

Programme Structure

Sharda School of Allied Health Sciences

Bachelor of Science in Medical Laboratory Technology (Techniques)

Programme code: SAH0104

Batch:2023 - 2027

SHARDA UNIVERSITY
Sharda School of Allied Health Sciences
Programme: B.Sc. in Medical Laboratory Technology (Techniques) - Technique
Semester/Term.: 1
Session: 2023-27

S.No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course: CC, AECC SEC, DSE
				L	T	P			
THEORY									
1.	36355	BOC 101	BIOCHEMISTRY- I	4	-	-	4	Core	CC
2.	36345	PAT 101	PATHOLOGY- I	4	-	-	4	Core	CC
3.	36353	MCB 101	MICROBIOLOGY-I	4	-	-	4	Core	CC
4.	36347	HAN 101	HUMAN ANATOMY-I	4	-	-	4	Core	CC
5.	36343	HPY 101	HUMAN PHYSIOLOGY-I	4	-	-	4	Core	CC
Practical									
1	36356	BOC 151	BIOCHEMISTRY- I (LAB)	-	-	2	1	Core	CC
2	36346	PAT 151	PATHOLOGY- I (LAB)	-	-	2	1	Core	CC
3	36354	MCB 151	MICROBIOLOGY-I (LAB)	-	-	2	1	Core	CC
4	36348	HAN 151	HUMAN ANATOMY-I (LAB)	-	-	2	1	Core	CC
5	36344	HPY 151	HUMAN PHYSIOLOGY-I (LAB)	-	-	2	1	Core	CC
6	16254	ARP 101	COMMUNICATIVE ENGLISH- I	0	1	2	2	Pre-requisite	AECC
TOTAL CREDITS							27		

¹ CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses



SHARDA UNIVERSITY
Sharda School of Allied Health Sciences
Programme: B.Sc. in Medical Laboratory Technology (Techniques)- Technique
Semester/Term.: 2
Session: 2023-27

S. No.	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course: CC, AECC SEC, DSE
				L	T	P			
THEORY									
1	-	BOC 201	BIOCHEMISTRY- II	4	-	-	4	Core	CC
2	-	PAT 201	PATHOLOGY- II	4	-	-	4	Core	CC
3	-	MCB 201	MICROBIOLOGY-II	4	-	-	4	Core	CC
4	-	HAN 201	HUMAN ANATOMY-II	4	-	-	4	Core	CC
5	-	HPY 201	HUMAN PHYSIOLOGY-II	4	-	-	4	Core	CC
6	-	OPE	Open Elective course	2	-	-	2	Elective	SEC
Practical									
7	-	BOC 251	BIOCHEMISTRY- II (LAB)	-	-	2	1	Core	CC
8	-	PAT 251	PATHOLOGY- II (LAB)	-	-	2	1	Core	CC
9	-	MCB 251	MICROBIOLOGY-II (LAB)	-	-	2	1	Core	CC
10	-	HAN 251	HUMAN ANATOMY-II (LAB)	-	-	2	1	Core	CC
11	-	HPY 251	HUMAN PHYSIOLOGY-II (LAB)	-	-	2	1	Core	CC
12	-	ARP 102	COMMUNICATIVE ENGLISH- II	0	1	2	2	Pre-requisite	AECC
TOTAL CREDITS							29		

¹ CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses



SHARDA UNIVERSITY

Sharda School of Allied Health Sciences

Programme: B.Sc. in Medical Laboratory Technology (Techniques)- Technique

Semester/Term: 3

Session: 2023-27

S.No	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course ¹ : CC AECC SEC DSE
				L	T	P			
THEORY									
1	36316	BMT 231	BIOCHEMISTRY- III	3	0	0	3	Core	CC
2	36317	BMT 232	PATHOLOGY- III	3	0	0	3	Core	CC
3	36318	BMT 233	MICROBIOLOGY-III	3	0	0	3	Core	CC
Practical									
4	35122	BMT 251	BIOCHEMISTRY- III (LAB)	0	0	2	1	Core	CC
5	35123	BMT 252	PATHOLOGY- III (LAB)	0	0	2	1	Core	CC
6	35124	BMT 253	MICROBIOLOGY-III (LAB)	0	0	2	1	Core	CC
7	31350	RBL-001	RBL-I	0	0	4	0	Pre-requisite	SEC
8	36333	VAM304	RECENT ADVANCES IN ALLIED HEALTH PRACTICE	0	0	0	0	Pre-requisite	SEC
TOTAL CREDITS							12		

¹ CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

SHARDA UNIVERSITY
Sharda School of Allied Health Sciences
Programme: B.Sc. in Medical Laboratory Technology (Techniques) - Technique
Semester/Term: 4
Session: 2023-27

S.No	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course ² : CC, AECC, SEC, DSE
				L	T	P			
THEORY									
1	35195	BMT 209	BIOCHEMISTRY- IV	3	-	-	3	Core	CC
2	35196	BMT 210	PATHOLOGY- IV	3	-	-	3	Core	CC
3	35197	BMT 211	MICROBIOLOGY-IV	3	-	-	3	Core	CC
4	35241	RMS 001	RESEARCH METHODOLOGY AND STATISTICS	3	-	-	3	Core	CC
		OPE	Open Elective course	-	-	-	2	SEC	SEC
		CCU 108	COMMUNITY CONNECT	-	-	4	2	SEC	SEC
Practical									
5	35198	BMT 254	BIOCHEMISTRY- IV (LAB)	-	-	2	1	Core	CC
6	35199	BMT 255	PATHOLOGY- IV (LAB)	-	-	2	1	Core	CC
7	35200	BMT 256	MICROBIOLOGY-IV (LAB)	-	-	2	1	Core	CC
		RBL-002	RBL-II				-	Pre-Requisite	SEC
TOTAL CREDITS							19		

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SHARDA UNIVERSITY
Sharda School of Allied Health Sciences
Programme: B.Sc. in Medical Laboratory Technology (Techniques) -
Semester/Term.: 5
Session: 2023-27

S.No	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course ³ : CC, AECC SEC, DSE
				L	T	P			
THEORY									
1	35233	BMT 306	BIOCHEMISTRY- V	3	-	-	3	Core	CC
2	35234	BMT 307	PATHOLOGY- V	3	-	-	3	Core	CC
3	35235	BMT 308	MICROBIOLOGY-V	3	-	-	3	Core	CC
4		BMT 359	BASIC CLINICAL LABORATORY MANAGEMENT -V	3	-	-	3	Core	CC
PRACTICAL									
5	35237	BMT 351	BIOCHEMISTRY- V (LAB)	-	-	2	1	Core	CC
6	35238	BMT 352	PATHOLOGY- V (LAB)	-	-	2	1	Core	CC
7	35239	BMT 353	MICROBIOLOGY-V (LAB)	-	-	2	1	Core	CC
8		RBL-003	RBL-III	-	-	4	2	Pre-Requisite	SEC
9	36334	VAM305	GOOD LABORATORY PRACTICES	-	-	-	-	Pre-Requisite	AECC
TOTAL CREDITS							17		

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SHARDA UNIVERSITY
Sharda School of Allied Health Sciences
Programme: B.Sc. in Medical Laboratory Technology (Techniques)
Semester/Term.: 6
Session: 2023-27

S.No	Paper ID	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course ⁴ : CC, AECC, SEC, DSE
				L	T	P			
THEORY									
1	35233	BMT 309	BIOCHEMISTRY- VI	3	-	-	3	Core	CC
2	35234	BMT 310	PATHOLOGY- VI	3	-	-	3	Core	CC
3	35235	BMT 311	MICROBIOLOGY-VI	3	-	-	3	Core	CC
4		INC001	FACULTY STUDENT INDUSTRY CONNECT	-	-	-	2	Pre-requisite	SEC
5		OPE	Open Elective course	-	-	-	2		
PRACTICAL									
6	35236	BMT 354	BIOCHEMISTRY- VI (LAB)	-	-	-	1	Core	CC
7	35237	BMT 355	PATHOLOGY- VI (LAB)	-	-	-	1	Core	CC
8	35238	BMT 356	MICROBIOLOGY-VI (LAB)	-	-	2	1	Core	CC
		RBL-004	RBL-IV				2	Pre-Requisite	SEC
TOTAL CREDITS							18		

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SHARDA UNIVERSITY
Sharda School of Allied Health Sciences
Programme: B.Sc. in Medical Laboratory Technology (Techniques)
7th Semester (Internship)
Session: 2023-27

S.NO.	PAPER ID	SUBJECT CODE	COURSE	Practical hours	CREDITS
			Internship in Hospital for 6 months with internship report and VIVA examination	40	20
	Total			40	20

Note: 540 Hours, 20 Credits, 180 Days, 6 months

- 1: Log Book
- 2: Project (project Report)
3. Presentation/Viva

Note: A student proceeds for internship after successful completion of all the 6 semesters of the Programme. The internship is non-teaching credit course (NTCC), wherein, each student has to undergo a minimum of 180 days which is equivalent to 20 credit (approx. 540 hrs) of mandatory rotational internship.

The evaluation will be based on submission of log book, project report and presentation/Viva-Voce which will lead to a satisfactory or unsatisfactory result.



**Course Modules
of
Bachelor of Science in Medical Laboratory
Technology (Techniques)**



BOC 101: BIOCHEMISTRY

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: I	
1	Course Code	BOC 101	
2	Course Title	BIOCHEMISTRY –I	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment's used in modern medical laboratories.To make the students able to do routine laboratory testing under stipulated conditions.To prepare specimens and operate machines that automatically analyse samples.To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life.To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To define the importance of sampling techniques CO2: To describe the importance of different types of glassware's CO3: To explain the importance of different types of equipment's CO4: To explain the importance of acid, base and buffer CO5: To describe the importance of chemistry of carbohydrates and lipids CO6:: Build the ability to understand the function of biomolecules in the biological system	
7	Course Description	<ul style="list-style-type: none">Introduction of Glassware'sIntroduction of Laboratory Equipment'sSafety of measurements in Laboratory, Sampling technique and its preservationPreparation of SolutionsAcid, Base and Indicators	



		<ul style="list-style-type: none">• Nutrition• Carbohydrate Chemistry• Lipid Chemistry	
8	Outline syllabus	Theory	CO mapping
	Unit 1	Introduction of Glassware's and laboratory equipment's	CO1, CO2,
	A	Pipettes, Burettes, Beakers, Petri dishes, depression plates; Flasks - different types; Volumetric, round bottomed, Erlenmeyer conical etc.	CO1, CO2,
	B	Water bath: Use, care and maintenance. Oven and Incubators.	CO1, CO2
	C	Refrigerators, cold box, deep freezers. Colorimeter and spectrophotometer	CO1, CO2
	Unit 2	Safety of measurements in Laboratory, Sampling technique and its preservation	CO1, CO2, CO3
	A	Different types of samples such as urine, blood, stool, tissue etc. and various techniques to preserve the samples.	CO1, CO2, CO3
	B	Preparation of percentage and normal solution.	CO1, CO2, CO3
	C	Preparation of molar and molal solution.	CO1, CO2, CO3
	Unit 3	Acid, Base, Indicators and Nutrition	CO1, CO3, CO4, CO6
	A	Acid- base indicators: Definition, concept, mechanism of action.	CO1, CO3, CO4, CO6
	B	Importance of nutrition: Calorific values, Respiratory quotient, Energy requirement of a person - Basal metabolic rate.	CO1, CO3, CO4, CO6
	C	Balanced diet, recommended dietary allowances, Role of carbohydrates, lipid and protein in diet.	CO1, CO3, CO4, CO6
	Unit 4	Carbohydrate Chemistry	CO4, CO5, CO6
	A	Definition, general classification with examples.	CO4, CO5, CO6
	B	Glycosidic bond, Structures, composition, sources, properties and functions of Monosaccharide's and Disaccharides.	CO4, CO5, CO6
	C	Structures, composition, sources, properties and functions of Oligosaccharides and Polysaccharides.	CO4, CO5, CO6
	Unit 5	Lipid Chemistry	CO5, CO6



A	Definition, classification, properties and functions of Fatty acids.			
B	Triacylglycerol and Phospholipids			
C	Cholesterol, Essential fatty acids and their importance, Lipoprotein.			
Mode of examination	Theory			
Weightage	CA	MTE	ETE	
Distribution	25	25	50	
Text books	<ol style="list-style-type: none"> 1. Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 2. Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. 3. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006. 4. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998 5. Voet and Voet. Biochemistry.4th edition, John Wiley, 2010. 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BOC 101	BIOCHEMISTR Y-I	CO1	3	3	3	3	1	3	3	2	3
		CO2	3	3	3	2	2	2	2	2	2
		CO3	3	3	3	3	1	3	3	2	2
		CO4	3	3	3	3	1	3	3	2	2
		CO5	3	3	3	3	2	3	3	1	2
		CO6	3	3	3	3	1	2	3	1	2
		Avg PO attained	3.0	3.0	3.0	2.83	1.33	2.67	2.83	1.66	2.16



PAT 101: PATHOLOGY I

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: I	
1	Course Code	PAT 101	
2	Course Title	PATHOLOGY-I	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for laboratory technologists.• The content of rigorous course provides knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis.• It also provide knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease.• The student will be able to properly order and interpret hematologic and coagulation tests, including CBC's, PT's, INR's, and APTT's, for the proper diagnosis and effective treatment of patients with hematologic, bleeding, and thrombotic disorders.	
6	Course Outcomes	CO1: To define the importance of Haematology CO2: To explain the importance of Laboratory safety guidelines CO3: To explain the importance of Hb, PCV estimation CO4: To describe the importance of Section cutting and Biomedical waste management CO5: To define the importance of Blood Bank CO6: To explain the techniques used in Blood banking	
7	Course Description	<ul style="list-style-type: none">• Introduction to Haematology• Laboratory safety guidelines• Estimation of Bleeding time, Clotting time, Prothrombin time• Biomedical waste management	



		<ul style="list-style-type: none"> Blood bank 	
8	Outline syllabus	Theory	CO mapping
	Unit 1	Haematology	CO1, CO3,
	A	Introduction to Haematology: Normal collection of blood, their structure and function.	CO1, CO3,
	B	Various anticoagulants used in Haematology	CO1, CO3,
	C	Various instruments and glassware's used in Haematology	CO1, CO3,
	Unit 2	Laboratory safety precautions, Blood Compositions	CO2, CO4
	A	Definition, composition, function and formation of blood,	CO2,
	B	Various anticoagulants, their uses, mode of action, merits, demerits.	CO4
	C	Morphology of normal blood cells and their identification, preparation and staining procedure for blood smear, Preparation of stains e.g. Leishman, Wright, Giemsa, J.B Stain	CO2,
	Unit 3	Haematological tests	CO3, CO4, CO5
	A	Hb, PCV, ESR and Normal haemostasis	CO3, CO4, CO5
	B	Bleeding time, Clotting time, Prothrombin time	CO3, CO4, CO5
	C	Quality assurance in hematology	CO3, CO4, CO5
	Unit 4	Tissue Processing	CO4, CO6
	A	Section cutting and Tissue processing for routine paraffin sections	CO4, CO6
	B	Decalcification of tissues and Staining of tissues – Hand E staining	CO4, CO6
	C	Biomedical waste management	CO4, CO6
	Unit 5	Blood Banking	CO5, CO6
	A	Introduction of Blood bank	CO5, CO6
	B	Blood grouping and Rh type	CO5, CO6



C	Cross matching			CO5, CO6
Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	25	25	50	
Text Books	<ol style="list-style-type: none"> 1. Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 2. Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers 3. Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates 4. Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004 5. Clinical Laboratory Hematology "McKenzie Shirlyn", Pearson Education Limited 6. Laboratory Manual of Clinical Pathology and Hematology. Santosh Kumar Mondal, CBS Publishers and distributors pvt ltd 7. Textbook of Histology. Leslie Gartner. Elsevier 8. ESSENTIALS OF HEMATOLOGY. SHIRISH M KAWTHALKAR Jaypee Brothers Medical Publishers; Third Edition (2020) 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
PAT 101	PATHOLOGY – I	CO1	3	3	3	3	1	2	3	1	2
		CO2	3	3	2	2	2	1	2	2	1
		CO3	3	3	3	3	2	2	3	2	1
		CO4	3	3	3	2	1	1	3	1	1
		CO5	3	3	3	1	1	1	3	1	1
		CO6	3	3	3	1	1	1	3	1	1
		Avg PO attained	3.0	3.0	2.83	2.0	1.33	1.33	2.83	1.33	1.16



School: SSAHS		Batch : 2023-27	
Programme:		Current Academic Year: 2023-24	
Branch:		Semester: I	
1	Course Code	MCB 101	
2	Course Title	MICROBIOLOGY-I	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for lab technologists.• To know many etiological agents responsible for global infectious diseases caused by bacteria, viruses and other pathogens related with infectious diseases in humans.• To provide the conceptual basis for understanding pathogenic microorganisms and particularly address the fundamental mechanisms of their pathogenicity.• To provide opportunities for a student to develop diagnostic skills in microbiology, including the practical application and interpretation of laboratory tests for the diagnosis of infectious diseases	
6	Course Outcomes	CO1: To explain about the Introduction and classification of microbiology CO2 : To explain about the Growth and nutrition in bacteria CO3: To define the importance of immunology and immune system CO4: To explain the importance of General Parasitology CO5: To define the importance of bacteriology CO6: To apply the possible analysis and mechanism involved in the microbial diversity	
7	Course Description	<ul style="list-style-type: none">• Introduction of microbiology• Introduction to immunology and immune system• Hypersensitivity and vaccines• General bacteriology• Systemic bacteriology	
8	Outline syllabus	Theory	CO mapping
	Unit 1	Introduction and classification of microbiology	CO1
	A	History and contribution of various scientist in microbiology, Medical Microbiology terminologies, and Importance and applications of medical Microbiology	CO1
	B	Various structure size and shape of bacteria.	CO1



		Use of microscope in the study of bacteria	
C		Classification of microorganisms, Bacterial taxonomy, General properties: morphology and anatomy	CO1
Unit 2		Microbial Growth and nutrition	CO1, CO2
A		Microbial nutrient and growth, Culture media and their types and identification system, application in diagnostic bacteriology	CO1, CO2
B		Nutrition of bacteria, Growth and multiplications of bacteria, factor affecting microbial growth	CO1, CO2
C		Definition of Sterilization, antiseptic and disinfection Principles and use of equipments of sterilization namely Hot Air oven, Autoclave and Serum Inspissator	CO1, CO2
Unit 3		Immunology and Immune system	CO3
A		Innate and acquired immunity, organ and cells involved in immune response	CO1, CO2
B		Definition of Hypersensitivity and types	CO1, CO3
C		Immunity (vaccines) Immunity vaccines, types of vaccine and immunization Principles and interpretation of commonly done serological tests namely Widal, ,HIV and ELISA technique Types of Antigen Antibody reaction	CO1, CO4
Unit 4		Parasitology	CO1, CO4
A		Introduction, classification and General features of parasites	CO1, CO4
B		Characteristic features of Metazoa and Prtozoa	CO1, CO4
C		Morphology, life cycle, laboratory diagnosis of Amoebiasis, Plasmodium, Tape worms	CO1, CO4
Unit 5		Bacteriology	CO5, CO6
A		Introduction, Diversity, classification, general features, pathogenicity, diagnosis, treatment and prevention of Mycobacterium tuberculosis, Mycobacterium leprae Enterobacteriaceae: coliform, proteus, Staphylococcus aureus, Steptococcus pneumoniae.	CO5, CO6



