

INTEGRAL UNIVERSITY, LUCKNOW INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH

DEPARTMENT OF PARAMEDICAL SCIENCES

BACHELOR OF SCIENCE IN CARDIOVASCULAR TECHNOLOGY (B.Sc. CVT)

SYLLABUS

YEAR/ SEMESTER: II/III



Integral University, Lucknow **Department of Paramedical Sciences** Study and Evaluation Scheme

Program: BSc. Cardiovascular Technology

Semester-III **Period Per** S. Туре **Evaluation Scheme** Course Sub. Total hr/week/sem N. **Course Title** ofPaper Credit code Total Credits Т Р СТ TA Total ESE L THEORIES 2 1 CV201 Clinical Hematology - I Core 1 0 40 20 60 40 100 2:1:0 3 2 CV202 Microbiology 2 1 0 40 20 60 40 100 2:1:0 3 Core 3 CV203 Pharmacology 2 1 0 40 20 60 40 100 2:1:0 3 Core CV204 Medical Biochemistry -II Core 2 1 0 40 20 60 40 100 2:1:0 3 4 Basics of Cardiovascular Technology 40 20 60 40 100 2:1:0 5 CV205 Core 2 1 0 3 ES101 Environmental Science 2 40 20 60 40 100 2:1:0 3 6 0 Core 1 PRACTICAL CV206 Clinical Hematology - I Lab 20 40 100 1 Core 0 0 4 40 60 0:0:2 2 2 CV207 Medical Biochemistry -II Lab Core 0 0 4 40 20 60 40 100 0:0:2 2 CV208 Basics of Cardiovascular Technology Lab 0 0 4 40 20 60 40 100 0:0:2 2 3 Core Total 12 06 12 360 180 540 360 800 24 24

S		1960		Type			А	ttributes				United Nation
N		ode	Course Title	ofPaper	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	Development Goal (SDGs)
			THEORIES									
1	L CV2	201 Clir	nical Hematology - I	Core	\checkmark	V	\checkmark					3,4
2	2 CV2	202 Mic	crobiology	Core		N	\checkmark					3,4
3	B CV2	203 Pha	armacology	Core		N	\checkmark					3,4
4	I CV2	204 Me	edical Biochemistry -II	Core		N	\checkmark					3,4
5	5 CV2	205 Bas	sics of Cardiovascular Technology	Core			\checkmark					3,4
6	5 ES1	101 Env	vironmental Science	Core			V		V			3,4
			PRACTICAL									
1	L CV2	206 Clir	nical Hematology - I Lab	Core			\checkmark					3,4
2	2 CV2	207 Me	edical Biochemistry -II Lab	Core		V	V				V	3,4
3	3 CV2	208 Basics of Cardiovascular Technology Lab		Core			\checkmark				\checkmark	3,4
		•				•	•		-	•		

T: Tutorials P: Practical CT: Class Test TA: Teacher Assessment ESE: End Semester Examination, L: Lecture AE= Ability enhancement, DSE- Discipline Specific Elective, Sessional Total: Class Test + Teacher Assessment **Subject Total:** Sessional Total + End Semester Examination (ESE)



Effective from Session: 2024-25													
Course Code	CV201	CLINICAL HAEMATOLOGY- I	L	Т	Р	С							
Year	П	Semester	III	2	1	0	3						
Pre-Requisite	10+2 with Biology Co-requisite Nil												
Course Objectives	The hematolog laboratory was The academic blood banking	gycurriculumaimstoprepare: te management protocols, i emphasis of this module i and automation	studentsinbasicunderstandingofcomposition of blood. Students wou nstrumentation, techniques and methods of estimating different para s that students would learn basic hematological techniques include	ld also umeters ling blo	be intro of blood od coag	luced to l. julation	tests,						

