GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Science

Level: Under Graduate

Branch Name: Honors/ Honors With Research (Biotechnology)

Course / Subject Code: BS02001051

Course / Subject Name: Haematology

W.e.f. Academic Year:	2024-25
Semester:	2
Category of the Course:	Multidisciplinary Course

Prerequisite: None
Rationale: The course aims to provide an in-depth understanding of hematology, including blood composition, hematopoiesis, and disorders related to blood cells. It will also cover diagnostic techniques and recent advances in the field, preparing students for professional roles in medical laboratories and research.

Course Scheme:

Teaching Scheme			**Total Credits**	**Assessment Pattern and Marks**				**Total Marks**
				Theory		**Practical**		
L	**T**	**PR**	**C**	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	30	200

Course Content:

Sr. No.	**Course Content**	**No. of Hours**	**% of Weightage**
1	**Introduction to Hematology**: Definition, importance, and scope of hematology, blood composition (plasma and formed elements), hematopoiesis including sites of blood cell formation, erythropoiesis, and the formation of leukocytes and platelets.	5	11
2	**Red Blood Cells (RBCs)**: Structure and function of RBCs, hemoglobin, RBC indices (MCV, MCH, MCHC), types and causes of anemia, polycythemia, and hemoglobinopathies such as sickle cell anemia and thalassemia.	10	22
3	**White Blood Cells (WBCs) and Immunohematology**: Structure and function of different WBCs, types of leukemia and lymphoma, principles of immunohematology including blood groups and transfusion medicine, mechanisms and disorders of hemostasis and coagulation.	10	23
4	**Platelets and Coagulation**: Platelet formation and function, pathways of coagulation (intrinsic, extrinsic, common), coagulation	10	22

	disorders (hemophilia, von Willebrand disease), diagnostic tests for coagulation, and types and mechanisms of anticoagulant therapy.		
5	**Advanced Topics in Hematology**: Bone marrow examination techniques, principles and applications of flow cytometry, molecular hematology with genetic disorders and molecular diagnostics, hematopoietic stem cell transplantation, recent advances and novel therapies in hematology.	10	22
	Total	**45**	

Reference Books:

- **Introduction to Hematology:** Hoffbrand AV, Moss PAH, "Essential Haematology," Wiley-Blackwell.
- **Red Blood Cells:** JP, "Wintrobe's Clinical Hematology," Wolters Kluwer.
- **White Blood Cells and Immunohematology:** Harmening DM, "Modern Blood Banking and Transfusion Practices," F.A. Davis Company.
- **Platelets and Coagulation:** Hoffman R, "Hematology: Basic Principles and Practice," Elsevier.
- **Advanced Topics in Hematology:** Orkin SH, "Nathan and Oski's Hematology of Infancy and Childhood," Elsevier.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
1	Understand the basics of blood composition and hematopoiesis.	UN
2	Analyze the structure, function, and disorders of RBCs.	AN
3	Evaluate the role of WBCs and principles of immunohematology.	EL
4	Apply knowledge of platelet function and coagulation pathways in diagnostics.	AP

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

List of Experiments:

1. Blood sample collection and handling.
2. Preparation of blood smears.
3. Microscopic examination of blood smears.
4. Determination of RBC indices.
5. Hemoglobin estimation.

6. Total and differential leukocyte count.
7. Platelet count.
8. Reticulocyte count.
9. Erythrocyte Sedimentation Rate (ESR).
10. Blood grouping and Rh typing.
11. Coagulation tests: Prothrombin time (PT), activated partial thromboplastin time (aPTT).
12. Peripheral blood film examination.
13. Flow cytometry: Basics and sample preparation.

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