B	Diarrhoea: Salmonella, Shigella, Vibrio				CO5, CO6
C	Food poisoning: Clostridium				CO5, CO6
Mode of examination	Theory				
Weightage Distribution	CA	MTE	ETE		
	25	25	50		
Text Books	1. General Microbiology by Hans Günter Schlegel, C. Zaborosch, M. Kogut, 7th ed, Cambridge University Press, 1986 2. General Microbiology by Roger Y. Stanier Roger Y Stanier (Author), John L Ingraham (Author), Mark L Wheelis (Author), 5 th Edition, Palgrave Macmillan, 1999				

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
MCB 101	MICROBIOLOGY-I	CO1	3	3	3	2	1	1	3	1	1
		CO2	3	3	2	3	1	2	3	1	2
		CO3	3	3	3	3	2	2	3	2	1
		CO4	3	3	3	3	1	1	3	2	1
		CO5	3	3	3	3	2	1	3	2	1
		CO6	3	3	3	3	2	3	3	1	3
		Avg PO attained	3.0	3.0	2.83	2.83	1.5	1.66	3.0	1.5	1.5



HAN101 – HUMAN ANATOMY-I

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: I	
1	Course Code	HAN 101	
2	Course Title	HUMAN ANATOMY-I	
3	Credits	4	
4	Contact Hours (L- L-T-P)	4-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To provide an opportunity for lab technologists who distinguish themselves in Human Anatomy - dissection consistency, theoretical knowledge and knowledge application, to undertake research based training in Anatomy.• To capture distinguished medical students and offer them such training as would enable them to sub-specialize in anatomy at an early stage of their career.• To develop as research scientists and research based teachers for schools of allied health sciences both locally and externally.• It also strengthens the research foundation of the students with broad vision of leading in research based teaching of anatomy and stimulates the research attitudes and aptitudes of students.	
6	Course Outcomes	CO1: To define the importance of Anatomy of human body CO2: To describe the importance of different types of bones involved in locomotion CO3: To explain the importance of Cardiovascular system CO4: To explain the importance of Gastro-intestinal system CO5: To explain the importance of Respiratory system CO6: To describe the applied anatomy of various systems of human body	
7	Course Description	<ul style="list-style-type: none">• Cells and its organelles• Locomotion and support• Cardiovascular system• Gastro-intestinal system	



		<ul style="list-style-type: none">Respiratory system	
8	Outline syllabus	Theory	CO mapping
	Unit 1	Introduction of Anatomy	CO1
	A	Introduction to Anatomy (division, planes, terminology for direction and movements).	CO1
	B	Cell and its organelles Tissue: Connective and Epithelium- definition, classification, example and function	CO1
	C	Glands- classification, describe serous and mucus glands with example. Basic tissue classification with examples.	CO1
	Unit 2	Locomotion and support	CO2
	A	Cartilage – types and histology Bones – classification, development, histology.	CO2
	B	Joints – classification with examples.	CO2
	C	Muscles – classification and histology (name of muscles of the body) Details of synovial joint	CO2
	Unit 3	Cardiovascular system	CO3
	A	Heart- size, location, chambers, exterior and interior. Blood supply of heart (Branches of aorta and all major artery, Major veins of body)	CO3
	B	Systemic and pulmonary circulation	CO3
	C	Lymphatic system (Histology of lymphatic organs)	CO3
	Unit 4	Gastro intestinal system	CO4, CO6
	A	Parts of GIT, oral cavity (lips, tongue, salivary gland with histology), tonsil, dentition, pharynx, salivary gland, waldeyer's ring.	CO4, CO6
	B	Oesophagus. Stomach. Intestine.	CO4,



		Radiographs of abdomen.			CO6
C		Accessory digestive organs (liver, pancreas, gallbladder)			CO4, CO6
Unit 5		Respiratory system			CO5, CO6
A		Part of respiratory system			CO5, CO6
B		Nose, nasal cavity, larynx, trachea Lungs and Broncho pulmonary segment			CO5, CO6
C		Histology of lungs Names of paranasal sinuses.			CO5, CO6
Mode of examination		Theory			
Weightage Distribution	CA	MTE	ETE		
	25	25	50		
Text Books	<ol style="list-style-type: none"> 1. Tortora, G.J. and Grabowski, S.R. Principles of Anatomy and Physiology 9th edition, 2000 Collins College Publishers, Luciano, New York 2. Guyton, A.C. and Hall, J.E. W.B. Textbook of Medical Physiology. 9th edition 1996, Sanders Co. New York 3. Ganong WE. Review of Medical Physiology. Appleton and Lange, USA. 4. Chatterjee CC: Human Physiology Latest Ed. Vol-1, Medical Allied Agency. 4. Choudhari Sujith K: Concise Medical Physiology Latest Ed. New Central Book. 				

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
HAN 101	HUMAN ANATOMY-I	CO1	2	3	3	3	1	2	3	2	1
		CO2	2	3	3	3	1	2	3	2	1
		CO3	2	3	3	3	2	1	3	1	2
		CO4	3	3	3	3	1	1	2	1	1
		CO5	3	3	3	3	2	1	3	1	1
		CO6	2	3	3	3	1	3	3	1	2
		Avg PO attained	2.33	3.0	3.0	3.0	1.33	1.66	2.83	1.33	1.33



HPY 101 – HUMAN PHYSIOLOGY-I

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: I	
1	Course Code	HPY 101	
2	Course Title	HUMAN PHYSIOLOGY-I	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
Course Status		Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To learn and understand the fundamental scientific concepts relating to a broad range of topics in human physiology.• To make the students familiar with the basic factual information concerning the mechanisms and functioning of humans body system.• To develop investigative skills and to become familiar with standard techniques of measurement.• To help the students to gain practice and confidence in applying this knowledge, in a quantitative manner where appropriate, to actual experiments.	
6	Course Outcomes	CO1: To define the importance of general physiology of the human body CO2: To explain the importance of nerve muscle physiology CO3: To define the importance, function and function of Blood along with clinical importance CO4:To explain in detail about the information about Cardiovascular system CO5: To describe the respiratory system and its function CO6:To explain about Digestive system of the body	
7	Course Description	<ul style="list-style-type: none">• General and nerve muscle physiology• Blood• Cardiovascular system• The respiratory system• Digestive system	



8	Outline syllabus	Theory	Outline syllabus Theory
	Unit 1	Cell Structure, Nerve Tissue, Muscles	CO1
	A	Cell and cell organelle Structure and function, transport across cell membrane, homeostasis, membrane potential.	CO1
	B	Structure and functions of nerve tissues, physiological properties of nerve fibres, nerve fibre types and functions.	CO1
	C	Neuromuscular junction, Difference between skeletal muscle, smooth muscle and cardiac muscle.	CO1
	Unit 2	Composition and functions of blood	CO2
	A	Composition and functions of blood, plasma proteins and haemoglobin.	CO2
	B	Erythrocytes, jaundice, leucocytes and platelets.	CO2
	C	Blood coagulation, blood groups and immunity	CO2
	Unit 3		CO3
	A	Cardiac Muscle, physiological anatomy of the heart and blood vessels, cardiac cycle.	CO3
	B	Conducting system of heart, Heart sounds and ECG.	CO3
	C	Heart Rate, Cardiac Output, Blood Pressure and Pulse.	CO3
	Unit 4	Respiratory System	CO4
	A	Physiological anatomy and functions of respiratory system, airways, dead space, graph of lung volume and capacities.	CO4
	B	Transport of Gases.	CO4
	C	Regulation of respiration and Hypoxia.	CO4
	Unit 5	Physiological anatomy of GIT	CO5, CO6
	A	Physiological anatomy of GIT, Saliva, Mouth and Oesophagus.	CO5, CO6



B	Stomach, Pancreas, Liver and Gall Bladder.			CO5, CO6
C	Small Intestine, Large Intestine, Digestion and Absorption in GIT.			CO5, CO6
Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	25	25	50	
Text Books	<ol style="list-style-type: none"> 1. Tortora, G.J. and Grabowski, S.R. Principles of Anatomy and Physiology 9th edition, 2000 Collins College Publishers, Luciano, New York 2. Guyton, A.C. and Hall, J.E. W.B. Textbook of Medical Physiology. 9th edition 1996, Sanders Co. New York 3. Ganong WE. Review of Medical Physiology. Appleton and Lange, USA. 4. Chatterjee CC: Human Physiology Latest Ed. Vol-1, Medical Allied Agency. 4. Choudhari Sujith K: Concise Medical Physiology Latest Ed. New Central Book. 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
HPY 101	HUMAN PHYSIOLOGY-I	CO1	3	3	3	3	1	2	3	2	3
		CO2	3	3	2	3	1	2	3	2	2
		CO3	3	3	3	3	2	3	3	1	3
		CO4	3	3	3	3	2	1	2	1	3
		CO5	3	3	3	3	2	3	2	1	3
		CO6	3	3	3	3	1	1	3	1	2
		Avg PO attained	3.0	3.0	2.8	3.0	1.5	2.0	2.66	1.33	2.66



BOC 151: BIOCHEMISTRY-1 LAB

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: I	
1	Course Code	BOC 151	
2	Course Title	BIOCHEMISTRY –I LAB	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To describe the importance of sampling techniques CO2: To explain the importance of different types of glass wares CO3: To define the importance of different types of equipment's CO4: To describe the importance of acid and base CO5: To describe the importance of buffers CO6: Build the ability to understand the properties of different types of reagents	
6	Course Description	<ul style="list-style-type: none">• Introduction of Glassware's• Introduction of Laboratory Equipment's• Safety of measurements in Laboratory,• Preparation of Solutions• Determination of strength of acids and bases	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Laboratory apparatus	CO1, CO2
	A	Introduction to Laboratory apparatus	CO1, CO2
	B	Maintenance of Laboratory apparatus	CO1, CO2
	C	Uses and application of Laboratory apparatus	CO1, CO2
	Unit 2	Laboratory glassware	CO1, CO2, CO4



A	Introduction to Laboratory glassware's		CO1, CO2, CO4
B	Washing and cleaning of glassware		CO1, CO2, CO4
C	Uses and application of glassware		CO1, CO2, CO4
Unit 3	Safety measurements and laboratory Protocol		CO3, CO4, CO4
A	Safety measurements in Biochemistry lab		CO3, CO4, CO4
B	General laboratory protocols		CO3, CO4, CO4
C	Awareness in a lab		CO3, CO4, CO4
Unit 4	Preparation of different concentration		CO4, CO5, CO6
A	Preparation of acids of different concentration		CO4, CO5, CO6
B	Preparation of bases of different concentration		CO4, CO5, CO6
C	Preparation of solutions of different concentration		CO4, CO5, CO6
Unit 5	NaOH, HCL, and NH₄OH Solution		CO4, CO5, CO6
A	Determination of the strength of NaOH solution		CO4, CO5, CO6
B	Determination of the strength of HCl solution		CO4, CO5, CO6
C	Determination of the strength of NH ₄ OH solution		CO4, CO5, CO6
Mode of examination	Practical		
Weightage Distribution	CA	ETE	
	25	75	
Text Books	1. Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 2. Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. 3. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006. 4. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998		



		5. Voet and Voet. Biochemistry.4th edition, John Wiley, 2010.	
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
BOC 151	BIOCHEMISTRY- I (LAB)	CO1	3	3	3	3	1	2	3	2	2
		CO2	3	2	2	3	2	1	2	1	1
		CO3	3	3	3	3	3	1	3	3	2
		CO4	3	3	3	3	3	1	3	2	3
		CO5	3	3	3	3	2	2	3	1	3
		CO6	3	3	3	3	2	2	3	1	2
		Avg PO attained	3.0	2.83	2.8	3.0	2.1	1.5	2.83	1.66	2.16



PAT 151: PATHOLOGY-I LAB

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: I	
1	Course Code	PAT 151	
2	Course Title	PATHOLOGY –I LAB	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To define the importance of Haematology CO2: To explain the importance of ABO blood grouping CO3: To describe the importance of WBC, RBCs, Platelets estimation CO4: To explain the importance of Bleeding time CO5: To define the importance of Clotting time CO6: To explain the advanced centrifugation techniques	
6	Course Description	<ul style="list-style-type: none">• Introduction to Haematology• Laboratory safety guidelines• Estimation of Bleeding time• Estimation of Clotting time• Estimation of Hb and Prothrombin time	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Sahli's and ESR	CO1, CO2
	A	Collection of Blood sample, Plasma separation	CO1, CO2
	B	Hemoglobin (Hb) estimation Sahli 's method	CO1, CO2
	C	Estimation of ESR	CO1, CO2
	Unit 2	Blood Grouping	CO2, CO3, CO4
	A	ABO Blood Grouping	CO2, CO3, CO4



B	Bleeding Time. Clotting Time			CO2, CO3, CO4
C	Differential leukocyte count (DLC) Preparation of blood smear			CO2, CO3, CO4
Unit 3	Blood Cells			CO3, CO4, CO4
A	Total White Blood Cell Count in Blood			CO3, CO4, CO4
B	Total Red Blood Cell Count in Blood			CO3, CO4, CO4
C	Estimation of Platelets count in Blood			CO3, CO4, CO4
Unit 4	BT and CT			CO4, CO6
A	Preparation of EDTA Vials			CO4, CO6
B	Bleeding Time.			CO4, CO6
C	Clotting Time,			CO4, CO6
Unit 5	Centrifuge			CO5, CO6
A	Types of Centrifuges,			CO5, CO6
B	Centrifugation technique			CO5, CO6
C	Principle, Application and uses			CO5, CO6
Mode of examination	Practical			
Weightage Distribution	CA	CE	ETE	
	25	25	50	
Text Books	<ol style="list-style-type: none"> 1. Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 2. Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers 3. Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates 4. Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004 			



Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
PAT 151	PATHOLOGY- I (LAB)	CO1	3	3	3	3	1	2	2	1	1
		CO2	3	3	2	3	1	2	3	1	2
		CO3	3	3	3	3	1	2	3	1	3
		CO4	3	3	3	3	2	1	2	1	2
		CO5	3	3	3	3	2	2	3	1	2
		CO6	3	3	3	3	1	1	3	1	2
		Avg PO attained	3.0	3.0	2.8	3.0	1.3	1.6	2.66	1.0	2.0



1	Course Code	MCB 151		
2	Course Title	MICROBIOLOGY-I (LAB)		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-2		
5	Course Outcomes	CO1: To understand the importance of Staining of bacterial strains CO2: To understand the importance of culture media CO3: To understand the importance of serological tests CO4: To understand the importance of parasite staining CO5: To understand the staining of important bacteria		
6	Course Description	<ul style="list-style-type: none"> • Bacteriology • Virology • Mycology • Parasitology • Bacterial Growth 		
	Practical's			CO mapping
	Unit- 1	a) Gram staining b) Acid fast staining c) Handling of microscope, Use of microscope, Safety measures		CO2, CO3, CO4
	Unit-2	a) Use of culture media b) Nutrient broth, nutrient agar, blood agar c) Demonstration and sterilization of equipments - Hot Air oven, Autoclave, Bacterial filters		CO3, CO4,
	Unit-3	Demonstration of common serological tests - a) Widal, b) HIV c) ELISA		CO3, CO4, CO4
	Unit-4	Slide demonstration of a) Amoebiasis b) Plasmodium		CO5, CO6
	Unit 5	Staining of a) Staphylococci b) Salmonella c) Clostridium		CO5, CO6
	Mode of examination	Theory and Practical		
		CA	MTE	ETE



Weightage Distribution for Theory	25%	25%	50%	
Weightage Distribution for Practical's	CA	MTE	ETE	
	25%	0%	75%	
Text book/s*	<ol style="list-style-type: none">1. Anathanarayana and Panikar Medical Microbiology2. Roberty Cruckshank – Medical Microbiology – The Practice of Medical Microbiology3. Chatterjee – Parasitology – Interpretation to Clinical medicine4. Rippon – Medical Mycology5. Emmons – Medical mycology6. Basic laboratory methods in Parasitology, 1st Ed, J P Bros, New Delhi7. Basic laboratory procedures in clinical bacteriology, 1st Ed, J P Brothers8. Medical Parasitology – Ajit Damle			

CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	2	3
CO6	3	3	3	3	3	3



HAN 151: -HUMAN ANATOMY-1 LAB

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: I	
1	Course Code	HAN 151	
2	Course Title	HUMAN ANATOMY-I LAB	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To explain about Anatomy and its importance CO2: To describe the importance of epithelium, cartilage and bones CO3: To define the importance of skeletal (TS and LS), smooth and cardiac muscle CO4: To analyze the importance of artery, vein, lymph node, spleen, tonsil and thymus CO5: To explain the importance of respiratory system CO6: To know the applied aspects of various systems of human body.	
6	Course Description	<ul style="list-style-type: none">• Histology of types of epithelium, serous, mucus and mixed salivary gland• Histology of cartilages, bones• Histology of skeletal (TS and LS), smooth and cardiac muscle• Histology of artery, vein, lymph node, spleen, tonsil and thymus• Demonstration of parts of respiratory system and histology of lung and trachea	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Epithelium and salivary gland	CO1
	A	Histology of epithelium and salivary gland,	CO1
	B	Histology of cartilage, compact and cancellous bone.	CO1



	C	Histology of muscle tissue.		CO1
	Unit 2	Bones and Joints		CO2
	A	Demonstration of all bone.		CO2
	B	Radiograph of bones and joints.		CO2
	C	Demonstration of all body muscles		CO2
	Unit 3	Lymph Node		CO3
	A	Histology of vessels.		CO3
	B	Histology of lymph node		CO3
	C	Histology of spleen.		CO3
	Unit 4	Tonsil and Thymus		CO4, CO6
	A	Histology of tonsil and thymus		CO4, CO6
	B	Demonstration of heart and related structure		CO4, CO6
	C	Radiograph related to heart		CO4, CO6
	Unit 5	Lungs Structure		CO5, CO6
	A	Demonstration of lung		CO5, CO6
	B	Demonstration of lung related structure.		CO5, CO6
	C	Radiograph related to lungs.		CO5, CO6
	Mode of examination	Practical		
	Weightage Distribution	CA	CE	ETE
		25	25	50



	Text Books	<ol style="list-style-type: none"> 1. Tortora, G.J. and Grabowski, S.R. Principles of Anatomy and Physiology 9th edition, 2000 Collins College Publishers, Luciano, New York 2. Guyton, A.C. and Hall, J.E. W.B. Textbook of Medical Physiology. 9th edition 1996, Sanders Co. New York 3. Ganong WE. Review of Medical Physiology. Appleton and Lange, USA. 	
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
HAN 151	HUMAN ANATOMY-I (LAB)	CO1	3	3	3	3	2	3	2	3	3
		CO2	3	3	2	3	3	3	2	2	3
		CO3	3	3	3	3	2	1	3	3	3
		CO4	3	3	3	3	2	3	2	2	3
		CO5	3	3	3	3	2	2	3	1	3
		CO6	3	3	3	3	1	1	2	2	3
		Avg PO attained	3.0	3.0	2.8	3.0	2.0	2.1	2.33	2.16	3.0