Course	Outcomes
CO1	Students will be able to receive process and preserve the tissue samples and can efficiently about the RBCs. Structure and function
CO2	Students will be able to receive process and about the Anemia.
CO3	Students will be able to receive process of the Anemic Disease.
CO4	Students will be able to receive process and preserve the tissue samples and can efficiently perform Anemia of Diminished Erythropoiesis.
CO5	Students will be able to receive process and preserve the Hemolytic anemia.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO							
1	BLOOD	Structure and metabolism of RBCs. Structure of normal hemoglobin and its metabolism. Variation of size and shape.	6	CO1							
2	ANEMIA	Definition of Anemia and its classification (Morphological and etiological) pathogenesis, laboratory investigations in a case of anemia.	6	CO2							
3	ANEMIC DISEASE	Anemia of blood loss - acute and chronic.	6	CO3							
4	ANEMIA OF DIMINISHED ERYTHROPOIESIS	Anemia of Diminished erythropoiesis: Iron deficiency anemia - pathogenesis, and laboratory investigations. Principle and procedure of special tests - Estimation of iron, TIBC, Transferrin, Ferritin, Plasma hemoglobin, Perls Prussian blue staining. Macrocytic anemia - pathogenesis, and laboratory investigations of Megaloblastic anemia, pernicious anemia, pathogenesis, clinical features, laboratory investigations, test for Vit.B12, Folic acid, FIGLU test and Schilling test.	6	CO4							
5	HEMOLYTIC ANEMIA	Features of Hemolytic anemia (extra vascular and intra vascular hemolysis). Hemolytic anemia of non-immune origin Sickle cell anemia, sickle cell trait, pathogenesis, clinical features, laboratory investigations. Principle and procedure of special test, Sickling test. Briefly about G-6-PD deficiency disease, tests for diagnosis, Hereditary spherocytosis and test for diagnosis (Osmotic fragility test, Heinz bodies). Immune-hemolytic anemia.	6	CO5							
Referenc	e Books:										
1. Mukhe	rjee .L. K(2017), Medical Laboratory	Technology, Vol.1-3,3rd edition, Tata Mc-graw Hill.									
2. SoodR	amnik,(2015), Text book of Medical L	Laboratory Technology,2nd edition, Jaypee Publications.									
3. Wintro	be's Clinical Haematology, (2014), 13t	the diffion, Lippincott Williams & Wilkins.									
5 Dacial	Lewis Practical Haematology III Medic	11 thedition Elsevier Publications									
e-Learni	Dacie& Lewis Practical Haematology, (2011),11thedition, Elsevier Publications.										
- Lear III	ug jource.										
1. <u>https://v</u>	www.slideshare.net/peddanasunilkum	ar/introduction-to-pathology-ppt									

2.https://www.ucsfhealth.org/medical-tests/semen- analysis#:~:text=Semen%20analysis%20is%20one%20of,have%20a%20male%20infertility%20problem. 3.https://www.youtube.com/watch?v=wZCKrseSIOE

	Course	Articul	ation Ma	atrix: (N	Aapping	g of COs	with PC)s and P	SOs)									
PO- PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
СО																		
CO1	<u>1 1 3 1 2 1 2 - 2 - 1 - 1 - 1</u>																	
CO2	1	3	1	3	-	-	-	1	3	-	-	3	-	2	-	2	-	1
CO3	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-	1
CO4	1	3	1	2	-	-	-	1	3	-	-	3	-	1	-	1	-	1
CO5	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-	1
			1- Lo	w Corre	elation; 1	2- Mode	rate Cor	relation	i; 3- Sub	ostantial (Correlatio	on Attribu	ites & SDO	Gs				
Cours	e Code	Co	urse Tit	e		Attri	hutes											SDCe

Course Code	Course The	Attributes							SDGs
CV201	CLINICAL	Employability	Entrepreneurship	Skill	Gender	Environment &	Human	Professional	No.
	HAEMATOLOGY-I			Development	Equality	Sustainability	Value	Ethics	
			\checkmark	V				\checkmark	3,4



Effective from Session	Effective from Session: 2024-25													
Course Code	CV202	Title of the Course	MICROBIOLOGY	L	Т	Р	C							
Year	II	Semester	III	2	1	0	3							
Pre-Requisite	Nil Co-requisite Nil													
Course Objectives	This subject gives a general insight into the history, basics of microbiology and imparts knowledge about equipment used in microbiology.													

	Course Outcomes
CO1	This course makes the students to know handling of instruments and sterilization techniques.
CO2	This course makes the students to know general insight into the history, basics of microbiology.
CO3	This course makes the students to know imparts knowledge about equipment used in microbiology.
CO4	This course makes the students to know Structure, function and chemical composition of bacterial cell membranes.
CO5	This course makes the students to know Biomedical waste management in a Medical Microbiology laboratory: Types of the waste generated,
	Segregation, Treatment, Disposal.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO							
1	INTRODUCTION ANDHISTORY OF MICROBIOLOGY	 Development of microbiology as a discipline, Contributions of Anton von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming, Edward Jenner. Introduction to bacterial taxonomy, Classification of Bacteria, Morphology based on size, shape, arrangement, motility, flagella, spores, capsules, cell wall, plasma membrane, pili, ribosomes. 	6	CO1							
2	MICROSCOPY	 Microscopy: Study of compound microscope– magnification, numerical aperture resolution and components of microscope. Dark ground illumination, care of microscope and common difficulties micrometry. Bright Field Microscope, Dark Field Microscope, Phase Contrast Microscope, Fluorescence Microscope, Transmission Electron Microscope, Scanning Electron Microscope, Confoca Microscope. 	6	CO2							
3	STRUCTURE OF BACTERIA	 Cell size, shape and arrangement, cell-wall, composition and detailed structure of Grampositive and Gram-negative cell walls, Cell Membrane. Structure, function and chemical composition of bacterial cell membranes. Cytoplasm: Ribosome, mesosomes, inclusion bodies, nucleoid, chromosome and plasmidsEndospore: Structure, formation, Bacterial Genetics. 	6	CO3							
4	STERILIZATION AND DISINFECTION	 General safety measures used in Microbiology laboratory. Sterilization and disinfection: Various physical methods of sterilization heat. UV radiation, ionizing radiation, filtration, characters affecting sterilization, auto clave control and sterilization indicators. Biomedical waste management in a Medical Microbiology laboratory: Types of thewaste generated, Segregation, Treatment, Disposal, PPE & infection prevention Control. 	6	CO4							
5	ANTISEPTICS AND DISINFECTANTS	 Antiseptics & Disinfectants: Definition, types and properties, mode of action, use, qualities of good disinfectants. Chemical disinfectants – phenol and its compounds, alcohol, halogen, heavy metals and quaternary ammonium compounds, aldehyde, gaseous compound use and abuse of disinfectants. precautions while using the disinfectants, Testing of disinfectants. 	6	CO5							
Referen	nce Books:										
1. Anar	hthanarayan R. and Paniker C.K.J. (200	9) Textbook of Microbiology. 8th edition, University Press Publication.									
2. Broo	herg's Medical Microbiology 26th edi	tion McGraw Hill Publication									
 Adelberg's Medical Microbiology. 20th edition. McGraw Hill Publication. Willey IM, Sherwood LM, and Woolverton CL (2013) Prescott. Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education. 											
5. Gold	5. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, NewYork.										
e-Lea	rning Source:										
1. <u>http</u>	s://www.babcock.edu.ng/oer/lecture_no	tes/mlsc/MLSC%20417%20HISTORY%200F%20MICROBIOLOGY.ppt									
2. <u>http</u>	2. <u>https://www.tru.ca/_shared/assets/Microbiology_Lab_Safety39696.pd</u> f										
3. http	s://www.healthline.com/health/what-is-	antiseptic									

