	0	0	2	1	2	1
CO2	3	1	1	0	0	0	2	1	2	1
CO3	3	1	1	0	0	0	2	1	2	1
CO4	3	2	1	1	0	0	2	1	2	1
Legends: - 3- High 2-Moderate/Medium 1-Slight/Low 0-None										

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