HPY 151: -HUMAN PHYSIOLOGY-1 LAB

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: I	
1	Course Code	HPY 151	
2	Course Title	HUMAN PHYSIOLOGY-I LAB	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To explain about Physiology and its importance CO2: To define the importance of Compound microscope CO3: To describe the importance of haemoglobin estimation CO4: To explain the importance of blood group detection CO5: To explain the importance of Total Red Blood Cell Count and total Leucocyte Count CO6: To define the importance of ESR and PCV	
6	Course Description	<ul style="list-style-type: none">• Study of Compound Microscope• Estimation of Haemoglobin Concentration• Total Red Blood Cell Count.• Total Leucocyte Count.• BT, CT, Blood Group Estimation and Demonstration of ESR and PCV.	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Study of Compound Microscope	CO1
	A	Briefing	CO1
	B	Demonstration	CO1
	C	Practical	CO1
	Unit 2	Estimation of Haemoglobin Concentration	CO2



A	Briefing			CO2
B	Demonstration			CO2
C	Practical			CO2
Unit 3	Total Red Blood Cell Count and			CO3
A	Briefing			CO3
B	Demonstration			CO3
C	Practical			CO3
Unit 4	Total Leucocyte Count			CO4, CO6
A	Briefing			CO4, CO6
B	Demonstration			CO4, CO6
C	Practical			CO4, CO6
Unit 5	Bleeding Time, Clotting Time, Blood Group Estimation and Demonstration of ESR and PCV.			CO5, CO6
A	BT and CT			CO5, CO6
B	Blood Groups			CO5, CO6
C	Demonstration of ESR and PCV			CO5, CO6
Mode of examination	Practical			
Weightage Distribution	CA	CE	ETE	
	25	25	50	
Text Books	1. William Davis (P): Understanding Human Anatomy and Physiology MC Graw Hill 2. Chaurasia: A Suggested Readings/ Books: of Anatomy 3. T.S. Ranganathan: A Suggested Readings/ Books: of Human Anatomy			



	<p>4. Fattana: Human anatomy(Description and applied) Saunder's and C P Prism Publishers, Bangalore – 1991</p> <p>5. Ester M Griscimer: Physiology and Anatomy with Practical Considerations, J.P. LippinCott. Philadelphia.</p> <p>6. Bhatnagar: Essentials of Human embryology. Revised Edition Orient Blackswan Pvt. Ltd.</p> <p>7. Tortora, G.J. and Grabowski, S.R.Principles of Anatomy and Physiology 9th edition,2000 Collins College Publishers, Luciano, New York</p>	
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
HPY 151	HUMAN ANATOMY-I (LAB)	CO1	3	3	3	3	2	3	2	3	3
		CO2	3	3	2	3	3	3	2	2	3
		CO3	3	3	3	3	2	1	3	3	3
		CO4	3	3	3	3	2	3	2	2	3
		CO5	3	3	3	3	2	2	3	1	3
		CO6	3	3	3	3	1	1	2	2	3
		Avg PO attained	3.0	3.0	2.8	3.0	2.0	2.1	2.33	2.16	3.0



Schools: SSSAHS		Batch : 2023-2027	
		Academic Year: 2023-2024	
		Semester: I	
1	Course Code	ARP101	
2	Course Title	Communicative English-1	
3	Credits	2	
4	Contact Hours (L-T-P)	0-1-2	
5	Course Objective	To minimize the linguistic barriers that emerges in varied socio-linguistic environments through the use of English. Help students to understand different accents and standardise their existing English. Guide the students to hone the basic communication skills - listening, speaking, reading and writing while also uplifting their perception of themselves, giving them self-confidence and building positive attitude.	
6	Course Outcomes	<p>After completion of this course, students will be able to:</p> <p>CO1 Develop a better understanding of advanced grammar rules and write grammatically correct sentences</p> <p>CO2 Acquire wide vocabulary and punctuation rules and learn strategies for error-free communication.</p> <p>CO3 Interpret texts, pictures and improve both reading and writing skills which would help them in their academic as well as professional career</p> <p>CO4 Comprehend language and improve speaking skills in academic and social contexts</p> <p>CO5 Develop, share and maximise new ideas with the concept of brainstorming and the documentation of key critical thoughts articulated towards preparing for a career based on their potentials and availability of opportunities.</p> <p>CO6 Function effectively in multi-disciplinary teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality</p>	
7	Course Description	The course is designed to equip students, who are at a very basic level of language comprehension, to communicate and work with ease in varied workplace environment. The course begins with basic grammar structure and pronunciation patterns, leading up to apprehension of oneself through written and verbal expression as a first step towards greater employability.	
8	Outline syllabus - ARP 101		
	Unit A	Sentence Structure	CO Mapping
	Topic 1	Subject Verb Agreement	CO1
	Topic 2	Parts of speech	
	Topic 3	Writing well-formed sentences	
	Unit B	Vocabulary Building and Punctuation	



	Topic 1	Homonyms/ homophones, Synonyms/Antonyms	CO1, CO2
	Topic 2	Punctuation/ Spellings (Prefixes-suffixes/Unjumbled Words)	CO1, CO2
	Topic 3	Conjunctions/Compound Sentences	CO1, CO2
	Unit C	Writing Skills	
	Topic 1	Picture Description – Student Group Activity	CO3
	Topic 2	Positive Thinking - Dead Poets Society-Full-length feature film - Paragraph Writing inculcating the positive attitude of a learner through the movie SWOT Analysis – Know yourself	CO3, CO2, CO3
	Topic 3	Story Completion Exercise –Building positive attitude - The Man from Earth (Watching a Full length Feature Film)	CO2, CO3
	Topic 4	Digital Literacy Effective Use of Social Media	CO3
	Unit D	Speaking Skill	
	Topic 1	Self-introduction/Greeting/Meeting people – Self branding	CO4
	Topic 2	Describing people and situations - To Sir With Love (Watching a Full length Feature Film)	CO4
	Topic 3	Dialogues/conversations (Situation based Role Plays)	CO4
	Unit E	Professional Skills Career Skills	
	Topic 1	Exploring Career Opportunities	CO4, CO5
	Topic 2	Brainstorming Techniques and Models	CO4, CO5
	Topic 3	Social and Cultural Etiquettes	CO4, CO5
	Topic 4	Internal Communication	CO4, CO5
	Unit F	Leadership and Management Skills	
	Topic 1	Managerial Skills	CO6
	Topic 2	Entrepreneurial Skills	CO6
9	Evaluations	<i>Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE</i>	N/A
10	Texts and References Library Links	<ul style="list-style-type: none"> Blum, M. Rosen. <i>How to Build Better Vocabulary</i>. London: Bloomsbury Publication Comfort, Jeremy (et.al). <i>Speaking Effectively</i>. Cambridge University Press 	



COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PS O1	PSO 2	PSO 3
ARP101.1	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.2	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.3	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP101.5	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP101.6	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-



BOC 201: BIOCHEMISTRY- II

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: 2	
1	Course Code	BOC 201	
2	Course Title	BIOCHEMISTRY –II	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To train the students in the management of medical laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment's used in modern medical laboratories.• To make the students able to do routine laboratory testing under stipulated conditions.• To prepare specimens and operate machines that automatically analyse samples.• To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life.• To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To explain the importance of amino acid chemistry CO2: To describe the importance of Enzymes CO3: To define the importance of Minerals CO4: To explain the importance of vitamins CO5: To analyze the importance of cell biology and chemistry of nucleic acid CO6: To apply and analyze the importance of cellular constituents and cell biology	
7	Course Description	<ul style="list-style-type: none">• Amino-acid Chemistry• Enzymes• Mineral metabolism• Vitamins Cell Biology, Nucleotide and Nucleic acid Chemistry	



7	Outline syllabus	Theory	CO mapping
	Unit 1	Amino-acid Chemistry	CO1, CO2
	A	Amino acid chemistry: Definition, Classification, Peptide bonds. Peptides: Definition, Biologically important peptides.	CO1, CO2
	B	Protein chemistry: Definition, Classification, Functions of proteins,	CO1, CO2
	C	Primary, Secondary, tertiary and quaternary structure of proteins	CO1, CO2
	Unit 2	Enzymes	CO1, CO2, CO3
	A	Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity.	CO1, CO2, CO3
	B	Enzyme inhibition and significance,	CO1, CO2, CO3
	C	Isoenzymes, Diagnostic enzymology (clinical significance of enzymes)	CO1, CO2, CO3
	Unit 3	Mineral metabolism	CO2, CO3, CO6
	A	Definition, Sources, RDA, absorption, transport, and excretion of various minerals.	CO2, CO3, CO6
	B	Functions of various minerals	CO2, CO3, CO6
	C	Disorder of various minerals (Sodium, Potassium, Calcium, Phosphate, Sulphur, Iron, Magnesium, Fluoride, Selenium, Zinc and Copper)	CO2, CO3, CO6
	Unit 4	Vitamins	CO4, CO5
	A	Definition, classification according to solubility, Sources and Coenzyme forms of different vitamins	CO4, CO5
	B	Functions, RDA, digestion, absorption and transport of various vitamins.	CO4, CO5
	C	Deficiency and toxicity of various vitamins	CO4, CO5
	Unit 5	Cell Biology, Nucleotide and Nucleic acid Chemistry	CO5, CO6
	A	Cell structure, Cell membrane structure and function, various types of absorption. Intracellular organelles and their functions, briefly on cytoskeleton.	CO5, CO6
	B	Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body.	CO5, CO6



C	Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.			CO5, CO6
Mode of examination	Practical			
Weightage Distribution	CA	MTE	ETE	
	25	25	50	
Text Books	<ol style="list-style-type: none"> Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998 Voet and Voet. Biochemistry.4th edition, John Wiley, 2010. 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
BOC201	BIOCHEMISTRY- II	CO1	3	3	3	3	1	1	3	2	3
		CO2	3	2	2	3	1	1	2	1	2
		CO3	3	3	3	3	1	1	3	1	1
		CO4	3	3	3	3	1	1	3	2	1
		CO5	3	3	3	3	2	1	3	1	1
		CO6	3	3	3	3	2	1	3	1	2
		Avg PO attained	3.0	2.83	2.8	3.0	1.3	1.0	2.83	1.33	1.66



PAT 201: PATAHOLOGY- II

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: 2	
1	Course Code	PAT 201	
2	Course Title	PATHOLOGY II	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for laboratory technologists.• The content of rigorous course provide knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis.• It also provide knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease.• The student will be able to properly order and interpret hematologic and coagulation tests, including CBC's, PT's, INR's, and APTT's, for the proper diagnosis and effective treatment of patients with hematologic, bleeding, and thrombotic disorders.	
6	Course Outcomes	CO1: To define the importance of Histopathology CO2: To explain the importance of Grossing and mounting techniques CO3: To describe the importance of Clinical pathology CO4: To analyze the importance of Urine examination CO5: To define the importance of examination of body fluids CO6: To analyze the importance of embedding and mounting techniques	
7	Course Description	<ul style="list-style-type: none">• Introduction to Histopathology• Grossing and mounting techniques• Clinical pathology• Urine collection and examination	



		<ul style="list-style-type: none"> Examination of body fluid 	
7	Outline syllabus	Theory	CO mapping
	Unit 1	Introduction To Histopathology, Microscopy, Equipments	CO1, CO2
	A	Introduction to histopathology and laboratory organization, Laboratory equipment, uses and maintenance, Laboratory hazards and safety precautions.	CO1, CO2
	B	Types of Microscope: Compound microscope-optical system, magnification, and maintenance	CO1, CO2
	C	Microtome -Types, Uses, Parts, different types of microtome knives, care and maintenance. Automated tissue processor components, working and precautions during use, Tissue floating bath	CO1, CO2
	Unit 2	Tissue processing	CO2, CO3, CO4
	A	Processing of histological tissues	CO2, CO3, CO4
	B	Reception, Recording and labeling of tissue specimens, Fixation, and various simple fixatives	CO2, CO3, CO4
	C	Processing of histological tissues for paraffin embedding, Embedding, and embedding media, Decalcification.	CO2, CO3, CO4
	Unit 3	Various Microtomes, uses and application	CO3, CO6
	A	Microtomes-various types, their working principle and maintenance, Microtomes knives and knife sharpening (honing and stropping) cutting faults and remedies	CO3, CO6
	B	Dye Chemistry, Theory and practice of staining-Hematoxylin and Eosin	CO3, CO6
	C	Introduction, Preparation and Fixation of specimen- Kaiserling solution-1 and Kaiserling solution-2 Precaution taken for the Fixation of Specimens.The mounting of pathological specimens, Storage of Specimens. Mounting of Museum Specimens	CO3, CO6
	Unit 4	Fixation	CO4, CO5
	A	Introduction, Preparation and Fixation of specimen	CO4, CO5
	B	Precaution taken for the Fixation of Specimens.	CO4, CO5
	C	The mounting of pathological specimens,	CO4, CO5
	Unit 5	Embedding and mounting	CO5, CO6



A	1. Processing of histological tissues for paraffin embedding, Embedding, and embedding media,	CO5, CO6
B	2. Decalcification	CO5, CO6
C	3. Storage of Specimens. Mounting of Museum Specimens	CO5, CO6
Mode of examination	Theory	
Weightage Distribution	CA	MTE
	25	25
		ETE
		50
Text Books	<ul style="list-style-type: none"> • Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 • Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers • Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates • Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004 • Histopathology Techniques by Culling • Cytology by Koss 	

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
PAT 201	PATHOLOGY- II	CO1	3	3	3	3	2	1	3	3	1
		CO2	3	3	2	3	2	1	3	2	1
		CO3	3	3	3	3	2	1	3	3	1
		CO4	3	3	2	3	2	1	3	3	1
		CO5	3	3	3	3	2	1	3	3	1
		CO6	3	3	3	3	2	1	3	3	1
		Avg PO attained	3.0	3.0	2.6	3.0	2.0	1.0	3.0	2.83	1.0



School: SSAHS		Batch : 2023-27	
Programme:		Current Academic Year: 2023-24	
Branch:		Semester: 2	
1	Course Code	MCB 201	
2	Course Title	MICROBIOLOGY-II	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
Course Status		Compulsory	
5	Course Objective	<ol style="list-style-type: none"> 1. Able to collect and dispatch specimen for routine investigation 2. Able to interpret commonly done bacteriological and serological investigations 3. Able to control hospital infections 4. Able to manage biomedical waste management 5. Able to understand immunisation schedule 	
6	Course Outcomes	CO1: To understand the Systemic Bacteriology CO2: To understand the importance of Virology CO3: To understand the importance of Mycology CO4: To understand the importance of Parasitology CO5: To understand the importance of Hospital acquired infection	
7	Course Description	<ul style="list-style-type: none"> • Classification, growth and nutrition of microorganism • Systemic bacteriology • Parasitology • Mycology • Virology • Hospital infection, Biomedical waste management 	
8	Outline syllabus		CO mapping
	Theory		
	Unit 1	Systemic Bacteriology	
	A	Morphology, cultivation, diseases caused ,laboratory diagnosis including specimen collection of the following bacteria(the classification, antigenic structure and pathogenicity are not to be taught)	CO1
	B	Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci,	CO1



	C	C. Diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, Escherichia coli, Klebsiella, Proteus, vibrio cholerae, Pseudomonas and Spirochetes	CO1
	Unit 2	Virology	
	A	Virology: Introduction, classification, general features, pathogenicity, diagnosis, treatment and prevention.	CO2
	B	Taxonomy and general features of viruses	CO2
	C	Cultivation of virus, Orthomyxovirus, Paramyxovirus, Hepatitis, Herpesvirus, HIV	CO2,CO3,CO4
	Unit 3	Mycology	
	A	Mycology: Introduction and classification	CO3,CO4,CO5
	B	General features of fungus Opportunistic fungi Subcutaneous and Systemic mycoses	CO5,CO6,
	C	Morphology, diseases caused and lab diagnosis of following fungi , Candida, Cryptococcus, Dermatophytes	CO3,CO4,CO5
	Unit 4	Parasitology	
	A	Parasitology: Introduction and classification and general features of parasites	CO4,CO5
	B	Pathogenicity, diagnosis, treatment and prevention of parasites, Plasmodium, Amoebiasis,	CO4,CO6
	C	Pathogenicity, diagnosis, treatment and prevention of parasites Roundworm, Hookworm, Giardiasis	CO4,CO5
	Unit 5	Hospital acquired infection	
	A	Definition of Hospital acquired infection , Investigation prevention and control of Hospital infection.	CO5,CO6
	B	Causative agents, transmission methods of Hospital acquired infection	CO5,CO6
	C	Biomedical waste management, Principle Practice an applications.	CO5,CO6



HAN 201 – HUMAN ANATOMY-II

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: 2	
1	Course Code	HAN 201	
2	Course Title	HUMAN ANATOMY-II	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To provide an opportunity for lab technologists who distinguish themselves in Human Anatomy - dissection consistency, theoretical knowledge and knowledge application, to undertake research based training in Anatomy.• To capture distinguished medical students and offer them such training as would enable them to sub-specialize in anatomy at an early stage of their career.• To develop as research scientists and research based teachers for schools of allied health sciences both locally and externally.• It also strengthens the research foundation of the students with broad vision of leading in research based teaching of anatomy and stimulates the research attitudes and aptitudes of students.	
6	Course Outcomes	CO1: To describe the anatomy of Urinary system CO2: To explain the importance of Reproductive system CO3: To define the position and function of Endocrine glands CO4: To explain the importance of parts of Nervous system CO5: To analyze the importance and location of sensory organs CO6: To explain the applied anatomy of various systems of human body.	
7	Course Description	<ul style="list-style-type: none">• Urinary system• Reproductive system• Endocrine glands• Nervous system	



		<ul style="list-style-type: none">Sensory organs	
7	Outline syllabus	Theory	CO mapping
	Unit 1	Urinary system	CO1, CO2
	A	Description in brief Urinary system	CO1, CO2
	B	Kidney, ureter, urinary bladder, male and female urethra	CO1, CO3
	C	Histology of kidney, ureter and urinary bladder	CO1, CO2
	Unit 2	Reproductive system	CO2
	A	Parts of male reproductive system, testis, vasdeferens and epididymis (gross and histology)	CO2
	B	Parts of female reproductive system, ovary (gross and histology), fallopian tube, uterus and mammary gland gross.	CO2
	C	Embryology: gametogenesis, ovulation, fertilization. Prostate gland, Mammary gland, Fetal circulation, Placenta.	CO2
	Unit 3	Endocrine glands	CO3, CO6
	A	Name of all endocrine glands in detail	CO3, CO6
	B	Pituitary gland and thyroid gland in detail	CO3, CO6
	C	Parathyroid gland, suprarenal gland (gross and histology)	CO3, CO6
	Unit 4	Nervous system	CO4
	A	Neuron, Classification of Nervous system, Cerebrum, cerebellum, midbrain, pons, medulla oblongata.	CO4
	B	Spinal cord with spinal nerve, Meninges, Ventricles and cerebrospinal fluid	CO4
	C	Names of basal nuclei, Blood supply of brain, Cranial nerves, Sympathetic trunk and parasympathetic ganglia	CO4
	Unit 5	Sensory organ	CO5, CO6
	A	Skin: Skin histology, Appendages of skin	CO5, CO6
	B	Eye: parts of eye, extra ocular muscle and blood supply	CO5, CO6
	C	Ear: parts of external, middle and internal ear with contents.	CO5, CO6



Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	25	25	50	
Text Books	1. Tortora, G.J. and Grabowski, S.R. Principles of Anatomy and Physiology 9th edition, 2000 Collins College Publishers, Luciano, New York 2. Guyton, A.C. and Hall, J.E. W.B. Textbook of Medical Physiology. 9th edition 1996, Sanders Co. New York 3. Ganong WE. Review of Medical Physiology. Appleton and Lange, USA.			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
HAN 201	HUMAN ANATOMY-II	CO1	3	3	3	3	1	1	3	3	2
		CO2	3	3	2	3	1	1	3	2	2
		CO3	3	3	3	3	1	1	2	3	2
		CO4	3	3	3	3	1	1	3	3	2
		CO5	3	3	3	3	1	1	3	3	2
		CO6	3	3	3	3	1	1	2	3	2
		Avg PO attained	3.0	3.0	2.8	3.0	1.0	1.0	2.66	2.83	2.0



HPY 201 – HUMAN PHYSIOLOGY-II

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: 2	
1	Course Code	HPY 201	
2	Course Title	HUMAN PHYSIOLOGY-II	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To learn and understand the fundamental scientific concepts relating to a broad range of topics in human physiology.• To make the students familiar with the basic factual information concerning the mechanisms and functioning of humans body system.• To develop investigative skills and to become familiar with standard techniques of measurement.• To help the students to gain practice and confidence in applying this knowledge, in a quantitative manner where appropriate, to actual experiments.	
6	Course Outcomes	CO1:To define the physiology of the different system of the human body CO2: To explain the importance, function and function of Excretory system of body CO3:To get the information about Endocrine system CO4: To describe the Nervous system and its function CO5: To explain the reproductive system and its function CO6:To analyze about special senses of the body	
7	Course Description	<ul style="list-style-type: none">• Physiology of Excretion system• Endocrine system• Nervous system• Reproductive system• Special Senses	
7	Outline syllabus	Theory	CO mapping
	Unit 1	Excretory system	CO1



A	Physiological anatomy of kidney, structure and functions of excretory system, structure of nephron.		CO1
B	Mechanism of formation of Urine. and mechanism of concentration and dilution of urine.		CO1
C	The Counter Current System: Physiology of micturition and Regulation of Body Temperature in Humans.		CO1
Unit 2	Endocrine system		CO2
A	General principles of endocrinology, The pituitary Gland.		CO2
B	The Thyroid Gland, The parathyroid, Calcitonin and Vitamin D		CO2
C	The Adrenal Cortex and Pancreas.		CO2
Unit 3	Reproductive system		CO3
A	Changes during Puberty, Classification of Male sex hormones and their functions, Spermatogenesis and semen.		CO3
B	Changes during Puberty, Classification and Functions of female sex hormones, menstruation, ovulation and contraception.		CO3
C	Physiological changes during pregnancy, functions of placenta and physiology of lactation.		CO3
Unit 4	Nervous system		CO4
A	Organisation of Nervous system, The Synapse , Physiology of receptor organs for special and general sensation, physiology of reflex action, classification and properties of reflexes.		CO4
B	Intro to Sensory and motor system. Functions of hypothalamus, thalamus, basal ganglia, cerebrum and cerebellum.		CO4
C	Autonomic nervous system, Cerebrospinal Fluid and Blood Brain Barrier.		CO4
Unit 5	Special Senses		CO5, CO6
A	Taste and Olfaction.		CO5, CO6
B	Vision—structure and function of eye, errors of refraction and their correction. Colour blindness.		CO5, CO6
C	Hearing—structure and function of ear, general outline of mechanism of hearing and perception of sound.		CO5, CO6
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE



		25	25	50	
	Text Books	<ol style="list-style-type: none"> 1. William Davis (P): Understanding Human Anatomy and Physiology MC Graw Hill 2. T.S. Ranganathan: A Suggested Readings/ Books: of Human Anatomy 3. Fattana: Human anatomy(Description and applied) Saunder's and C P Prism Publishers, Bangalore – 1991 4. Ester M Grishcimer: Physiology and Anatomy with Practical Considerations, J.P. LippinCott. Philadelphia. 5. Bhatnagar: Essentials of Human embryology. Revised Edition Orient Blackswan Pvt. Ltd. 6. Tortora, G.J. and Grabowski, S.R.Principles of Anatomy and Physiology 9thedition,2000 Collins College Publishers, Luciano, New York 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
HPY 201	HUMAN PHYSIOLOGY-II	CO1	3	3	3	3	3	3	3	3	3
		CO2	3	3	2	3	3	3	3	3	3
		CO3	3	3	3	3	3	3	2	3	3
		CO4	3	3	3	3	3	3	3	3	3
		CO5	3	3	3	3	2	3	3	3	3
		CO6	3	3	3	3	3	3	3	3	3
		Avg PO attained	3.0	3.0	2.8	3.0	2.8	3.0	2.83	3.0	3.0



BOC 251: - BIOCHEMISTRY-11 LAB

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: II	
1	Course Code	BOC 251	
2	Course Title	BIOCHEMISTRY-II LAB	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To describe the importance of different types of acids CO2: To explain the importance of different types of bases CO3: To define the importance of different types of solutions CO4: To explain the importance of carbohydrates CO5: To define the importance of proteins CO6: To explain various ways to identify the biomolecules	
6	Course Description	<ul style="list-style-type: none">• Preparation of acids of different concentration:• Preparation of bases of different concentration:• Preparation of solutions of different concentration:• Qualitative analysis of Carbohydrates• Qualitative analysis of Proteins	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Acids of different Concentration	CO1, CO2
	A	a. Preparation of acids of different concentration-1	CO1,CO2
	B	b. Preparation of acids of different concentration-2	CO1, CO2
	C	Preparation of acids of different concentration-3	CO1, CO2
	Unit 2	Bases of different concentration	CO1, CO2, CO4
	A	Preparation of bases of different concentration-1	CO1, CO2, CO4



B	Preparation of bases of different concentration-2			CO1, CO2, CO4
C	Preparation of bases of different concentration-3			CO1, CO2, CO4
Unit 3	Solutions of different concentration			CO1, CO3, CO4
A	Preparation of solutions of different concentration-1			CO1, CO3, CO4
B	Preparation of solutions of different concentration-2			CO1, CO3, CO4
C	Preparation of solutions of different concentration-			CO1, CO3, CO4
Unit 4	Carbohydrates			CO4, CO5, CO6
A	Qualitative analysis of Carbohydrates-1			CO4, CO5, CO6
B	Qualitative analysis of Carbohydrates-2			CO4, CO5, CO6
C	Qualitative analysis of Carbohydrates-3			CO4, CO5, CO6
Unit 5	Proteins			CO4, CO5, CO6
A	Qualitative analysis of Proteins -1			CO4, CO5, CO6
B	Qualitative analysis of Proteins-2			CO4, CO5, CO6
C	Qualitative analysis of Proteins -3			CO4, CO5, CO6
Mode of examination	Practical			
Weightage Distribution	CA	CE	ETE	
	25	25	50	
Text Books	1. Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 2. Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. 3. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006. 4. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998			



		5. Voet and Voet. Biochemistry.4th edition, John Wiley, 2010.	
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
BOC251	BIOCHEMISTRY- II (LAB)	CO1	3	3	3	3	2	2	3	2	1
		CO2	3	2	2	3	2	2	2	2	2
		CO3	3	3	3	3	2	2	3	2	3
		CO4	3	3	3	3	2	2	3	2	1
		CO5	3	3	3	3	2	2	3	2	3
		CO6	3	3	3	3	2	2	3	2	1
		Avg PO attained	3.0	2.83	2.8	3.0	2.0	2.0	2.83	2.0	1.83



PAT 251: - PATHOLOGY-II LAB

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: II	
1	Course Code	PAT 251	
2	Course Title	PATHOLOGY-II LAB	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To define the importance of Histopathology testing CO2: To explain the importance of instruments in Histopathology CO3: To describe the importance of section cutting CO4: To define the importance of Tissue processing CO5: To analyze the importance of tissue staining CO6: To explain the importance of HandE staining	
6	Course Description	<ul style="list-style-type: none">• Histopathology• Instrumentation in histopathology• Section cutting• Tissue processing for routine paraffin sections• Staining of tissues-H and E staining	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Instruments of Histopathology-1	CO1, CO2
	A	To demonstrate organization of histopathology Laboratory	CO1,CO2
	B	To Study the principle and use of various instrument in histopathology laboratory	CO1, CO2
	C	Microscope, Microtome, microtome blades	CO1, CO2
	Unit 2	Instruments of Histopathology-II	CO1, CO2, CO4
	A	To Study the principle and use of wax bath, slide warmer, tissue floating bath, digital balance used in histopathology laboratory	CO1, CO2, CO4



B	To demonstrate principle, construction and working of Compound microscope			CO1, CO2, CO4
C	Electron Microscope			CO1, CO2, CO4
Unit 3	Fixation			CO1, CO3, CO4
A	Process of reception, recording and labeling of various histopathology specimen.			CO1, CO3, CO4
B	To prepare various fixatives			CO1, CO3, CO4
C	Demonstrate the process of tissue fixation in Histopathology.			CO1, CO3, CO4
Unit 4	Embedding			CO4, CO5, CO6
A	To demonstrate the principle and method of tissue embedding using paraffin wax.			CO4, CO5, CO6
B	To demonstrate the process of decalcification of calcified tissue before processing.			CO4, CO5, CO6
C	To demonstrate the process of Washing and preparation of wash buffer			CO4, CO5, CO6
Unit 5	Microtomy			CO5, CO6
A	To study principle, working, maintenance of Microtome and Honing and stropping techniques			CO5, CO6
B	Used for correcting fault and remedies of microtome knives			CO5, CO6
C	To demonstrate principle and method of Hematoxylin and eosin staining techniques			CO5, CO6
Mode of examination	Practical			
Weightage Distribution	CA	CE	ETE	
	25	25	50	
Text Books	<ol style="list-style-type: none"> 1. Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 2. Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers 3. Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates 			



		<ol style="list-style-type: none">4. Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 20045. An Introduction to medical laboratory technology, F.J. Baker et al., Butter works and co. , London.6. Bancroft and Stevens ,Theory and practice of Histological Techniques, Butterworth's London	
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
PAT 251	PATHOLOGY- II	CO1	3	3	3	3	2	1	3	3	1
		CO2	3	3	2	3	2	1	3	2	1
		CO3	3	3	3	3	2	1	3	3	1
		CO4	3	3	2	3	2	1	3	3	1
		CO5	3	3	3	3	2	1	3	3	1
		CO6	3	3	3	3	2	1	3	3	1
		Avg PO attained	3.0	3.0	2.66	3.0	2.0	1.0	3.0	2.83	1.0



1	Course Code	MCB 251	
2	Course Title	MICROBIOLOGY–II (LAB)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
5	Course Outcomes	CO1: To understand the importance of Staining of bacterial strains CO2: To understand the importance of Viral infections CO3: To understand the importance of Fungal infections CO4: To understand the importance of parasite staining CO5: To understand the importance of biomedical waste management through visit	
6	Course Description	<ul style="list-style-type: none"> • Bacteriology • Virology • Mycology • Parasitology • Hospital acquired infections 	
	Practical's		CO mapping
	Unit- 1	Staining of a) Staphylococci b) Bacillus c) Pseudomonas	CO1,CO3
	Unit-2	Lab diagnosis of a) Herpes b) Hepatitis, HIV, Rabies c) Poliomyelitis	CO2,CO3
	Unit-3	Lab diagnosis of a) candida, Cryptococcus b) dermatophytes c) opportunistic fungi	CO3,CO4,CO5
	Unit-4	Stool examination for a) Ova b) Cyst c) Parasite	CO4,CO5,CO6
	Unit 5	a) Visit to hospital for demonstration of biomedical waste management-1 (Observation)	CO5,CO6



		b) Visit to hospital for demonstration of biomedical waste management-2 (Working) c) Visit to hospital for demonstration of biomedical waste management-3 (Disposal)			
	Mode of examination	Theory and Practical			
	Weightage Distribution for Theory	CA	MTE	ETE	
		25%	25%	50%	
	Weightage Distribution for Practical's	CA	MTE	ETE	
		25%	0%	75%	
	Text book/s*	9. Anathanarayana and Panikar Medical Microbiology 10. Roberty Cruckshank – Medical Microbiology – The Practice of Medical Microbiology 11. Chatterjee – Parasitology – Interpretation to Clinical medicine 12. Rippon – Medical Mycology 13. Emmons – Medical mycology 14. Basic laboratory methods in Parasitology, 1 st Ed, J P Bros, New Delhi 15. Basic laboratory procedures in clinical bacteriology, 1 st Ed, J P Brothers 16. Medical Parasitology – Ajit Damle			

CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	2	3



HAN 251 – HUMAN ANATOMY-II (LAB)

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: II	
1	Course Code	HAN 251	
2	Course Title	HUMAN ANATOMY –II (LAB)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To define about the importance of urinary system CO2: To describe the location and importance of glands CO3: To explain the importance and role of different types of nerves CO4: To define the importance and parts of Brain CO5: To describe the importance and location of Sensory organs CO6: To analyze and applied aspects of various systems of human body.	
6	Course Description	<ul style="list-style-type: none">• Reflections and urinary system• Different types of endocrine glands• Different types of nerves• Brain and its part along with function• Sensory organs such as skin and eye	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Urinary Tract Infection	CO1, CO6
	A	Demonstration of parts of urinary system	CO1, CO6
	B	Histology of kidney, ureter and urinary bladder	CO1, CO6
	C	Radiograph related to urinary system	CO1, CO6
	Unit 2	Reproductive System	CO2
	A	Demonstration of reproductive organ	CO2



B	Radiograph related to reproductive system		CO2
C	Function of reproductive organ		CO2
Unit 3	Eye Ball		CO3
A	Demonstration of eyeball		CO3
B	Histology of eyeball		CO3
C	Structure of eyeball		CO3
Unit 4	Glands		CO4, CO6
A	Demonstration of glands		CO4 , CO6
B	Histology of pituitary gland and thyroid gland.		CO4, CO6
C	Histology of parathyroid and suprarenal gland.		CO4, CO6
Unit 5	Skin		CO5, CO6
A	Histology of thick skin		CO5, CO6
B	Histology of thin skin		CO5, CO6
C	Demonstration of brain and spinal cord		CO5, CO6
Mode of examination	Practical		
Weightage Distribution	CA	ETE	
	25	75	
Text Books	<ol style="list-style-type: none"> 1. Tortora, G.J. and Grabowski, S.R. Principles of Anatomy and Physiology 9 thedition,2000 Collins College Publishers, Luciano, New York 2. Guyton, A.C. and Hall, J.E. W.B. Textbook of Medical Physiology.9th edition1996,Sanders Co.New York 3. Ganong WE. Review of Medical Physiology. Appleton and Lange, USA. 		



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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
HAN 251	HUMAN ANATOMY-II (LAB)	CO1	3	3	3	3	2	1	3	2	1
		CO2	3	3	2	3	2	1	3	1	1
		CO3	3	3	3	3	2	3	3	1	1
		CO4	3	3	3	3	2	2	3	2	1
		CO5	3	3	3	3	2	1	3	2	1
		CO6	3	3	3	3	2	2	3	1	1
		Avg PO attained	3.0	3.0	2.83	3.0	2.0	1.66	3.0	1.5	1.0



HPY 251 – HUMAN PHYSIOLOGY-II (LAB)

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: II	
1	Course Code	HPY 251	
2	Course Title	HUMAN PHYSIOLOGY –II (LAB)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
Course Status		Compulsory	
5	Course Outcomes	CO1: To define about importance of DLC estimation CO2: To explain the importance of TLC estimation CO3: To describe the importance of arterial blood pressure measurement CO4: To define the importance of Radial pulse measurement CO5: To define the importance of Blood indices measurement CO6: To apply the importance of hematology and clinical physiology.	
6	Course Description	<ul style="list-style-type: none">• Differential Leucocyte Count.• Arterial Blood Pressure• Radial pulse.• Blood indices• Effect of posture on blood pressure	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Differential Leucocyte Count -1	CO1
	A	Briefing	CO1
	B	Demonstration	CO1
	C	Practical	CO1
	Unit 2	Differential Leucocyte Count -2	CO2



A	Briefing		CO2
B	Demonstration		CO2
C	Practical		CO2
Unit 3	Arterial Blood Pressure measurement		CO3
A	Briefing		CO3
B	Demonstration		CO3
C	Practical		CO3
Unit 4	Radial Pulse measurement		CO4
A	Briefing		CO4
B	Demonstration		CO4
C	Practical		CO4
Unit 5	Effect of posture on Blood pressure		CO5, CO6
A	Briefing		CO5, CO6
B	Demonstration		CO5, CO6
C	Practical		CO5, CO6
Mode of examination	Practical		
Weightage Distribution	CA	ETE	
	25	75	
Text Books	1. William Davis (P): Understanding Human Anatomy and Physiology MC Graw Hill 2. T.S. Ranganathan: A Suggested Readings/ Books: of Human Anatomy		



		<p>3. Fattana: Human anatomy(Description and applied) Saunder's and C P Prism Publishers, Bangalore – 1991</p> <p>4. Ester M Grishcimer: Physiology and Anatomy with Practical Considerations, J.P. LippinCott. Philadelphia.</p> <p>5. Bhatnagar: Essentials of Human embryology. Revised Edition Orient Blackswan Pvt. Ltd.</p> <p>6. Tortora, G.J. and Grabowski, S.R.Principles of Anatomy and Physiology 9th edition,2000 Collins College Publishers, Luciano, New York</p>	
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
HPY 251	HUMAN PHYSIOLOGY-II (LAB)	CO1	3	3	3	3	2	1	3	1	2
		CO2	3	3	2	3	2	2	3	2	1
		CO3	3	3	3	3	2	1	3	1	2
		CO4	3	3	3	3	2	2	2	2	1
		CO5	3	3	3	3	2	1	3	1	2
		CO6	3	2	3	3	2	2	2	2	1
		Avg PO attained	3.0	2.83	2.83	3.0	2.0	1.5	2.66	1.5	1.5

Schools: SSSAHS		Batch : 2023-2027	
		Current Academic Year: 2023-2024	
		Semester: II	
1	Course Code	ARP102	
2	Course Title	Communicative English -2	
3	Credits	2	
4	Contact Hours (L-T-P)	0-1-2	
5	Course Objective	To Develop LSRW skills through audio-visual language acquirement, creative writing, advanced speech et al and MTI Reduction with the aid of certain tools like texts, movies, long and short essays.	
6	Course Outcomes	<p>After completion of this course, students will be able to:</p> <p>CO1 Acquire Vision, Goals and Strategies through Audio-visual Language Texts</p> <p>CO2 Synthesize complex concepts and present them in creative writing</p> <p>CO3 Develop MTI Reduction/Neutral Accent through Classroom Sessions and Practice</p> <p>CO4 Determine their role in achieving team success through defining strategies for effective communication with different people</p> <p>CO5 Realize their potentials as human beings and conduct themselves properly in the ways of world.</p> <p>CO6 Acquire satisfactory competency in use of Quantitative aptitude and Logical Reasoning</p>	
7	Course Description	The course takes the learnings from the previous semester to an advanced level of language learning and self-comprehension through the introduction of audio-visual aids as language enablers. It also leads learners to an advanced level of writing, reading, listening and speaking abilities, while also reducing the usage of L1 to minimal in order to increase the employability chances.	
8	Outline syllabus - ARP 102		
	Unit A	Acquiring Vision, Goals and Strategies through Audio-visual Language Texts	CO Mapping
	Topic 1	Pursuit of Happiness / Goal Setting and Value Proposition in life	CO1
	Topic 2	12 Angry Men / Ethics and Principles	
	Topic 3	The King's Speech / Mission statement in life strategies and Action Plans in Life	
	Unit B	Creative Writing	