		Course Articulation Matrix: (Mapping of COs with POs and PSOs)															
PO-PSO	DO 1	DO1	DO 2	DO4	DOS	DOC	DO7	DOP	DOO	DO10	DO11	DO12	DEO1	DEOD	DCO2	DCO4	DEOS
СО	POI	PO2	P03	P04	P05	PO6	PO/	P08	PO9	POIO	POIT	P012	PS01	PS02	PS05	PS04	PS05
CO1	1	3	2	2	-	-	-	1	2	-	-	2	3	1	2	3	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	3	-	1	2	-
CO3	1	3	1	2	-	-	-	1	2	-	-	2	2	2	1	2	2
CO4	1	3	1	2	-	-	-	1	3	1	-	3	2	3	1	3	2
CO5	1	3	1	2	-	-	-	1	2	2	-	2	3	1	2	2	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	Course Title		Attributes									
CV202	MICROBIOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	No.			
		1	1	1	1		ſ	ſ	3,4			



Effective from Session: 202	24-25		necuve from Session: 2024-25													
Course Code	CV203	Title of the Course	PHARMACOLOGY L T													
Year	II	Semester	III 3 1 0													
Pre-Requisite	Nil Co-requisite Nil															
Course Objectives	The course will formulations, do chemical and tra	e course will provide training in general pharmacology with special emphasis on common drugs used, routes of ministration, types of mulations, dose and frequency of administration, side effects and toxicity, management of toxic effects, drug interactions, knowledge of emical and trade name, importance of manufacturing and expiry dates and instructions for handling of drugs.														

 Course Outcomes: After the successful course completion, learners will develop following attributes:

 CO1
 General Pharmacology & ANS: Possess a relevant knowledge in basic principles of pharmacology and its recent advances.

 CO2
 Autacoids, PNS & Resp. System: Understand the basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy.

 CO3
 CVS, GIT & Miscellaneous: Understand the general principles of drug action and the handling of drugs by the body.

 CO4
 CNS & Hormones: Understand the contribution of both drug and physiotherapy factors in the outcome of treatment

 CO5
 Anti - Microbial Agents: Learn the various drugs such as Anti-leprotic& Anti-fungal Drugs, Anti-malarial Drugs, Anti-tubercular Drugs

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	GENERAL PHARMACOLO GY	Introduction to pharmacology-various terminologies-sources & routes of drug administration-Absorption & Factors modifying drug absorption – Distribution of drugs- Metabolism: Phase II, - Excretion: routes, modes & kinetics of elimination-Excretion- Mechanism of drug action in brief, synergism & antagonism and Factors modifying drug action-Adverse drug reactions-ADR reporting & monitoring – Drug interactions.	8	CO1
2	CENTRAL NERVOUS SYSTEM & RESPIRATORY SYSTEM	Introduction to CNS and Neurotransmitters, drugs used in insomnia, Sedatives and hypnotics-diazepam- alprazolam, anti-anxiety drugs, Antiepileptic-phenytoin, carbamazepine, sodium valproate, General Anesthetics – halothane, isoflurane, sevoflurane – Local Anesthetics – lignocaine – list of other drugs, Alcohols – ethyl alcohol –disulfuram, Anti parkinsonians – levodopa – carbidopa, Opioids – morphine – naloxone – tramadol – pentazocine, NSAIDs –aspirin – diclofenac – ibuprofen – paracetamol – Cox 2 inhibitors. Drugs used in bronchial asthma and cough	8	CO2
3	CARDIO VASCULAR SYSTEM & BLOOD	Drugs used in ischemic heart disease-nitrates-Calcium channel blockers-nifedipine, verapamil-list of other drugs – Beta blockers – propronolol, atenolol – metoprolol and antiplatelets – aspirin, clopidogrel, and names of other drugs-fibrinolytic drugs-streptokinase and other drugs, Drugs used in CCF-digoxin and list of other drugs useful in CCF, Shock. Diuretics: 4 groups – Thiazides, Loop diuretics, Potassium sparing and osmotic diuretics. Hypertension – outline of drugs used in hypertension, Rennin angiotensin system – ACE inhibitors – captopril, ramipril and names of other drugs – Receptor antagonist – losartan and list of other drugs, Antiarrhythmic drugs- classification – Quinidine, Lignocaine and amiodaron – Drugs for Hypercholesterolemia – statins. Drugs for anemia – oral & parenteral iron preparations, folic acid, vit B12 and erythropoietin. Coagulants and anticoagulants	8	CO3
4	HORMONES AND GIT	Contraceptives – oral and injectable, Corticosteroids – glucocorticoids – hydrocortisone-prednisolone- dexamethasone and names of topical steroids – Insulin – Oral hypoglycemic –sulphonyl urea's, biguanides and others, Thyroid and Antithyroid drugs, Sex Hormones-Estrogen and antiestrogens, Progestin and Anti progestin's, Androgen And anti-androgens. Emetics and anti-emetics-metoclopramide and domperidone, Drugs used in peptic ulcer, constipation-lactulose & Diarrhea-ORS-Loperamide.	8	CO4
5	CHEMOTHERA PY AND MISCELLANEO US	Introduction – Beta lactum antibiotics: Penicillin's – natural, semi synthetic penicillin's – amoxicillin – cloxacillin-clauvulinic acid – sulbactum – Cephalosporin's – cephalexin – cefuroxime – cefixime – ceftrioxone-cefipime, Broad spectrum antibiotics – Doxycycline – chloramphenicol-imipenum-Macrolides – erythromycin, azithromycin and others – Quinolones- ciprofloxacin and list of other drugs and sulfonamides- cotrimoxazole- Amino glycosides-gentamycin, amikacin and names of other drugs Anti TB-first line drugs, Anti leprosy- dapsone and clofazimine Anti-malarial- chloroquine-mefloquine and artemisinins, Anti-fungal- amphotericin B- fluconazole and topical drugs & Anti viraldrugs- acyclovir and anti-HIV, Anti protozoals- metronidazole – Anthelmintics- albendazole-praziquantel. Anti-cancer drugs-Introduction – Anti metabolites- methotrexate- 6 mercapto purine- Alkylating agents- cyclophosphamide- busulphan and cisplatin – Plant products- vinblatin- vincristine-taxanes, antibiotics- actinomycin D- monoclonal antibodies. Immuno modulators- cyclosporine, tacrolimus, azathioprine and steroids.	8	CO5
Referen	ce Books:			
1. Dr. K	.D. Tripathi Jaypee, Essential o	of Medical Pharmacology, Brothers Medical Publishers.		
2.Gaudi 3.Dr R	S Satoskar & Dr S D Bhanda	rkar. Pharmacology & Pharmacotherapeutics Revised 19th Edition 2005 by Popular Prakashan		
4. Krant	x, &Carr, Pharmacology princi	ple of Medical practice, Williams & Wilkins.		
5.Goodi	nan Pharmacological basis of T	Cherapeutics, L. S. Gilman A		
e-Learr	ing Source:			
1. <u>https:</u>	//youtu.be/a01WFQvQKw8			
2. <u>https:</u>	//youtu.be/qhiMmNZjHRg			
3. https:	//youtu.be/-znHCAu5OnY			

4. https://youtu.be/t2tKyjj7u5Y

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
СО																	
CO1	2	3	-	-	-	-	-	-	-	-	-	1	3	-	1	-	2
CO2	3	3	-	-	-	2	-	-	-	-	-	-	3	3	2	3	3
CO3	2	3	-	-	-	2	-	-	-	-	-	1	3	2	1	3	2
CO4	3	3	-	-	-	-	-	-	-	-	-	-	2	3	2	2	3
CO5	3	3	-	-	-	3	-	1	-	-	-	-	3	3	2	3	3
			1-L	ow Corr	elation;	2- Mode	rate Corr	relation;	3- Substa	ntial Corre	lation Attri	butes & SE	DGs				

Course Code	Course Title		Attributes SI								
CV203	PHARMACOLOGY	Employability	Entrepreneurship	Skill Development	Gender	Environment &	Human Value	Professional Ethics	No.		
C V 203	THARMACOLOGI	√	V	√	Equanty	Sustainability	value √	√	3,4		



Effective from Session: 2024-25										
Course Code	CV204	Title of the Course	MEDICAL BIOCHEMISTRY-II	L	Т	Р	C			
Year	П	Semester	III	2	1	0	3			
Pre-Requisite	Nil	Co-requisite	Nil							
Course Objectives This course deals with fundamentals of metabolism, metabolic disorders, laboratory test and instruments of Clinical Biochemistry.										