	Topic 1	Story Reconstruction - Positive Thinking	
	Topic 2	Theme based Story Writing - Positive attitude	CO2
	Topic 3	Learning Diary Learning Log – Self-introspection	
	Unit C	Writing Skills 1	
	Topic 1	Precis	
	Topic 2	Paraphrasing	CO2
	Topic 3	Essays (Simple essays)	
	Unit D	MTI Reduction/Neutral Accent through Classroom Sessions and Practice	
	Topic 1	Vowel, Consonant, sound correction, speech sounds, Monothongs, Diphthongs and Triphthongs	
	Topic 2	Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds	CO3
	Topic 3	Speech Sounds Speech Music Tone Volume Diction Syntax Intonation Syllable Stress	
	Unit E	Gauging MTI Reduction Effectiveness through Free Speech	
	Topic 1	Jam sessions	
	Topic 2	Extempore	CO3
	Topic 3	Situation-based Role Play	
	Unit F	Leadership and Management Skills	
	Topic 1	Innovative Leadership and Design Thinking	CO4
	Topic 2	Ethics and Integrity	CO4
	Unit F	Universal Human Values	
	Topic 1	Love and Compassion, Non-Violence and Truth	CO5
	Topic 2	Righteousness, Peace	CO5
	Topic 3	Service, Renunciation (Sacrifice)	CO5
	Unit G	Introduction to Quantitative aptitude and Logical Reasoning	
	Topic 1	Analytical Reasoning and Puzzle Solving	CO6
	Topic 2	Number Systems and its Application in Solving Problems	CO6
9	Evaluations	<i>Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE</i>	N/A
10	Texts and References Library Links	<ul style="list-style-type: none"> • Wren, P.C.andMartin H. <i>High English Grammar and Composition</i>, S.Chandand Company Ltd, New Delhi. • Blum, M. Rosen. <i>How to Build Better Vocabulary</i>. London: Bloomsbury Publication • Comfort, Jeremy(et.al). <i>Speaking Effectively</i>. Cambridge University Press. <p>The Luncheon by W.Somerset Maugham - http://mistera.co.nf/files/sm_luncheon.pdf</p>	



COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PS O1	PSO 2	PSO 3
ARP102.1	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.2	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.3	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP102.5	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP102.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-



BMT 206: BIOCHEMISTRY- III

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: 3	
1	Course Code	BMT 206	
2	Course Title	BIOCHEMISTRY –III	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To train the students in the management of medical laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment's used in modern medical laboratories.• To make the students able to do routine laboratory testing under stipulated conditions.• To prepare specimens and operate machines that automatically analyse samples.• To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life.• To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To define the diagnostic importance of Blood and Urine CO2: To explain the diagnostic importance of Enzymes CO3: To describe the Chemistry and metabolic pathways of Carbohydrates CO4: To explain the importance of Hormones CO5: To describe the process of formation of ATP and its transport CO6: To Develop the ability to understand the process of formation of ATP and its transport	
7	Course Description	<ul style="list-style-type: none">• Blood and Urine chemistry• Clinical Enzymology and Hormones• Nutrition and Carbohydrates chemistry	



		<ul style="list-style-type: none"> • Carbohydrate digestion, absorption and metabolism • Biological oxidation 	
8	Outline syllabus Theory		CO mapping
	Unit 1	Blood and Urine chemistry	CO1, CO2
	A	Physical chemical properties of Blood	CO1, CO2
	B	Physical chemical properties of Urine	CO1, CO2
	C	Diagnostic importance /Clinical significance of Blood and Urine	CO1, CO2
	Unit 2	Clinical Enzymology and Hormones	CO1, CO2, CO4,
	A	Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic importance of enzymes (clinical significance of enzymes)	CO1, CO2, CO4,
	B	Mechanism of action of pep tidal hormones	CO1, CO2, CO4,
	C	Mechanism of action of steroidal hormones	CO1, CO2, CO4,
	Unit 3	Nutrition and Carbohydrate chemistry	CO2, CO3, CO6
	A	Importance of nutrition: Calorific values, Respiratory quotient, Energy requirement of a person - Basal metabolic rate. Balanced diet, recommended dietary allowances, Role of carbohydrates, lipid and protein in diet.	CO2, CO3, CO6
	B	Definition, general classification with examples. Glycosidic bond, Structures, composition, sources, properties and functions of Monosaccharide's and Disaccharides.	CO2, CO3, CO6
	C	Structures, composition, sources, properties and functions of Oligosaccharides and Polysaccharides.	CO2, CO3, CO6
	Unit 4	Carbohydrate digestion, absorption and metabolism	CO4, CO5, CO6
	A	Digestion and absorption of different types of Carbohydrates	



									CO4, CO5, CO6	
	B	Catabolism of Carbohydrates (Glycolysis, Krebs cycle, HMP shunt, glycogenolysis)								CO4, CO5, CO6
	C	Anabolism of Carbohydrates (Gluconeogenesis, Glycogenesis)								CO4, CO5, CO6
	Unit 5	Biological oxidation								CO5, CO6
	A	Electron transport chain								CO5, CO6
	B	Oxidative Phosphorylation								CO5, CO6
	C	Uncouplers and Shuttle system								CO5, CO6
	Mode of examination	Theory								
	Weightage Distribution for Theory	CA	MTE	ETE						
		25	25	50						
	Text book/s*	<ol style="list-style-type: none"> 1. Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 2. Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. 3. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006. 4. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998 5. Voet and Voet. Biochemistry.4th edition, John Wiley, 2010. 								

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 206	BIOCHEMISTRY- III	CO1	3	3	3	3	2	1	3	1	2
		CO2	3	2	2	3	1	2	2	2	1
		CO3	3	3	3	3	2	1	3	1	2
		CO4	3	3	3	3	1	2	3	2	1
		CO5	3	3	3	3	2	1	3	1	2
		CO6	3	3	3	3	1	2	3	2	1
		Avg PO attained	3.0	2.83	2.83	3.0	1.5	1.5	2.83	1.5	1.5



BMT 207: PATHOLOGY III

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2021-22	
Branch: Medical Lab Technology-Technique		Semester: 3	
1	Course Code	BMT 207	
2	Course Title	PATHOLOGY –III	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for laboratory technologists.• The content of rigorous course provide knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis.• It also provides knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease.• The student will be able to properly order and interpret hematologic and coagulation tests, including CBC's, PT's, INR's, and aPTT's, for the proper diagnosis and effective treatment of patients	



		with hematologic, bleeding, and thrombotic disorders.	
6	Course Outcomes	CO1: To define the importance of Haematology CO2: To describe the importance of Special haematological tests CO3: To explain the importance of Haemostasis and coagulation CO4: To define the importance of types of Anaemia CO5: To describe the importance of Bone marrow biopsy study CO6: To apply and analyze the importance of Quality control in Histopathology	
7	Course Description	<ul style="list-style-type: none"> • Haematology • Special haematological tests • Haemostasis and coagulation • Anaemia • Bone marrow biopsy study 	
8	Outline syllabus		CO mapping
	Theory		
	Unit 1	Haematology	CO1
	A	Definition, classification Laboratory investigations for Anemias including megaloblastic anemia, iron deficiency anemia,hemolytic anemia	CO1
	B	Definition, classification, and laboratory diagnosis of leukemias,Bone marrow composition and function,aspiration of bone marrow,preparation of Bone marrow slides and staining.	CO1
	C	Thalassemia: Alpha Thalassemia	CO1
	Unit 2	Special haematological tests:	CO2, CO3
	A	a) Sickling tests and Osmotic fragility test, Determination HbF and HbA2, Haemoglobin electrophoresis, Investigation of G6PD deficiency.	CO2, CO3



	B	b) Plasma haptoglobin and demonstration of hemosiderin in urine.			CO2, CO3
	C	Tests for autoimmune haemolytic anaemia, Measurement of abnormal Hb pigments			CO2, CO3
	Unit 3	Haemostasis and coagulation			CO3, CO4
	A	Hemophilia, Idiopathic Thrombocytopenic Purpura Normal haemostasis, mechanism of blood coagulation and normal fibrinolytic system. Collection of blood and anticoagulants used in coagulation studies.			CO3, CO4
	B	Investigation of haemostatic mechanism-BT, CT, whole blood coagulation time test, PT., Assay of clotting factors.			CO3, CO4
	C	Tests for fibrinolytic activity- Euglobulin , clot lysis test and platelet function tests.			CO3, CO4
	Unit 4	Anaemia			CO4, CO6
	A	Investigation of megaloblastic anaemia and iron deficiency anaemia			CO4, CO6
	B	B12 and folate assay and Schilling test			CO4, CO6
	C	Estimation of serum iron and iron binding capacity			CO4, CO6
	Unit 5	Bone marrow biopsy study			CO5, CO6
	A	Needle aspiration and surgical biopsy technique			CO5, CO6
	B	Preparation of smears and staining. Demonstration of LE cells, Cytochemistry.			CO5, CO6
	C	Administration in haematology and quality control			CO5, CO6
	Mode of examination	Theory			
		CA	MTE	ETE	



	Weightage Distribution for Theory	25	25	50	
	Text book/s*	<ol style="list-style-type: none"> 1. Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 2. Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers 3. Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates 4. Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 207	PATHOLOGY- III	CO1	3	3	3	3	2	1	2	1	2
		CO2	3	3	2	3	1	2	3	2	1
		CO3	3	3	3	3	2	1	3	1	2
		CO4	3	3	3	3	1	2	3	2	1
		CO5	3	3	3	3	2	1	3	1	2
		CO6	3	3	3	3	1	2	3	2	1
		Avg PO attained	3.0	3.0	2.83	3.0	1.5	1.5	2.83	1.5	1.5



BMT 208 - MICROBIOLOGY-III

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: 3	
1	Course Code	BMT 208	
2	Course Title	MICROBIOLOGY-III	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for lab technologists.• To know many etiological agents responsible for global infectious diseases caused by bacteria, viruses and other pathogens related with infectious diseases in humans.• To provide the conceptual basis for understanding pathogenic microorganisms and particularly address the fundamental mechanisms of their pathogenicity.• To provide opportunities for a student to develop diagnostic skills in microbiology, including the practical application and interpretation of laboratory tests for the diagnosis of infectious diseases	
6	Course Outcomes	CO1: To define the importance of Systemic mycoses	

		<p>CO2: To define the importance of Opportunistic mycoses</p> <p>CO3: To describe the importance of Infection</p> <p>CO4: To define the mechanism of Immunology</p> <p>CO5: To explain the importance of Quality control and biosafety</p> <p>CO6: To create the possible analysis and mechanisms involved in the microbial assortment and management.</p>	
7	Course Description	<ul style="list-style-type: none"> • Systemic mycoses • Opportunistic mycoses • Infection • Immunology • Quality control and biosafety 	
8	Outline syllabus Theory		CO mapping
	Unit 1	Superficial mycoses	CO1, CO6
	A	Introduction and classification,	CO1, CO6
	B	General features and pathogenicity	CO1, CO6
	C	Diagnosis, treatment and prevention	CO1, CO6
	Unit 2	Opportunistic mycoses	CO1, CO2
	A	Introduction and classification,	CO1, CO2
	B	General features and pathogenicity	CO1, CO2
	C	Diagnosis, treatment and prevention	CO1, CO2
	Unit 3	Infection	CO3
	A	Urinary tract infection	CO3
	B	Respiratory tract infection	CO3



	C	Genital tract infections, pyrexia of unknown origin, Meningitis			CO3
	Unit 4	Immunology			CO4
	A	Immune response: humoral and cell mediated immunity			CO4
	B	Autoimmune disorders			CO4
	C	Transplantation			CO4
	Unit 5	Quality control and biosafety			CO5
	A	Principles of laboratory management and			CO5
	B	Planning Ethical principles, lab organization and management			CO5
	C	Recording of results and quality control			CO5
	Mode of examination	Theory			
	Weightage Distribution for Theory	CA	MTE	ETE	
		25	25	50	
	Text book/s*	<ol style="list-style-type: none"> General Microbiology by Hans Günter Schlegel, C. Zaborosch, M. Kogut, 7th ed, Cambridge University Press, 1986 General Microbiology by Roger Y. Stanier Roger Y Stanier (Author), John L Ingraham (Author), Mark L Wheelis (Author), 5th Edition, Palgrave Macmillan, 1999 Medical Microbiology by Anathanarayana and Panikar Medical Microbiology –The practice of medical Microbiology by Roberty Cruckshank Parasitology – Interpretation to Clinical Medicine by Chatterjee Medical Mycology by Rippon 			



Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 208	MICROBIOLOGY -III	CO1	3	3	3	3	2	1	3	1	2
		CO2	3	3	2	3	1	2	3	2	1
		CO3	3	3	3	3	2	1	3	1	2
		CO4	3	3	3	3	1	2	3	2	1
		CO5	3	3	3	3	2	1	3	1	2
		CO6	3	3	3	3	1	2	3	2	1
		Avg PO attained	3.0	3.0	2.83	3.0	1.5	1.5	3.0	1.5	1.5



BMT 022: ENGLISH-II

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: III	
1	Course Code	BMT 022	
2	Course Title	ENGLISH-II	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Pre requisite	
5	Course Objective	To develop the better understanding in English language To develop the English communication skill To know the importance of English in Programmeme To develop the potential of independent learner in the student	
6	Course Outcomes	CO1: To analyze the use of parts of speech CO2: To explain the importance of Articles CO3: To define the use of tenses CO4: To describe the implication of vocabulary enhancement CO5: To explain the pattern of reading comprehension CO6: To analyze the importance of grammar	
7	Course Description	Basic elements of grammar Vocabulary enhancement Reading comprehension	
8	Outline syllabus Theory		CO mapping
	Unit 1	Basic elements of grammar	CO1
	A	Subject verb agreement	CO1
	B	Active voice	CO1
	C	Passive voice	CO1
	Unit 2	Vocabulary enhancement	



	A	One word substitutes Phrasal verbs			CO2
	B	Formation of words using suffixes			CO2
	C	Formation of words using prefixes			CO2
	Unit 3	Reading comprehension			CO3
	A	The Last Leaf by O Henry: Reading text and discussions.			CO3
	B	Comprehension based exercise			CO3
	C	Vocabulary based exercise			CO3
	Unit 4	Writing composition and Public speaking skills			CO4
	A	1) Paragraph writing			CO4
	B	2) Summary writing			CO4
	C	Presentation			CO4
	Unit 5	Grammar			CO5, CO6
	A	Narration.			CO5, CO6
	B	Voice change (Use of passive voice particularly in scientific and official writing).			CO5, CO6
	C	Use of articles and preposition.			CO5, CO6
	Mode of examination	Theory			
	Weightage Distribution for Theory	CA	MTE	ETE	
		25	25	50	
	Text book/s*	First flight: Text book in English Pearson: Text book in English			



Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 022	ENGLISH-II	CO1	3	3	3	3	2	1	3	1	2
		CO2	3	3	2	3	1	2	3	2	1
		CO3	3	3	3	3	2	1	3	1	2
		CO4	3	3	3	3	1	2	3	2	1
		CO5	3	3	3	3	2	1	3	1	2
		CO6	3	3	3	3	1	2	3	2	1
		Avg PO attained	3.0	3.0	2.83	3.0	1.5	1.5	3.0	1.5	1.5



BMT 251: BIOCHEMISTRY- III (Lab)

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: III	
1	Course Code	BMT 251	
2	Course Title	BIOCHEMISTRY –III (LAB)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To define the importance of different types of buffers CO2: To describe the importance of different types of reagents CO3: To explain the importance of qualitative analysis of carbohydrates CO4: To define the importance of hydrolysis of sucrose and starch CO5: To understand the importance of qualitative analysis of proteins CO6: Build the ability to identify the types of biomolecules	
6	Course Description	<ul style="list-style-type: none">• Preparation of buffer and checking of ph• Preparation of reagent• Qualitative analysis of carbohydrate• Hydrolysis of sucrose and starch• Qualitative analysis of protein	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Different pH	CO1, CO2
	A	Preparation of Citrate buffer of different pH	CO1, CO2
	B	Preparation of Phosphate buffer of different pH	CO1, CO2
	C	Preparation of Carbonate buffer of different pH	CO1, CO2
	Unit 2	Differential concentration	CO1, CO2, CO3



A	Preparation of reagents of different concentration-1	CO1, CO2, CO3
B	Preparation of reagents of different concentration-2	CO1, CO2, CO3
C	Preparation of reagents of different concentration-3	CO1, CO2, CO3
Unit 3	Carbohydrates	CO3, CO4, CO6
A	Qualitative analysis of Carbohydrates-1	CO3, CO4, CO6
B	Qualitative analysis of Carbohydrates-2	CO3, CO4, CO6
C	Qualitative analysis of Carbohydrates-3	CO3, CO4, CO6
Unit 4	Hydrolysis of sucrose	CO1, CO4, CO6
A	Hydrolysis of sucrose	CO1, CO4, CO6
B	Hydrolysis of starch	CO1, CO4, CO6
C	Confirmation of hydrolysis	CO4
Unit 5	Proteins	CO5, CO6
A	Qualitative analysis of Proteins -1	CO5, CO6
B	Qualitative analysis of Proteins-2	CO5, CO6
C	Qualitative analysis of Proteins -3	CO5, CO6
Mode of examination	Practical	
Weightage Distribution	CA	ETE
	25	75
Text Books	1. Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 2. Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. 3. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006.	