	Course Outcomes: After the successful course completion, learners will develop following attributes:
CO1	Students will be able to learn about metabolism of carbohydrates, HMP pathway & ETC
CO2	Students will be able to learn about blood glucose regulation mechanism and its disorder, ex- Diabetes Mellitus
CO3	Students will be able to learn about Proteins and their metabolism.
CO4	Students will be able to learn about Lipids, their structure, metabolic pathways and cholesterol metabolism
CO5	Students will be able to learn about Acid-Base balance mechanism, Blood chemistry profile, various techniques to monitor blood chemistry.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	METABOLISM OF CARBOHYDRATES	Introduction of Metabolism, Metabolism of Carbohydrates: Glycolysis, TCA cycle, Gluconeogenesis, Glycogenesis, Glycogenolysis, Hexose monophosphate Pathway. Biological Oxidation and Electron Transport Chain.	6	CO1
2	DIABETES MELLITUS	Blood glucose homeostasis and its regulation, Insulin, glucagon, C-peptide. Diabetes mellitus, types, clinical features, diabetic profile test, HbA1C, Fructosamine, GTT, Glycosuria, Hyperglycemia and Hypoglycemia.	6	CO2
3	PROTEINS	Metabolism of Proteins: Formation of ammonia, Transamination, Deamination, Urea, Cycle, Significance of Urea cycle, metabolism of Aromatic and Branched chain amino acids, Aminoaciduria.	6	CO3
4	LIPID	Metabolism of Lipids: Fatty acid synthesis, Beta oxidation of fatty acids, Ketone bodies and ketosis, Cholesterol metabolism, metabolism of Lipoproteins, Lipid profile, Hyperlipidemia, Dyslipidemia and Atherosclerosis.	6	CO4
5	ACID & BASE BALANCE	 Acid- Base balance and pH: pH and its Regulation, Metabolic and Respiratory Disorders. Principle, application, calibration and maintenance of colorimeter, Blood Chemistry analyzer, ABG analyzer, Flame photometer, Turbidimetry, Nephelometry. 	6	CO5
Refere	ence Books:			

1. D M Vasudevan, Text book of Medical Biochemistry, JaypeePublishers.

2. M N Chatterjee&RanaShinde,	Text book of Medical Biochemistry, Jayppe Publications.
	41-

3. Michael Cox, David L. Nelson, Lehninger Principles of Biochemistry, 7thedition, W.H. Freeman.

A RanjanaChawla, Practical Clinical Biochemistry: Methods andInterpretations.
 e-Learning Source:
 <u>1.https://youtu.be/t5DvF5OVr1Y
 A https://youtu.be/ggc9vctvBQ
 A https://youtu.be/Q6R4o-oECxs
 </u>

		Course Articulation Matrix: (Mapping of COs with POs and PSOs)															
PO-PSO	PO1	DOJ	PO3		DO2	DO6		POS		DO10	PO11	DO12	DSO1	DSO2	DSO3	DSO4	DSO5
CO	roi	r02	105	104	105	100	107	100	109	1010	ron	1012	1301	1302	1303	1304	1305
CO1	1	3	2	2	-	-	-	1	2	1	-	2	2	1	-	1	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	3	2	-	2	-
CO3	1	3	1	2	-	-	-	1	2	2	-	2	3	1	-	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	-
CO5	1	3	1	2	-	-	-	1	2	1	-	2	2	1	-	1	-

1-

Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

	Course Code	Course Title			Att	ributes				SDGs
		MEDICAL	Employability	Entrepreneursh	Skill Developme	Gender Equalit	Environment	Huma	Professional	No.
	CV204	BIOCHEMISTRY-II	Employuomity	ip	nt	y y	Sustainability	Value	Ethics	
		Г	ſ	ſ	Г		Ţ	ſ	3,4	



Effective from Session:20	Effective from Session:2024-25											
Course Code	CV205	Title of the Course	BASICS OF CARDIOVASCULAR TECHNOLOGY	L	Т	Р	С					
Year	II	Semester	III	2	1	0	3					
Pre-Requisite	-Requisite NIL Co-requisite NIL											
Course Objectives	Students can understand the Basic concepts of cardiovascular technology.											

 Course Outcomes

 CO1
 To understand the Basic Function of Heart

 CO2
 To understand the Gross Anatomy and Physiology of the Heart.

 CO3
 To understand the Non-invasive ECG techniques

 CO4
 To understand the purpose of ECG machines and related equipment

 CO5
 To understand the gas administration devices

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
		1. Gross anatomy and physiology of the heart.		
1	ANATOMY AND	2. Systemic and pulmonary circulation,		
	PHYSIOLOGY OF	3. Coronary structure.		
	HEART AND BLOOD	4. Chest topography.	6	CO1
	VESSELS	5. Surface marking of heart.		
		6. Conduction system of the heart		
		1. Technique of ECG recording		
		2. ECG leads system		
2	NONINVASIVE ECG	3. ECG waves, intervals and segments - person, Osborn wave, delta wave, epsilon	6	CO2
_		wave		
		4. ECG reporting exercise testing		
		1. Introduction and purposes, demonstration of machine parts,		
3	NONINVASIVE	2. Basic windows		
e	FCHOCARDIOGRAPHY	3. Echocardiographic views	6	CO3
		4. Imaging modes - two-dimensional (2d) imaging, m-mode imaging, doppler		
		imaging, color-flow mapping.		
		1. Introduction to Cath labs and biomedical equipment.		
	INVASIVE TECHNOLOGIES	2. Radiation safety and protocols.	6	CO4
4		3. Catheterization of heart and angiography	U	004
		4. Maintaining sterility and patient care		
		1. Gas administration devices (reducing valves, flow meters and regulators). A)		
	GAS ADMINISTRATION	simple oxygen administration devices.		
5	DEVICES	2. Methods of controlling gas flow.	6	CO5
	DEVICES	3. Reducing valves, flow meters, restrictors and regulators		
		4. Selection of device		
Refere	nce Books:			
1.	A Textbook of Electrocardiog	raphy - Goldberger.		
2.	Nanda's A Textbook of Echoc	ardiography.		
3.	A Text of Cardiac Catheteriza	tion & Interventions. Dr. W. Grossman's D. Baim.		
4.	A Textbook of Cardiovascular	Medicine. Dr. Bruanwald's.		
5.	A Textbook of Medicine. Dav	idsons.		
e-Lea	rning Source:			
1. <u>https</u>	//youtu.be/t5DvF5OVr1Y			

2. https://youtu.be/gggC9vctvBQ

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO- PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO																		
CO1	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-	1
CO2	1	3	1	3	-	-	-	1	3	-	-	3	-	2	-	2	-	1
CO3	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-	1
CO4	1	3	1	2	-	-	-	1	3	-	-	3	-	1	-	1	-	1
CO5	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-	1
	1- Low Correlation: 2- Moderate Correlation: 3- Substantial Correlation Attributes & SDGs																	

Γ	Course Code	Course Title		Attributes								
ſ	CV205	BASICS OF	Employability	Entrepreneurship	hip Skill Gender Environment & Human Professi Development Equality Sustainability Value Ethic				Professional Ethics	No.		
		TECHNOLOGY	\checkmark		\checkmark			\checkmark		3,4		



Effective from Session: 2024-25												
Course Code	ES101	Title of the Course	ENVIRONMENTAL STUDIES	L	Т	Р	С					
Year	II	Semester	III	2	1	0	3					
Pre-Requisite	Nil	Co-requisite	Nil									
Course Objectives	The student will and social issues	The student will be made aware of our environment in general, natural resources, ecosystems, environmental pollution and social issues related to environment.										

	Course Outcomes								
CO1	To study about the Environment and the ECO system.								
CO2	To study about the Natural Resources.								
CO3	To study about Biodiversity and Conservation								
CO4	To study Environmental pollution, its policies and practices								
CO5	To study Human Population and Environmental Ethics								

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO ENVIRONMENT AND ECOSYSTEMS	Environment, its components and segments, Multidisciplinary nature of Environmental studies, Concept of Sustainability and sustainable development, Environmental movements, Ecosystem, Structure & Function, Energy flow in the Ecosystem, Ecological Pyramids and Ecological Succession.	6	CO1
2	NATURAL RESOURCES	Energy Resources: Renewable and nonrenewable, Soil erosion and desertification, Deforestation, Water: Use and over exploitation, Impacts of large Dams, Case studies.	6	CO2
3	BIODIVERSITY AND CONSERVATION	Levels of biological diversity, Hot spots of biodiversity, India as a Mega Diversity Nation, Endangered and endemic species of India, Threats to Biodiversity, Conservation of Biodiversity, Ecosystem and biodiversity services.	6	CO3
4	ENVIRONMENTAL POLLUTION, POLICIES AND PRACTICES	Environmental pollution, Solid waste management, Ill effects of fireworks, Climate change, Ozone layer depletion, acid rain and impacts on human communities and Environment. Environmental Laws: Environment Protection Act, Wildlife protection Act, Forest conservation Act, Convention on Biological Diversity (CBD), Tribal rights, Human wildlife conflicts.	6	CO4
5	HUMAN POPULATION AND THE ENVIRONMENT	Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons, Environmental ethics, Environmental communication and public awareness, case studies.	6	CO5
1.4		2'1 - X7'''D 1 7 / D''		
1. Aga	rwal, K.C. 2001 Environmental; I	Biology, Nidi Pub. Ltd. Bikaner.	D 472	
2. Glic	ringham W P 2001 Cooper T H	c institute for studies in dev, Environment & security, Stocknoim Env, Institute, Oxford Un Corbani E & Henworth Environmental angyglopedia Jaigob Publication House, Mumbri	IV, Press 4/3).
4. Clar	k R.S. Marine Pollution, Clander	on Press Oxford(TB).		
5. Bru	nner R.C. 1989. Hazardous waste	incineration, Mc Graw Hill.		
6. Bha	ruchaErach, The Biodiversity of I	India, Mapin Pub. Pvt. Ltd., Ahemdabad-380, India.		
7. De.	A.K. Environmental chemistry W	/illey EasternLimited.		
e-Lea	arning Source:			
1. <u>ht</u>	tps://www.sathyabama.ac.in/site	s/default/files/course-material/2020-10/UNIT-I_15.pdf		
2. ht	tps://juniperpublishers.com/raps	ci/pdf/RAPSCI.MS.ID.555586.pdf		