		4. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998 5. Voet and Voet. Biochemistry. 4th edition, John Wiley, 2010.	
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 251	BIOCHEMISTRY-III (LAB)	CO1	3	3	3	3	2	1	3	1	1
		CO2	3	2	2	3	1	2	2	2	2
		CO3	3	3	3	3	2	1	3	1	1
		CO4	3	3	3	3	1	2	3	2	2
		CO5	3	3	3	3	2	1	3	1	1
		CO6	3	3	3	3	1	2	3	2	2
		Avg PO attained	3.0	2.83	2.83	3.0	1.5	1.5	2.83	1.5	1.5



BMT 252: PATHOLOGY- III (Lab)

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: III	
1	Course Code	BMT 252	
2	Course Title	PATHOLOGY –III (LAB)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Outcomes	CO1: To define the importance of haematological parameters CO2: To describe the importance of Instrumentation CO3: To explain the importance of staining techniques CO4: To define the importance of Total white blood cell count CO5: To define the importance of ESR CO6: To describe the importance of Wintrobs and westergreen methods of ESR	
6	Course Description	<ul style="list-style-type: none">• Haemoglobin estimation• Determination of Haematocrit• Red blood cell count• Total white blood cell count• Erythrocyte sedimentation rate	
7	Outline syllabus	PRACTICAL'S	CO mapping
	Unit 1	Hematological investigations	CO1, CO2. CO3
	A	Hemoglobin estimation	CO1, CO2 CO3
	B	To estimate serum iron and total iron binding capacity.	CO1, CO2 CO3
	C	To detect whether the given specimen is G6PD deficient or normal	CO1, CO2 CO3



	Unit 2	Instrumentation		CO1, CO2, CO3
	A	Microscopy (Morphology of normal blood cells and their identification)		CO1, CO2, CO3
	B	Sterilization instrument(Autoclave, Hot air oven, Laminar air flow)		CO1, CO2, CO3
	C	Lab Safety and instrumentation.		CO1, CO2, CO3
	Unit 3	Staining techniques centrifuges		CO3,CO4,CO5
	A	Centrifugation technique, principle, application uses		CO3,CO4,CO5
	B	Cytochemical staining on the given smears such as PAS, SBB, MPO, LAP and Perl's reaction.		CO3,CO4,CO5
	C	Hematology Auto analyzers (Principles, application, uses)		CO3, CO4, CO6
	Unit 4	Total white blood cell count		CO1, CO4, CO6
	A	Briefing		CO1, CO4, CO6
	B	Demonstration		CO1, CO4, CO6
	C	Practical		CO4
	Unit 5	Proteins		CO5, CO6
	A	Qualitative analysis of Proteins -1		CO5, CO6
	B	Qualitative analysis of Proteins-2		CO5, CO6
	C	Qualitative analysis of Proteins -3		CO5, CO6
	Mode of examination	Practical		
	Weightage Distribution	CA	ETE	
		25	75	



Text Books	<ul style="list-style-type: none">• Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016• Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers• Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates• Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004	
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BMT 209: BIOCHEMISTRY-IV

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2021-22	
Branch: Medical Lab Technology-Technique		Semester: IV	
1	Course Code	BMT 209	
2	Course Title	BIOCHEMISTRY –IV	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To train the students in the management of medical laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment's used in modern medical laboratories.• To make the students able to do routine laboratory testing under stipulated conditions.• To prepare specimens and operate machines that automatically analyse samples.• To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life.• To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To define the importance of lipid chemistry and its metabolism CO2: To describe the importance of Haemoglobin, myoglobin and heme metabolism CO3: To describe the importance of Nucleic acid metabolism CO4: To explain the importance of vitamins and minerals CO5: To define the formation, role and scavenging of free radicals in the body CO6: Build the ability to understand the function of various sorts of nutrients	

7	Course Description	<ul style="list-style-type: none"> • Lipid chemistry, digestion, absorption and metabolism • Haemoglobin, Myoglobin and porphyria's • Nucleic acid Chemistry and metabolism • Vitamins and minerals metabolism • Free radical chemistry 	
8	Outline syllabus Theory		CO mapping
	Unit 1	Lipid chemistry, digestion, absorption and metabolism	CO1, CO2
	A	Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol, Essential fatty acids and their importance, Lipoprotein.	CO1, CO2
	B	Digestion and absorption of lipids. Lipid metabolism (Beta oxidation, fatty acid	CO1, CO2
	C	biosynthesis) ketone body's metabolism, Alcohol metabolism.	CO1, CO2
	Unit 2	Haemoglobin, Myoglobin and Porphyria's	
	A	Definition, Structure, types and function of Haemoglobin.	CO2, CO4, CO6
	B	Definition, structure and function of Myoglobin.	CO2, CO4, CO6
	C	Heme synthesis, breakdown and diseases associated with heme metabolism	CO2, CO4, CO6
	Unit 3	Nucleic acid chemistry and metabolism	CO3, CO6
	A	Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body.	CO3, CO6
	B	Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.	CO3, CO6
	C	Purine and Pyrimidine synthesis and breakdown, Uric acid and gout.	CO3, CO6
	Unit 4	Vitamins and Mineral metabolism	CO4, CO5, CO6



	A	Definition, classification according to solubility, Sources and Coenzyme forms of different vitamins, Functions, RDA, digestion, absorption and transport of various vitamins.			CO4, CO5, CO6
	B	Definition, Sources, RDA, absorption, transport, and excretion of various minerals. Functions of various minerals.			CO4, CO5, CO6
	C	Deficiency disorders of various minerals (Sodium, Potassium, Calcium, Phosphate, Sulphur, Iron, Magnesium, Fluoride, Selenium, Zinc and Copper) and vitamins (Fat and water soluble vitamins).			CO4, CO5, CO6
	Unit 5	Free radicals chemistry			CO3, CO5, CO6
	A	Definitions and types of free radicals.			CO3, CO5, CO6
	B	Mechanism of synthesis and sources of free radicals.			CO3, CO5, CO6
	C	Harmful effect of free radicals and its scavenging by antioxidant defence system			CO3, CO5, CO6
	Mode of examination	Theory			
	Weightage Distribution for Theory	CA	MTE	ETE	
		25	25	50	
	Text book/s*	<ol style="list-style-type: none"> 1. Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 2. Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. 3. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006. 4. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998 5. Voet and Voet. Biochemistry.4th edition, John Wiley, 2010. 			



Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 209	BIOCHEMIST RY- IV	CO1	3	3	3	3	2	1	3	2	3
		CO2	3	2	2	3	1	2	2	2	2
		CO3	3	3	3	3	2	1	3	1	1
		CO4	3	3	3	3	1	2	3	2	2
		CO5	3	3	3	3	2	1	3	1	1
		CO6	3	3	3	3	1	2	3	2	2
		Avg PO attained	3.0	2.83	2.83	3.0	1.5	1.5	2.83	1.66	1.83



BMT 210: PATHOLOGY- IV

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: IV	
1	Course Code	BMT 210	
2	Course Title	PATHOLOGY-IV	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for laboratory technologists.• The content of rigorous course provide knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis.• It also provide knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease.• The student will be able to properly order and interpret hematologic and coagulation tests, including CBC's, PT's, INR's, and APTT's, for the proper diagnosis and effective treatment of patients with hematologic, bleeding, and thrombotic disorders.	
6	Course Outcomes	CO1: To define the importance of Instrumentation CO2: To describe the importance of basic techniques CO3: To explain the importance of staining technique CO4: To define the importance of mounting technique CO5: To define the importance of record maintenance CO6: To describe the importance of Computers in Laboratory	



7	Course Description	<ul style="list-style-type: none"> • Instrumentation : • Techniques • Staining techniques • Mounting techniques • Maintenance of records and computer application 	
8	Outline syllabus		CO mapping
	Unit 1	Instrumentation :	CO1,CO2
	A	Automated tissue processor, Microtomes, knives, knife sharpeners and ultra-microtome	CO1,CO2
	B	Freezing microtome and cryostat	CO1,CO2
	C	Automatic slide stainer	CO1,CO2
	Unit 2	Techniques	CO2, CO4
	A	Routine paraffin section cutting.	CO2, CO4
	B	Frozen section	CO2, CO4
	C	Cryostat section studies	CO2, CO4
	Unit 3	Staining techniques	CO3
	A	Special stains for carbohydrates,	CO3
	B	Special stain for connective tissue, nervous tissue, bone tissue, collagen fibres, elastic fibres etc.	CO3
	C	Special stains for lipids, organisms, fungi, parasites, pigments and deposits in tissues	CO3
	Unit 4	Mounting techniques	CO4, CO5
	A	Various mounts and mounting techniques.	CO4, CO5
	B	Electron microscope, scanning electron microscope, dark ground and Fluorescent microscope.	CO4, CO5
	C	Museum technology	CO4, CO5
	Unit 5	, Maintenance of records and computer application:	CO5, CO6



A	Microphotography and its applications, maintenance of records and filing of slides				CO5, CO6
B	ICDs classification and coding				CO5, CO6
C	Application of computers in pathology.				CO5, CO6
Mode of examination	Theory				
Weightage Distribution for Theory	CA	MTE	ETE		
	25	25	50		
Text book/s*	<ol style="list-style-type: none"> 1. Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 2. Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers 3. Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates 4. Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004 				

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 210	PATHOLOGY-IV	CO1	3	3	3	3	2	3	3	3	3
		CO2	3	3	2	3	1	2	3	2	2
		CO3	3	3	3	3	2	1	3	1	1
		CO4	3	3	3	3	1	2	3	2	2
		CO5	3	3	3	3	2	1	3	1	1
		CO6	3	3	3	3	1	3	3	2	2
		Avg PO attained	3.0	3.9	2.83	3	1.5	2	3	1.83	1.83



BMT 211 - MICROBIOLOGY-IV

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2021-22	
Branch: Medical Lab Technology-Technique		Semester: IV	
1	Course Code	BMT 211	
2	Course Title	MICROBIOLOGY-IV	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for lab technologists.• To know many etiological agents responsible for global infectious diseases caused by bacteria, viruses and other pathogens related with infectious diseases in humans.• To provide the conceptual basis for understanding pathogenic microorganisms and particularly address the fundamental mechanisms of their pathogenicity.• To provide opportunities for a student to develop diagnostic skills in microbiology, including the practical application and interpretation of laboratory tests for the diagnosis of infectious diseases	
6	Course Outcomes	CO1: To explain the importance of Bacteriology CO2: To define the importance of Virology CO3: To describe the importance of Parasitology CO4: To explain the diagnosis and treatment of Dengue, Chikungunya CO5: To define the diagnosis and treatment of Rabies, Rotavirus CO6: To create the potential analytical tools involved in the microbial assortment, management and diagnosis.	

7	Course Description	<ul style="list-style-type: none"> • Bacteriology: Chlamydia, Gonococci, Spirochaetes, Meningococci • Corynebacterium, Pseudomonas, Camplyobacter, Helicobacte. • Parasitology: Leishmaniasis and Filariasis • Virology: Introduction, classification, general features, pathogenicity, diagnosis, treatment and prevention of Adenovirus, Picornavirus: Poliovirus, Coxsackievirus, Poxvirus, Arbovirus- Dengue, Chikungunya • Rabies, Parvovirus, Coronavirus: SARS and Rotavirus 	
8	Outline syllabus Theory		CO mapping
	Unit 1	Bacteriology 1	CO1/ CO6
	A	Introduction and classification	CO1/ CO6
	B	General features and pathogenicity	CO1/ CO6
	C	Diagnosis, treatment and prevention of Chlamydia Gonococci, Spirochaetes, Meningococci	CO1/ CO6
	Unit 2	Bacteriology 2	CO1/CO2
	A	Introduction and classification	CO1/CO2
	B	General features and pathogenicity	CO1/CO2
	C	Diagnosis, treatment and prevention of Corynebacterium,nPseudomonas, Camplyobacter. Helicobacter	CO1/CO2
	Unit 3	Parasitology	CO1/CO3
	A	Introduction and classification	CO1/CO3
	B	General features and pathogenicity	CO1/CO3
	C	Diagnosis, treatment and prevention of Leishmaniasis and Filariasis	CO1/CO3
	Unit 4	Virology-1	CO1/CO4



	A	Introduction and classification	CO1/CO4
	B	General features and pathogenicity, Diagnosis, treatment and prevention (Adenovirus, Picornavirus: Poliovirus, Coxsackievirus, Poxvirus, Arbovirus- Dengue, Chikungunya).	CO1/CO4
	C		CO1/CO4
	Unit 5	Virology-2	CO1/CO5
	A	Introduction and classification	CO1/CO5
	B	General features and pathogenicity Diagnosis, treatment and prevention of Rabies,	CO1/CO5
	C	Parvovirus, Coronavirus: SARS and Rotavirus	CO1/CO5

Mode of examination	Theory and Practical			
Weightage	CA	MTE	ETE	
Distribution for Theory	25	25	50	

Text book/s*	<ol style="list-style-type: none">1. General Microbiology by Hans Günter Schlegel, C. Zaborosch, M. Kogut, 7th ed, Cambridge University Press, 19862. General Microbiology by Roger Y. Stanier Roger Y Stanier (Author), John L Ingraham (Author), Mark L Wheelis (Author), 5th Edition, Palgrave Macmillan, 19993. Medical Microbiology by Anathanarayana and Panikar4. Medical Microbiology –The practice of medical Microbiology by Roberty Cruickshank5. Parasitology – Interpretation to Clinical Medicine by Chatterjee Medical Mycology by Rippon	
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RMS 001: Research Methodology and Statistics

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: IV	
1	Course Code	RMS 001	
2	Course Title	Research Methodology and Statistics	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	1.To enable students, comprehend research issues 2. To enable students to identify research questions and formulate research hypothesis 3. To equip students with various techniques of research design and data collection 4. To enable students to synthesize qualitative and quantitative data crunching techniques	
6	Course Outcomes	CO1: To define the basic concepts and methods of research. CO2: To describe students comprehend research issues CO3: To apply the application of descriptive statistics on data. CO4: To equip students with various techniques of research design and data collection CO5: To describe students to synthesize quantitative data crunching techniques CO6: To analyze students to synthesize qualitative data crunching techniques	
7	Course Description	To help the students to understand the basic principles of Statistics and research methodology and applied to draw the inferences from the data	
8	Outline syllabus Theory		
	Unit 1	Introduction	CO mapping
	A	Introduction to Research: Meaning of research, Types of research, Research Process.	CO1, CO2, CO3
	B	Literature Review: Literature review basics Primary data, Secondary data and exploration.	CO1, CO2, CO3



	C	Types of variables, Exogenous and Endogenous Variables Formulation of Hypothesis and Research question		CO1, CO2, CO3
	Unit 2	Research design		
	A	Types of Research design, Instrument design, Scale formation.		CO2, CO4
	B	Basics Statistics, Methods of data collection.		CO2, CO4
	C	Questionnaires creation, Sampling Design.		CO2, CO4
	Unit 3	Data analysis		
	A	Data Analysis and interpretation:		CO3
	B	Descriptive Analysis: Normality tests		CO3
	C	Outlier tests, Hypothesis testing		CO3
	Unit 4	Referencing :		CO4, CO2
	A	APA format· MLA format.		
	B	Harvard Style· IEEE format		CO4, CO2
	C	Report Writing		CO4, CO2
	Unit 5	Ethical Practices in Research: Plagiarism		CO5,CO6
	A			
	B	Introduction to plagiarism software		CO5,CO6
	C	Legal, Governmental and other norms		CO5,CO6
	Mode of examination	Jury/Viva		
	Weightage	CA	Viva	ETE
	Distribution for Theory	50%	50%	0%
	Text book/s*	1. Research Methodology- CR Kothari 2. Statistics in Medicine-Colton-Little Brown. Boston		



Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
RMS 001	Research Methodology and Statistics	CO1	2	2	2	2	3	3	2	3	3
		CO2	2	2	2	2	3	3	2	3	3
		CO3	2	2	2	2	3	3	2	3	2
		CO4	2	2	2	2	3	3	2	3	3
		CO5	2	2	2	2	2	3	2	3	3
		CO6	2	2	2	2	3	3	2	3	3
		Avg PO attained	2.0	2.0	2.0	2.0	2.83	3.0	2.0	3.0	2.83



BMT 306: BIOCHEMISTRY- V

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: V	
1	Course Code	BMT 306	
2	Course Title	BIOCHEMISTRY –V	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To train the students in the management of medical laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment's used in modern medical laboratories.• To make the students able to do routine laboratory testing under stipulated conditions.• To prepare specimens and operate machines that automatically analyse samples.• To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life.• To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To define the importance of Protein chemistry and metabolism CO2: To describe the importance of Specialized product and Inborn error of Protein metabolism CO3: To define the importance of Liver function test, Renal function test, Gastric function test CO4: To explain the importance of Cardiac Marker and Thyroid function test CO5: To define the importance of Quality control and Preparation of reagents CO6: Build the ability to explain the importance of various sorts of biochemical markers	



7	Course Description	<ul style="list-style-type: none">• Chemistry and metabolism of amino acid and proteins• Specialized product and Inborn error of Protein metabolism• Liver function test, Renal function test, Gastric function test• Cardiac Marker and Thyroid function test• Quality control and Preparation of reagents	
8	Outline syllabus Theory		CO mapping
	Unit 1	Chemistry and metabolism of amino acid and proteins	CO1, CO2
	A	Amino acid chemistry: Definition, Classification, Peptide bonds. Peptides: Definition, Biologically important peptides. Protein chemistry: Definition, Classification, Functions of proteins, Primary, Secondary, tertiary and quaternary structure of proteins.	CO1, CO2
	B	Digestion of protein and absorption of amino acid	CO1, CO2
	C	Catabolism of Protein and detoxification of ammonia along with clinical disorders of Urea cycle.	CO1, CO2
	Unit 2	Specialized product and Inborn error of Protein metabolism	CO1,CO2, CO4
	A	Formation, function and clinical significance of specialized product of amino acids (NO, Creatin, Glutathione, Thyroid hormone, Melanin, Serotonin etc.)	CO1,CO2, CO4
	B	Inborn error of protein metabolism (Deficiency manifestation, treatment and screening) Albinism, Alkaptonuria, Cystinuria, Phenyl ketonuria,	CO1,CO2, CO4
	C	MSUD (Clinical manifestation)	CO1,CO2, CO4
	Unit 3	Liver function test, Renal function test, Gastric function test	CO3, CO5, CO6
	A	Function of liver and kidney	CO3, CO5, CO6
	B	Tests used for diagnosis of liver and kidney diseases	CO3, CO5, CO6



	C	Gastric function Test and its Clinical interpretation	CO3, CO5, CO6
	Unit 4	Cardiac Marker and Thyroid function test	CO4,CO6
	A	Importance of cardiac marker	CO4,CO6
	B	Clinically important cardiac markers	CO4,CO6
	C	T3, T4 and TSH levels and their importance.	CO4,CO6
	Unit 5	Quality control and Preparation of reagents	CO2, CO5, CO6
	A	Terminology used in Quality control, EQAS and IQAS, LJ chart and ISO.	CO2, CO5, CO6
	B	Preparation of stock solution of different concentration.	CO2, CO5, CO6
	C	Preparation of working standard solution of different concentration.	CO2, CO5, CO6



Mode of examination	Theory and Practical			
Weightage Distribution for Theory	CA	MTE	ETE	
	30%	20%	50%	
Text book/s*	<ol style="list-style-type: none"> 1. Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 2. Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. 3. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006. 4. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998 5. Voet and Voet. Biochemistry.4th edition, John Wiley, 2010. 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 306	BIOCHEMISTRY- V	CO1	3	3	3	3	2	3	3	2	1
		CO2	3	2	2	3	1	1	2	1	2
		CO3	3	3	3	3	2	2	3	2	1
		CO4	3	3	3	3	1	1	3	1	2
		CO5	3	3	3	3	2	2	3	2	1
		CO6	3	3	3	3	1	3	3	1	2
		Avg PO attained	3.0	2.83	2.83	3.0	1.5	2.0	2.83	1.5	1.5



BMT 307: PATHOLOGY- V

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: V	
1	Course Code	BMT 307	
2	Course Title	PATHOLOGY-V	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for laboratory technologists.• The content of rigorous course provide knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis.• It also provide knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease.• The student will be able to properly order and interpret hematologic and coagulation tests, including CBC's, PT's, INR's, and APTT's, for the proper diagnosis and effective treatment of patients with hematologic, bleeding, and thrombotic disorders.	
6	Course Outcomes	CO1: To define the importance of Cytology CO2: To describe the importance of Female genital tract CO3: To explain the importance of Respiratory tract, gastrointestinal tract and urinary tract CO4: To define the importance of CSF, Cytology of glands and automation in cytology CO5: To define the importance of anaemia, leukaemia and immunohistochemistry CO6: To describe the advanced techniques in the diagnosis of leukaemia and anemia	
7	Course Description	<ul style="list-style-type: none">• Cytology• Female genital tract	