3. https://ourworldindata.org/world-population-growth

						Cours	e Artic	ulation I	Matrix: (Mapping	g of COs v	with POs a	and PSOs)			
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
СО	101	102	105	104	105	100	107	100	10)	1010	1011	1012	1501	1502	1505	100+	
CO1	1	3	1	2	-	-	-	1	2	1	-	2	-	1	2	-	3
CO2	2	3	2	2	-	-	-	1	3	1	-	3	-	2	1	-	2
CO3	1	3	1	2	-	-	-	1	2	-	-	2	-	1	2	-	3
CO4	2	3	1	2	-	-	-	1	3	-	-	3	-	2	3	-	3
CO5	1	3	1	2	-	-	-	1	2	1	-	2	-	1	2	-	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	Course Title		Attributes SD										
ES101	ENVIRONMENTAL	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	No.				
	STUDIES	\checkmark	\checkmark	V			V		3,4				



Effective from Session: 2024-25												
Course Code	CV206	Title of the Course	CLINICAL HAEMATOLOGY- I LAB	L	Т	Р	С					
Year	II	Semester	III	0	0	4	2					
Pre-Requisite	Nil	Co-requisite	Nil									
Course Objectives	The hematologycurricu	The hematologycurriculumaimstopreparestudentsinbasicunderstandingofcomposition of blood. Students would also be introduced to laboratory										
	waste management prot	ocols, instrumentation, tec	hniques and methods of estimating different parameters of blood.									
	The academic emphasis of	he academic emphasis of this module is that students would learn basic hematological techniques including blood coagulation tests, blood banking										
	and automation.											

	Course Outcomes									
CO1	Students will be able to learn about Hemoglobin Detection Technique, Total RBC counting technique, PCV									
CO2	Students will be able to learn about Red cell Indices, Blood smear, GBP									
CO3	Students will be able to learn about G-6PD, Leucocyte count, ALC techniques									
CO4	Students will be able to learn about toxic granulation of neutrophil, PT & NR, APTT									
CO5	Students will be able to learn about SICKLE TEST, Plasma HB, Reticulocyte count techniques.									

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mappe d CO
1	HEMOGLOBIN DETECTION TECHNIQUE	1. Determination of hemoglobin by various methods.		CO1
2	TOTAL RBCCOUNTING TECHNIQUE	2. Determination of Total RBC count.		CO1
3	PCV	3. Determination of PCV.		CO1
4	RED CELL INDICES	4. Determination of red cell indices.		CO2
5	BLOOD SMEAR	5. Demonstration of hypochromic microcytic slide.		CO2
6	GBP	6. General blood picture.		CO2
7	G-6PD	7. Determination of G-6-PD.		CO3
8	LEUCOCYTE COUNT	8. Differential Leucocyte Count.	60	CO3
9	ALC	9. Absolute leucocyte count.		CO3
10	NEUTROPHIL	10. Demonstration of toxic granulation of neutrophil.		CO4
11	PT & NR	11. Toperform PT and Calculate INR.		CO4
12	APTT	12. Toperform APTT.		CO4
13	SICKLE TEST	13. Toperform sickling test.		CO5
14	PLASMA HB	14. Determination of Plasma Hemoglobin.		CO5
15	RETICULOCYTE COUNT	15. Toperform reticulocyte count.		CO5
Referen	ce Books:			
1 D	D Caller Tartharlas Mad			

1. Praful B. Godkar: Textbook of Medical Laboratory Technology

2. Dr.RamnikSood: Textbook of Medical Laboratory Technology

e-Learning Source:

1. https://www.slideshare.net/peddanasunilkumar/introduction-to-pathology-ppt

2. https://www.ucsfhealth.org/medical-tests/semen-

analysis#:~:text=Semen%20analysis%20is%20one%20of,have%20a%20male%20infertility%20problem.