		<ul style="list-style-type: none"> Respiratory tract, gastrointestinal tract and urinary tract CSF, Cytology of glands and automation in cytology Tissue culture, cytogenetics and immunohistochemistry 	
8	Outline syllabus Theory		CO mapping
	Unit 1	Cytology	CO1
	A	Normal cell structure, functions, cytological criteria of malignancy. Types of specimens, methods of collection and preparation of cell block.	CO1
	B	Different fixatives and methods of fixation	CO1
	C	Staining : (a) Papanicolaou's stain- principle , preparation and staining techniques (b) May Grunwald Giemsa stain (c) Shorr's stain (d) Aceto Orcin stain	CO1
	Unit 2	Female genital tract	CO2
	A	Cervical cytology-basis of detection of malignant and premalignant lesions.	CO2
	B	Hormonal assessment with cytological techniques and sex Chromatin and pregnancy tests.	CO2
	C	Exfoliative cytology with special emphasis on female genital tract, thyroid, salivary glands, and lymph nodes	CO2
	Unit 3	Respiratory tract, gastrointestinal tract and urinary tract	CO3
	A	Anatomy, histology and physiology	CO3
	B	Collection of sample, preparation of smears and staining	CO3



	C	Cytology of normal, non-malignant and malignant conditions	CO3
	Unit 4	CSF, Cytology of glands and automation in cytology	CO4
	A	CSF and effusions: Cytology of CSF in inflammatory, Non-malignant and malignant conditions Cytology of effusions in non-malignant and malignant conditions	CO4
	B	Glands – breast, thyroid, salivary glands and lymph nodes. Cryptologic features in non-malignant Malignant conditions of different glands and nipple discharges	CO4
	C	Automation in cytology Flow cytometry Image analysis Principles, equipment's, procedures and evaluation	CO4
	Unit 5	Anaemia's, Leukaemia's and immunohistochemistry	CO5, CO6
	A	Anaemia's Various indices of blood Morphological classification of anaemia Etiological classification of anaemia	CO5, CO6



B	Leukaemia's Classification ALL and AML their lab diagnosis CML and CLL their lab diagnosis	CO5, CO6
C	Immunohistochemistry Fluorescence reactions Basics concepts of immunocytochemistry Monoclonal antibodies and its preparation	CO5, CO6

Weightage Distribution for Theory	CA	MTE	ETE
	30%	20%	50%

Text book/s*	<ol style="list-style-type: none"> 1. Clinical diagnosis by Laboratory method by Todd and Sanford by Davidsohn-Wells, W.B. Saunders, 2016 2. Laboratory Technology by Ramnic Sood, January 2015, Jaypee Brothers Medical Publishers 3. Practical Haematology by Dacie and Lewis, Eleventh Edition • 2011, Barbara J. Bain, Imelda Bates 4. Text book of Pathology by Krishna, V. Krishna (Author), Orient Longman, 2004
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 307	PATHOLOGY-V	CO1	3	3	3	3	1	3	3	1	2
		CO2	3	3	2	3	2	1	3	2	1
		CO3	3	3	3	3	1	2	3	1	2
		CO4	3	3	3	3	2	1	3	2	1
		CO5	3	3	3	3	1	2	3	1	2
		CO6	3	3	3	3	2	3	3	2	3
		Avg PO attained	3.0	3.0	2.83	3.0	1.5	2.0	3.0	1.5	1.83



BMT 308 - MICROBIOLOGY-V

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: V	
1	Course Code	BMT 308	
2	Course Title	MICROBIOLOGY-V	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for lab technologists.• To know many etiological agents responsible for global infectious diseases caused by bacteria, viruses and other pathogens related with infectious diseases in humans.• To provide the conceptual basis for understanding pathogenic microorganisms and particularly address the fundamental mechanisms of their pathogenicity.• To provide opportunities for a student to develop diagnostic skills in microbiology, including the practical application and interpretation of laboratory tests for the diagnosis of infectious diseases	
6	Course Outcomes	CO1: To explain the importance of host pathogen infection CO2: To describe the importance of various types of infection. CO3: To define the importance of Sexually transmitted infections CO4: To explain the mechanism of hospital acquired infection CO5:To define the importance of Laboratory diagnosis CO6: To create the possible analysis and mechanisms involved in the microbial infections and diagnosis..	

7	Course Description	<ul style="list-style-type: none"> • Host pathogen infection • Gastro intestinal infections • Sexually transmitted infections • Skin and soft tissue infections • Laboratory diagnosis, their interpretation and comparative evaluation 	
8	Outline syllabus		CO mapping
	Theory		
	Unit 1		CO1/CO6
	A	Host pathogen interaction	CO1/CO6
	B	Respiratory tract infections	CO1/CO6
	C	Blood stream infections	CO1/CO6
	Unit 2		CO1/CO2
	A	Hospital acquired infection	CO1/CO2
	B	Gastro intestinal infections	CO1/CO2
	C	Sexually Transmitted infections	CO1/CO2
	Unit 3		CO1/CO3
	A	Skin infection	CO1/CO3
	B	Soft tissue infections	CO1/CO3
	C	Zoonoses	CO1/CO3
	Unit 4		CO1/CO4
	A	Laboratory diagnosis of infection	CO1/CO4
	B	Interpretation of infected case	CO1/CO4
	C	Comparative evaluation	CO1/CO4
	Unit 5		CO1/CO5
	A	Serological test	CO1/CO5
	B	Antibiotic susceptibility test	CO1/CO5



	C	Widal test	CO1/CO5

	Mode of examination	Theory and Practical			
	Weightage Distribution for Theory	CA	MTE	ETE	
		30%	20%	50%	

Text book/s*	<ol style="list-style-type: none"> 1. General Microbiology by Hans Günter Schlegel, C. Zaborosch, M. Kogut, 7th ed, Cambridge University Press, 1986 2. General Microbiology by Roger Y. Stanier Roger Y Stanier (Author), John L Ingraham (Author), Mark L Wheelis (Author), 5th Edition, Palgrave Macmillan, 1999 3. Medical Microbiology by Anathanarayana and Panikar 4. Medical Microbiology –The practice of medical Microbiology by Roberty Cruckshank 5. Parasitology – Interpretation to Clinical Medicine by Chatterjee Medical Mycology by Rippon 	
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Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 308	MICROBIOLO GY-V	CO1	3	3	3	3	1	3	2	3	3
		CO2	3	3	2	3	2	1	3	1	3
		CO3	3	3	3	3	1	2	3	2	3
		CO4	3	3	3	3	2	1	3	1	2
		CO5	3	3	3	3	1	2	3	2	3
		CO6	3	3	3	3	2	1	3	1	3
		Avg PO attained	3.0	3.0	2.83	3.0	1.5	1.66	2.83	1.66	2.83



School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: V	
1	Course Code	BMT 359	
2	Course Title	BASIC CLINICAL LABORATORY MANAGEMENT	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Outcomes	<p>CO1: To create awareness of ethics in a clinical laboratory.</p> <p>CO2: Good laboratory practice and Quality Management in a clinical laboratory.</p> <p>CO3: To learn about the principles of management, management functions, lab planning and store management.</p> <p>CO4: To impart knowledge about lab staffing and selection procedure for new equipment</p> <p>CO5: To know about the labelling and lab safety procedures</p> <p>CO6 To describe the importance of lab training</p>	
6	Course objectives	<ol style="list-style-type: none"> 1. Students will be able to identify different levels of management, leadership and administrative qualities 2. Disciples will learn about different type of staff requirement in lab, their jobs and responsibilities, performance, validation of new equipment 3. Upon learning the different laboratory hazards, students will be able to manage the laboratory safety accordingly 	
7	Course Description	<ol style="list-style-type: none"> 1. Lab Management 2. Quality control 3. Leadership skill enhancement 4. Safety and Hazards 	
8	Outline syllabus Theory		
	Unit 1	Lab management	CO mapping
	A	Principles of Management: Leadership, Management, Administration, Decision Making	CO2, CO3, CO5



	B	Introduction, Planning, Organizing, Directing, Controlling Lab Planning: Space Requirement, duties Organization, Function, types of stores, Stores Record,	CO2, CO3, CO5
	C	Goods Inward Note Form Material Requisition Form, Bin Card	CO2, CO3, CO5
	Unit 2	Lab staffing	
	A	Laboratory Staffing and Scheduling:	CO2, CO3
	B	Introduction, Lab Personnel, Current Dynamics affecting Staffing, Personnel Requirement,	CO2, CO3
	C	Laboratory staffing, Staffing scheduling.	CO2, CO3
	Unit 3	Lab safety	CO2, CO3
	A	Laboratory Safety : Labelling, Safety Management plan and responsibilities,	CO3
	B	Standard precautions, Hazard prevention and containment,	CO3
	C	sterilization and disinfection	CO3
	Unit 4	Lab planning	
	A	Selection and Implementation of New Equipment and Procedure:	CO5, CO6
	B	Introduction, defining laboratory requirement, Performance consideration, technology requirement,	CO5, CO6
	C	Human resources, implementation, Verification and Validation.	CO5, CO6
	Unit 5	Lab Training	
	A	Decontamination, Spill management, Fire safety,	CO5, CO6
	B	Waste management, Packaging and Shipping of Infectious substances,	CO5, CO6



C	Personnel training			CO5, CO6
Mode of examination	Jury/Viva			
Weightage Distribution for Theory	CA	Viva	ETE	
	50%	50%	0%	
Text book/s*				

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 359	Basic clinical Laboratory Management	CO1	3	3	3	3	1	1	2	3	3
		CO2	3	3	2	3	2	2	1	1	3
		CO3	3	3	3	3	1	1	2	2	3
		CO4	3	2	3	3	2	2	1	1	2
		CO5	3	3	3	3	1	1	2	2	3
		CO6	3	3	3	3	2	2	3	1	3
		Avg PO attained	3.0	2.83	2.83	3.0	1.5	1.5	1.83	1.66	2.83



1	Course Code	BMT 351	
2	Course Title	BIOCHEMISTRY –V (LAB)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
5	Course Outcomes	CO1: To define the importance of Preparation of protein free filtrate CO2: To describe the importance of Glucose estimation and Glucose tolerance test CO3: To describe the importance of Total protein estimation CO4: To define the importance of albumin and globulin estimation CO5: To define the clinical importance of A:G ratio CO6: Build the ability to identify the diagnostic importance of various biomolecules	
6	Course Description	<ul style="list-style-type: none">• Preparation of protein free filtrate• Glucose estimation and Glucose tolerance test• Total protein estimation• Albumin estimation• A:G ratio determination	
	Practical's		CO mapping
	Unit 1	Preparation of protein free filtrate	CO1, CO2
		a. Briefing b. Demonstration c. Practical	
	Unit 2	Quantitative estimation of Glucose	CO1,CO2, CO4
		a. Glucose estimation in normal sample b. Glucose estimation in abnormal sample c. Glucose estimation in unknown sample	
	Unit 3	Glucose tolerance test	CO3, CO5, CO6



		<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Practical and Clinical interpretation of curve 		
	Unit 4	Quantitative estimation of Total Protein	CO4,CO6	
		<ul style="list-style-type: none"> a. Total protein estimation in normal sample b. Total protein estimation in abnormal sample c. Total protein estimation in unknown sample 		
	Unit 5	Albumin, Globulin and A: G ratio determination	CO2, CO5, CO6	
		<ul style="list-style-type: none"> a. Estimation of Albumin b. Determination of Globulin concentration c. Calculation of A: G ratio 		
	Mode of examination	Theory and Practical		
	Weightage Distribution for Theory	CA	MTE	ETE
		30%	20%	50%
	Weightage Distribution for Practical's	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	<ul style="list-style-type: none"> 1. A text book of Medical Biochemistry by Chatterjee and Shinde 2. Text book of biochemistry for Medical students by Vasudevan and Sreekumari 3. Biochemistry by Lehninger 4. Clinical chemistry by Varley 5. Harpers Illustrated Biochemistry by Robert K.M. 		

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 351	BIOCHEMISTRY- V (LAB)	CO1	3	3	3	3	2	1	3	2	3
		CO2	3	2	2	3	1	2	2	1	1
		CO3	3	3	3	3	2	1	3	2	2
		CO4	3	3	3	3	1	2	3	1	1
		CO5	3	3	3	3	2	1	3	2	2
		CO6	3	3	3	3	1	2	3	1	1
		Avg PO attained	3.0	2.83	2.83	3.0	1.5	1.5	2.83	1.5	1.66



	Course Code	BMT 352	
	Course Title	PATHOLOGY –V (LAB)	
	Credits	1	
	Contact Hours (L-T-P)	0-0-2	
	Course Outcomes	CO1: To define the importance of smear preparation CO2: To describe the importance of fixation of smear CO3: To define the importance of Papanicolaou staining CO4: To describe the importance of May-Grunwald Geimsa staining CO5: To describe the importance of study of hormonal cytology CO6: To define the importance of Techniques used in cytology	
	Course Description	<ul style="list-style-type: none"> • Preparation of various cytology smears • Fixation of smears • Papanicolaou staining • May-Grunwald Geimsa staining • Hormonal cytology study 	
	Practical's		CO mapping
	Unit 1	A. Preparation of cytological fixatives for tissue processing and method of fixation of specimen. B. To demonstrate the process of FNAC. C. To prepare the reagent for cytological techniques.	CO1
	Unit 2	A. To demonstrate Collection processing and staining of the sputum specimen. B. To demonstrate Collection processing C. Staining of the skin scrapping specimen.	CO2
	Unit 3	A. Papanicolaou staining	CO3



		B. Geimsa staining C. PAS staining		
	Unit 4	A. Cytological screening B. Geimsa staining C. Principal, Method and interpretation	CO4	
	Unit 5	A. Types of Hormonal cytology investigations B. Sample collection C. Shorr staining	CO5, CO6	
	Mode of examination	Theory and Practical		
	Weightage Distribution for Theory	CA	MTE	ETE
		30%	20%	50%
	Weightage Distribution for Practical's	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	<ol style="list-style-type: none"> 1. Histopathology Techniques by Culling 2. Cytology by Koss 3. Clinical diagnosis by Laboratory method by Todd and Sanford 4. Laboratory Technology by Ramnic Sood 5. Practical Hematology by Dacie and Lewis 6. Text book of Pathology by Krishna 		

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 352	PATHOLOGY-V (LAB)	CO1	3	3	3	3	3	3	2	3	1
		CO2	3	3	2	3	3	1	3	1	2
		CO3	3	3	3	3	3	2	3	2	1
		CO4	3	3	3	3	3	1	3	1	2
		CO5	3	3	3	3	2	2	3	2	1
		CO6	3	3	3	3	3	1	3	1	2
		Avg PO attained	3.0	3.0	2.83	3.0	2.83	1.66	2.83	1.66	1.5



	Course Code	BMT 353	
	Course Title	MICROBIOLOGY –V (LAB)	
	Credits	1	
	Contact Hours (L-T-P)	0-0-2	
	Course Outcomes	<p>CO1: To define about importance of Antibiotic susceptibility test (AST)</p> <p>CO2: To describe the importance of Sensitivity and specificity of different diagnostic test</p> <p>CO3: To explain the process of collection and transportation of clinical specimens</p> <p>CO4: To analyze the importance of central instrument facility</p> <p>CO5: To describe the importance of exposure to clinical microbiology labs</p> <p>CO6: To create the possible diagnosis of microbial assortment and its management.</p>	
	Course Description	<ul style="list-style-type: none"> • Antibiotic susceptibility test (AST) • Sensitivity and specificity of different diagnostic test • Concepts for analysis with reference to the collection and transportation of clinical specimens • Visit to central instrument facility • Visit to Clinical Microbiology labs 	
	Practical's		CO mapping
	Unit 1	Antibiotic susceptibility test (AST)	CO1
		<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Practical 	
	Unit 2	Sensitivity and specificity of different diagnostic test	CO2
		<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Practical 	
	Unit 3	Concepts for analysis with reference to the collection and transportation of clinical specimens	CO3
		<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Hands on practice 	



Unit 4	Visit to central instrument facility			CO4
	<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Hands on practice in lab 			
Unit 5	Visit to Clinical Microbiology labs			CO5, CO6
	<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Hands on practice in lab 			
Mode of examination	Theory and Practical			
Weightage Distribution for Theory	CA	MTE	ETE	
	30%	20%	50%	
Weightage Distribution for Practical's	CA	MTE	ETE	
	60%	0%	40%	
Text book/s*	<ul style="list-style-type: none"> 1. Medical Microbiology by Anathanarayana and Panikar 2. Medical Microbiology –The practice of medical Microbiology by Roberty Cruckshank 3. Parasitology – Interpretation to Clinical Medicine by Chatterjee 4. Medical Mycology by Rippon 5. Medical Paristology by Ajit Damle 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 353	MICROBIOLOGY-V (LAB)	CO1	3	3	3	3	2	3	2	2	1
		CO2	3	3	2	3	3	3	3	1	2
		CO3	2	3	3	3	2	3	3	2	1
		CO4	3	3	3	3	3	3	3	1	2
		CO5	3	3	3	3	2	3	3	2	1
		CO6	3	3	3	3	2	3	3	1	2
		Avg PO attained	2.83	3.0	2.83	3.0	2.33	3.0	2.83	1.5	1.5



BMT 309: BIOCHEMISTRY- VI

School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology- Technique		Semester: VI	
1	Course Code	BMT 309	
2	Course Title	BIOCHEMISTRY -VI	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To train the students in the management of medical laboratory along with handling a variety of laboratory chemicals and instruments including electronic and advanced equipment's used in modern medical laboratories.• To make the students able to do routine laboratory testing under stipulated conditions.• To prepare specimens and operate machines that automatically analyse samples.• To provide the conceptual basis for understanding biochemical and particularly address the fundamental mechanisms of the biomolecules to facilitate the life.• To develop diagnostic skills in clinical biochemistry and to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis.	
6	Course Outcomes	CO1: To define the importance of Molecular Biology CO2: To describe the concept and importance of Immunology CO3: To describe the importance of Acid base balance and Detoxification reaction CO4: To describe the importance of Recombinant DNA technology and Application of genetic engineering CO5: To define the importance of Techniques and Statistics CO6: Build the ability to understand the importance of various Techniques	

7	Course Description	<ul style="list-style-type: none"> • Molecular biology • Immunology • Acid base balance and Detoxification • Recombinant DNA technology and Application of genetic engineering • Techniques and Statistics 	
8	Outline syllabus		CO mapping
	Unit 1	Molecular biology	CO1, CO2
	A	Structure, function and types of DNA and RNA	CO1, CO2
	B	Replication, Transcription, Genetic code and Translation.	CO1, CO2
	C	Post transcriptional and post translational modification, Mutation.	CO1, CO2
	Unit 2	Immunology	CO1,CO2,CO3
	A	Active and Passive immunity. Antigen and Antibody	CO1,CO2,CO3
	B	Cell mediated immunity, Epitope, Immunogenicity	CO1,CO2,CO3
	C	Diagnostic immunological test (ELISA, RIA), Hybridoma technology	CO1,CO2,CO3
	Unit 3	Acid Base balance and Detoxification	CO3, CO6
	A	pH, Concept of Acid and Bases	CO3, CO6
	B	Body buffers, Acidosis and Alkalosis	CO3, CO6
	C	Phase 1 and Phase 2 detoxification reactions, Cytochrome P450	CO3, CO6
	Unit 4	Recombinant DNA technology and Application of genetic engineering	CO4, CO5, CO6
	A	Recombinant DNA synthesis, Genetic engineering	CO4, CO5, CO6
	B	Vector, Cosmid, Plasmid,	CO4, CO5, CO6



	C	DNA library, Gene cloning, PCR, cDNA synthesis, Gene therapy, DNA fingerprinting, RFLP.			CO4, CO5, CO6
	Unit 5	Techniques and Statistics			CO5,CO6
	A	Southern, Northern and Western blotting			CO5,CO6
	B	Chromatography, Electrophoresis			CO5,CO6
	C	Mean, Median, Mode, Standard Deviation, Variance, Correlation coefficient.			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution for Theory	CA	MTE	ETE	
		25	25	50	
		<ol style="list-style-type: none"> 1. Nelson.D.L, Cox. M. M. Lehninger s Principle of Biochemistry. 5th ed. Freeman, 2008 2. Murray. R.K, Granner.D.K, Mayes. P. A, Rodwell. V. W. Harper s Biochemistry. 27th ed. McGraw Hill, 2006. 3. Berg.J.M, Tymoczko.J.L, Stryer, L. Biochemistry. 6th ed. Freeman, 2006. 4. Zubay. Biochemistry. 4th ed. William C. Brown Publication, 1998 5. Voet and Voet. Biochemistry.4th edition, John Wiley, 2010. 			

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 309	BIOCHEMISTRY-VI	CO1	3	3	3	3	2	3	3	2	1
		CO2	3	2	2	3	1	1	2	1	2
		CO3	3	3	3	3	2	2	3	2	1
		CO4	3	3	3	3	1	1	3	1	2
		CO5	3	3	3	3	2	2	3	2	1
		CO6	3	3	3	3	1	3	3	1	2
		Avg PO attainted	3.0	2.83	2.83	3.0	1.5	2.0	2.83	1.5	1.5



School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: 6	
1	Course Code	BMT 310	
2	Course Title	PATHOLOGY-VI	
3	Credits	4	
4	Contact Hours (L-T-P)	2-2-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for laboratory technologists.• The content of rigorous course provide knowledge of the structure and function of the major organ systems, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis.• It also provide knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease.• The student will be able to properly order and interpret hematologic and coagulation tests, including CBC's, PT's, INR's, and APTT's, for the proper diagnosis and effective treatment of patients with hematologic, bleeding, and thrombotic disorders.	

6	Course Outcomes	<p>CO1: To define the importance of Cytogenetics</p> <p>CO2: To describe the importance of Immuno-cytochemistry</p> <p>CO3: To describe the importance of Immuno – haematology</p> <p>CO4: To describe the importance of Blood transfusion</p> <p>CO5: To describe the importance of Blood bank</p> <p>CO6: To define the importance of blood banking techniques</p>	
7	Course Description	<ul style="list-style-type: none"> • Cytogenetics • Immunocytochemistry • Immunohematology • Blood transfusion • Blood Bank 	
8	Outline syllabus		CO mapping
	Theory		
	Unit 1	Cytogenetics	CO1
		<p>A. Introduction to cytogenetics, terminology , classification and nomenclature of human Chromosomes</p> <p>B. Methods of karyotypic analysis (culture of bone marrow cells, peripheral blood lymphocytes, solid tumours and skin fibroblasts, direct preparation from tumour materials)</p> <p>C. Characterization of human chromosomes by various banding techniques, Sex chromatin identification, Chromosomes in neoplasia and oncogenes.</p>	
	Unit 2	Immunocytochemistry	CO2
		<p>A. Basics concepts of Immunocytochemistry</p> <p>B. Monoclonal antibodies and its preparation</p> <p>C. Fluorescence reactions</p>	
	Unit 3	Immunohematology	CO3
		<p>A. ABO blood group and Rh system</p> <p>B. Subgroups of A and B, other blood groups</p>	



		C. HLA antigens and their significance	
	Unit 4	Blood transfusion	CO4
		A. Principles of blood transfusion (blood donor selection, methods of bleeding donors, blood containers, anticoagulants and storage of blood, Coomb's test and its significance) B. Screening of blood for infective material, blood components, preparation and component therapy C. Autologous transfusion, transfusion reactions and work up	
	Unit 5	Blood bank	CO5, CO6
		A. Blood bank organization, B. Standards and procedures of blood bank C. Techniques and quality control	

Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 310	PATHOLOGY- VI	CO1	3	3	3	3	1	1	3	1	1
		CO2	3	3	2	3	2	2	3	2	2
		CO3	3	3	3	3	1	1	3	1	1
		CO4	3	3	3	3	2	2	3	2	2
		CO5	3	3	3	3	1	1	3	1	1
		CO6	3	3	3	3	2	2	3	2	2
		Avg PO attained	3.0	3.0	2.83	3.0	1.5	1.5	3.0	1.5	1.5



School: SSAHS		Batch : 2023-27	
Programme: BMLT- Technique		Current Academic Year: 2023-24	
Branch: Medical Lab Technology-Technique		Semester: 6	
1	Course Code	BMT 311	
2	Course Title	MICROBIOLOGY-VI	
3	Credits	4	
4	Contact Hours (L-T-P)	2-2-0	
	Course Status	Compulsory	
5	Course Objective	<ul style="list-style-type: none">• To introduce basic principles and application relevance of clinical disease for students who are in preparation for lab technologists.• To know many etiological agents responsible for global infectious diseases caused by bacteria, viruses and other pathogens related with infectious diseases in humans.• To provide the conceptual basis for understanding pathogenic microorganisms and particularly address the fundamental mechanisms of their pathogenicity.• To provide opportunities for a student to develop diagnostic skills in microbiology, including the practical application and interpretation of laboratory tests for the diagnosis of infectious disease.	



6	Course Outcomes	CO1: To describe the importance of bacteriology CO2: To define the importance of immune system CO3: To explain the importance of syndromic approach CO4: To describe the mechanism of quality control CO5: To define the importance of molecular diagnostic tests CO6: To create the analytical tool for assessment of microbial infections	
7	Course Description	<ul style="list-style-type: none"> • Bacteriology • Immune system • Syndromic approach • Quality control • Molecular diagnostic tests 	
8	Outline syllabus		CO mapping
	Theory		
	Unit 1		CO1
		A. Normal microbial flora of human body B. Bacteriology of water, C. Bacteriology of milk	
	Unit 2		CO1/CO2
		A. Bacteriology of food B. Function of immune system C. Monoclonal and polyclonal Antibody	
	Unit 3		CO3
		A. Antibody and its type B. Emerging and re-emerging infections C. Syndromic approach	
	Unit 4		CO1/ CO4
		A. Drug resistance B. Laboratory control of antimicrobial therapy C. Quality control	
	Unit 5		CO5/CO6
		A. Molecular diagnostic test B. Recent advances in diagnostic microbiology C. Automation in detection techniques	



Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 311	MICROBIOLOGY -VI	CO1	3	3	3	3	2	1	3	1	1
		CO2	3	3	2	3	1	2	3	2	2
		CO3	3	3	3	3	2	1	3	1	1
		CO4	3	3	3	3	1	2	3	2	2
		CO5	3	3	3	3	2	1	3	1	1
		CO6	3	3	3	3	1	3	3	3	2
		Avg PO attained	3	3	2.83 3333	3	1.5	1.66 6667	3	1.6666 67	1.5

1	Course Code	BMT 354	
2	Course Title	BIOCHEMISTRY –VI (LAB)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
5	Course Outcomes	CO1: To describe the importance of Urea, uric acid and creatinine estimation CO2: To define the importance of Clearance test CO3: To describe the use of enzymatic kit in enzyme activity estimation CO4: To define the importance of urine analysis in disease diagnosis CO5: To describe the importance of Lipid profile and CSF analysis. CO6: Build the ability to identify the diagnostic importance of various biomolecules	
6	Course Description	<ul style="list-style-type: none"> • Urea estimation and Creatinine estimation • Clearance test • Estimation of enzymes and Uric acid by kit method • Urine analysis • Lipid profile and CSF analysis 	
	Practical's		CO mapping
	Unit 1	Urea estimation and Creatinine estimation	CO1, CO2
		a. Estimation of Urea and Creatinine in normal sample b. Estimation of Urea and Creatinine in abnormal sample	



		c. Estimation of Urea and Creatinine in unknown sample		
	Unit 2	Clearance test	CO1,CO2,CO3	
		a. Briefing of clearance test b. Perform and calculate Urea clearance test c. Perform and calculate Creatinine clearance test		
	Unit 3	Estimation of enzymes and Uric acid by kit method	CO3, CO6	
		a) Estimation of SGPT and SGOT by kit method b) Estimation of LDH and Amylase by kit method c) Estimation of Uric acid by kit method		
	Unit 4	Urine analysis	CO4, CO5, CO6	
		a. Physical properties of urine b. Normal constituent of urine c. Abnormal constituent of urine		
	Unit 5	Lipid profile and CSF analysis	CO5,CO6	
		a. Total cholesterol, TG and HDL estimation b. Calculation of LDL and VLDL c. Collection of CSF and CSF protein analysis		
	Mode of examination	Theory and Practical		
	Weightage Distribution for Theory	CA	MTE	ETE
		30%	20%	50%
	Weightage Distribution for Practical's	CA	MTE	ETE
		60%	0%	40%
	Text book/s*	1. A text book of Medical Biochemistry by Chatterjee and Shinde 2. Text book of biochemistry for Medical students by Vasudevan and Sreekumari 3. Biochemistry by Lehninger 4. Clinical chemistry by Varley 5. Harpers Illustrated Biochemistry by Robert K.M.		



	Course Code	BMT 355	
	Course Title	PATHOLOGY –VI (LAB)	
	Credits	1	
	Contact Hours (L-T-P)	0-0-2	
	Course Outcomes	CO1: To define the importance of blood grouping CO2: To define the importance of Rh typing CO3: To describe the importance of Cross matching techniques CO4: To explain the importance of Transfusion reaction CO5: To explain the importance and process of Screening of donor’s blood for infective agents CO6: To define the importance of blood products	
	Course Description	<ul style="list-style-type: none"> • Blood grouping • Rh typing • Cross matching techniques • Transfusion reaction • Screening of donor’s blood for infective agents 	
	Practical’s		CO mapping
	Unit 1	Blood grouping	CO1
		A. ABO grouping and Rh types by tube method B. Rh typing by indirect antiglobulin method. C. Anti-A, anti-B and anti-D titre saline phase.	
	Unit 2	Rh typing	CO2
		A. Collection of blood for cross matching from a blood bag, B. Selection of donor or component separation	



		C. Selection of blood bags for component preparation	
Unit 3	Cross matching techniques	A. Major and minor cross-matching. B. Direct and Indirect antiglobulin method. C. Gel technology of blood grouping and compatibility testing	CO3
Unit 4	Transfusion reaction		CO4
		A. Haemapheresis: pertaining to Leucocytes, platelets, and plasma. B. Writing standard operating procedures. C. Platelet pheresis, Blood component preparation on component extractor	
Unit 5	Screening of donor's blood for infective agents		CO5, CO6
		A. Preparation of washed red blood cells. B. Preparation of platelet concentrates by PRP method. C. Preparation of platelet concentrates by buffy coat method. Testing of haematological parameters of blood products	
Mode of examination	Theory and Practical		
Weightage Distribution for Theory	CA	MTE	ETE
	30%	20%	50%
Weightage Distribution for Practical's	CA	MTE	ETE
	60%	0%	40%
Text book/s*	<ol style="list-style-type: none"> 1. Histopathology Techniques by Culling 2. Cytology by Koss 3. Clinical diagnosis by Laboratory method by Todd and Sanford 4. Laboratory Technology by Ramnic Sood 5. Practical Haematology by Dacie and Lewis 6. Text book of Pathology by Krishna 		



Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 355	PATHOLOGY- VI (LAB)	CO1	3	3	3	3	3	3	2	3	3
		CO2	3	3	2	3	3	3	3	3	3
		CO3	3	3	3	3	3	3	3	3	3
		CO4	3	3	3	3	3	3	3	3	3
		CO5	3	3	3	3	2	3	3	3	3
		CO6	3	3	3	3	3	3	3	3	3
		Avg PO attained	3.0	3.0	2.83	3.0	2.83	3.0	2.83	3.0	3.0

Course Code	BMT 356	
Course Title	MICROBIOLOGY –VI (LAB)	
Credits	1	
Contact Hours (L-T-P)	0-0-2	
Course Outcomes	CO1: To define about importance of Antibiotic susceptibility test (AST) CO2: To know the importance of Sensitivity and specificity of different diagnostic test CO3: To know the process of collection and transportation of clinical specimens CO4: To know the importance of central instrument facility CO5: To define the importance of exposure to clinical microbiology labs CO6: To create the possible analysis and mechanisms involved in the microbial lab diagnosis	
Course Description	<ul style="list-style-type: none"> • Antibiotic susceptibility test (AST) • Sensitivity and specificity of different diagnostic test • Concepts for analysis with reference to the collection and transportation of clinical specimens • Visit to central instrument facility • Visit to Clinical Microbiology labs 	
Practical's		CO mapping
Unit 1	Antibiotic susceptibility test (AST)	CO1
	a. Briefing b. Demonstration c. Practical	



Unit 2	Sensitivity and specificity of different diagnostic test			CO2
	<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Practical 			
Unit 3	Concepts for analysis with reference to the collection and transportation of clinical specimens			CO3
	<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Hands on practice 			
Unit 4	Visit to central instrument facility			CO4
	<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Hands on practice in lab 			
Unit 5	Visit to Clinical Microbiology labs			CO5, CO6
	<ul style="list-style-type: none"> a. Briefing b. Demonstration c. Hands on practice in lab 			
Mode of examination	Theory and Practical			
Weightage Distribution for Theory	CA	MTE	ETE	
	30%	20%	50%	
Weightage Distribution for Practical's	CA	MTE	ETE	
	60%	0%	40%	
Text book/s*	<ol style="list-style-type: none"> 1. Medical Microbiology by Anathanarayana and Panikar 2. Medical Microbiology –The practice of medical Microbiology by Roberty Cruckshank 3. Parasitology – Interpretation to Clinical Medicine by Chatterjee 4. Medical Mycology by Rippon 5. Medical Parasitology by Ajit Damle 			



Course code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO3
BMT 356	MICROBIOLOGY- VI (LAB)	CO1	3	3	3	3	1	1	3	3	3
		CO2	3	3	2	3	2	2	3	3	2
		CO3	3	3	3	3	3	1	3	3	1
		CO4	3	3	3	3	3	2	3	2	2
		CO5	3	3	3	3	2	1	3	2	1
		CO6	3	3	3	3	2	3	3	1	2
		Avg PO attained	3.0	3.0	2.83	3.0	2.16	1.66	3.0	2.33	1.83



Clinical Training and internship: Every student who has passed in all the theory and practical examinations of all the six semesters will have to undergo **6 months** clinical training in at-least 250 bedded hospital as internship as per schedule finalized by the Sharda School of Allied Health Sciences authorities. No candidate shall be permitted to proceed to the internship of the course of study i.e. clinical training in hospital, unless he/she has passed in all the written theory and practical examinations conducted during the preceding three years of the course of study. Every student should attend his/her training in the associated training hospital as per the timings of those centers. The Regular participation of students in seminars / case presentations is mandatory and aimed to encourage them in learning research and development Programmes in medical laboratory technology.

RULES and REGULATION FOR INTERNSHIP TRAINING PROGRAMMEME

- 1) For the Degree of Bachelor of Medical Lab Technology, the students after passing the professional examinations as per the syllabi prescribed by the Sharda University, for all 3 years shall undergo 6 Months compulsory rotatory internship training Programmeme to develop skill and acquire clinical knowledge with proficiency in managing patient and perform lab investigations independently.
- 2) These rules shall be implemented by Department of Medical Lab Technology, Sharda School of Allied Health Sciences, Sharda University, Greater Noida. The evaluation of the interns shall be done very carefully by the In-charge, Internship Training Programmeme and the Head of the concerned department in respective hospitals, on the basis of the skill, knowledge and ability to handle the patients independently.
- 3) The In-charge, Internship Training Programmeme, Heads of the Departments and the Dean /HOD of the institution shall be responsible for the maintenance of standard and records of the interns

GENERAL –

The Rules and Regulations recommended by the Department of Medical Lab Technology, Sharda School of Allied Health Sciences, shall be implemented by Sharda University.



- 1) The faculty incharge (Internship) / Dean/HOD Medical Lab Technology shall be responsible for implementation of Internship Programme and also for the issue of Internship completion certificate.
- 2) Internship shall commence not later than One Month from the day of declaration of results of 3rd year BMLT examination.
- 3) It shall be binding on the candidate to follow strictly, the code of conduct prescribed by the Department of Medical Lab Technology, Sharda School of Allied Health Sciences.
- 4) Compulsory Internship shall include rotational clinical assignments, administrative skills over a period of 6 months.
- 5) On successful completion of Internship, to the satisfaction of the Head of Medical Lab Technology Dept. and the Dean / HOD, the Internship completion certificate shall be issued by the institution; and it will be forwarded to the Sharda University for the award of BMLT Degree.

INTERNSHIP SCHEDULE -

Candidate shall be posted to Rotational Clinical posting for 6 months, including administrative skills pertaining to Medical Lab Technology practice.

INTERNSHIP REPORT-

During the Internship, candidate shall prepare a detailed report pertaining to the clinical posting at different specialization i.e. Pathology (Hematology, Histopathology, Cytology), Blood Bank, Microbiology and biochemistry, OPD and IPD sample collection

The candidate shall submit the internship report not earlier than two weeks and not later than 4 weeks of the last day of internship and the HOD, Medical Lab Technology of parent institution shall sign on the same if the internship report is up to her /his satisfaction.

EVALUATION-

On completion, the internship report will be submitted by each candidate will be evaluated by authorities and declared to be 'Satisfactory' or 'Not Satisfactory' and degree will be awarded after the successful VIVA examination. At the end of the rotational posting, student shall treat patients and also undertake skills of maintaining administrative records and Maintenance of equipment. The candidate shall maintain a log book and



record all the events of the respective posting He /She shall be closely monitored by the senior Lab staff in charge throughout the posting and the same shall also sign in the Log book on completion of the assignment.

LEAVE FOR INTERNS –

1. An internee shall be entitled for maximum 6 days leave (not more than 2days at a time) during 6 Months period of internship posting.
2. An interns will not be permitted to avail more than 2 days leave in any department. The leave other than C.L. will not be admissible.
3. Any leave in excess of above rule or absence from the work on any ground should be treated, as absence and the intern shall have to complete the required attendance as a repeat day.
4. Internees cannot avail casual leave without prior permission to HOD/ Clinical Incharge of the School. In emergency interns should intimate within 24 hours, with supporting reasons to the HOD/ Clinical Incharge.
5. Any student taking Leave without prior permission will be compensated for 2 days. Working hours for interns are to be not less than 7 hours per day.
6. He\She can avail weekly off\ Sunday and national \Govt. holidays permissible to hospital with prior permission of Hospital Authority

ISSUE OF INTERNSHIP COMPLETION CERTIFICATE

The internship completion certificate by the Dean / HOD MLT will be issued only after the successful completion of internship training Programmeme, Internship report and VIVA examination.

Place: GreaterNoida
Lucose)

(Dr. Sally

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GUIDELINES FOR INTERNS

1. Timing of reporting to the department will be as per the host institute guidelines.
2. Dress code:
 - a. Always wear apron while working
 - b. Adopt safety measures (gloves and mask{N95})
3. At the end of internship, intern need to submit a internship report to the department
4. Interns will be on rotatory internship at different departments i.e. Hematology, Histopathology, Cytology, Blood Bank, Microbiology, biochemistry, OPD and IPD for sample collection at the hospital during their training.
5. Female interns must tie their hair and should not be wearing any accessories.
6. Male interns must have short hair and beard must be shaved.
7. Nails should be cut short.
8. Students must maintain their logbooks.
9. Disciplinary action will be taken against interns found loitering during the posting hours.

In charge
Medical Lab Technology

Dean
SSAHS