3. <u>https://www.youtube.com/watch?v=wZCKrseSIOE</u>

					(Course	Articul	ation M	latrix: (l	Mapping	g of COs	with PO	s and PS	Os)			
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	POS	POQ	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO	101	102	105	104	105	100	107	100	10)	1010	1011	1012	1501	1502	1505	1504	1505
CO1	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-
CO2	1	3	1	3	-	-	-	1	3	-	-	3	-	2	-	2	-
CO3	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	-	1	-	1	-
CO5	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	Course Title		Attributes									
CV206	CLINICAL HAEMATOLOGY-ILAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	No.			
		ſ	ſ	1	ſ		1	1	3,4			



Effective from Session: 2024	Effective from Session: 2024-25												
Course Code	CV207	Title of the Course	MEDICAL BIOCHEMISTRY- II LAB	L	Т	P	С						
Year	II	Semester	III	0	0	4	2						
Pre-Requisite	Nil	Co-requisite	Nil										
Course Objectives	This course de	eals with fundamentals	s of metabolism, metabolic disorders, laboratory test a	nd instr	uments	of Cli	inical						
	Biochemistry.	nemistry.											

	Course Outcomes									
CO1	Students will be able to learn about Picratemethod, Benedict's/ Uristixmethod									
CO2	Students will be able to learn about Rothera Nitroprussidetest, Serum Amylase, Serum Lipase estimation									
CO3	Students will be able to learn about Malloy-Evelyn method, BCG method									
CO4	Students will be able to learn about Uricase/ PAP method									
CO5	Students will be able to learn aboutSemi Autoanalyzer, Flame Photometer									

Unit No.	Ti	tle of tl	he Unit							Сог	ntent of U	Unit				Cont Hr	tact 's.	Mapped CO	1
1	P	ICRAT	FE ME	THOD.		1.	Estima	ation of	Serum	Creatinir	ne by Alk	aline Pic	rate meth	iod.				CO1	
2	BE	NEDIO MET	CT'S/U FHOD	RISTI	X	2.	Toperf	form uri	ne suga	r by Ben	edict's/ (Uristix m	ethod.					CO1	
3	RO	THER	A NITI TES	ROPRU T	JSSIDE	3.	3. Toperform urine Ketone body analysis by Rothera Nitroprusside test.											CO2	
4	S	ERUM	AMYI	LASE		4.	Estin	nation of	f Serum	Amylase	.							CO2	T
5	S	SERUN	A LIPA	SE		5.	5. Estimation of Serum Lipase.								6	0	CO3		
6	MAL	LOY-	EVELY	YN ME	ГНОD	6.	Estima	ation of S	Serum T	'otal Bilir	ubin by N	falloy–E	velyn met	hod.				CO3	Τ
7	7 BCG METHOD						Estima Glob	tion of ulin &	Serum A A/Grati	Albumin o.	by BCG	method	and calcu	lation of				CO4	
8	8 URICASE/ PAP METHOD							ation of	Serum u	uric acid	by Urica	se/ PAP	method.					CO4	T
9	SEN	MIAU	TOAN	ALYZF	ER	9.	Demor	nstration	n of Sen	ni Autoa	nalyzer.							CO5	
10	10 FLAME PHOTOMETER 10. Demonstration of Flame Photometer.													CO5					
Refer	Reference Books:																		
1. <u>Rar</u>	1. Ranjna Chawla, Practical Clinical Biochemistry: Methods and Interpretations. 2. P. G. D. G. D. D. L. D. G. D. J. M. H. J. M. D. J. M. D. J. M. J.																		
2. <u>Pra</u>	2. <u>Pratul B. Godkar, DarshanP. Godkar</u> , Textbook of Medical Laboratory Technology.																		
3. Dr.	DrKamnikSood, Medical Laboratory Technology: Methods and Interpretations. Diskon, Eady and Sakooff ClinicalChamistry techniques principles and correlations.																		
4. Dis	oh & Sa	uy anu hni In	troducto	ory Prac	tical Bic	chem	istrv	,princip	lesaliuci	JITEIAUOI	15.								+
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3. <u>ht</u>	tps://yo	utu.be/	ufvZ8b	YtyO8															
4. <u>ht</u>	tps://yo	utu.be/	Q6R40	-oECxs															
						С	ourse A	Articula	tion M	atrix: (N	Iapping	of COs	with POs	and PSC	Ds)				
PO-I	PSO	PO1	PO2	PO3	PO4	ΡO	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	
C	0	101	102	100	10.	5	100	10/	100	107	1010	1011	1012	1501	1002	1500	100.	1500	
CC)1	1	3	2	2	-	-	-	1	2	1	-	2	-	2	2	1	-	
CC)2	1	3	1	3	-	-	-	2	3	-	-	3	-	1	1	1	-	
CC)3	1	3	1	2	-	-	-	1	2	2	-	2	-	1	1	1		_
)4	1	3		2	-	-	-	1	3	-	-	3	-	1	2	1		_
	5	1	3	1	2	-	-	-	1	2	1	-	2	-	1	1	1	<u> </u>	

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

	Course Code	Course Title		Attributes								
										INO.		
CV207	MEDICAL	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics				
L		BIOCHEMISTRY-II LAB	ſ	ſ	Ţ	1		1	Ţ	3,4		



Effective from Session	: 2024-25								
Course Code	CV208	Title of the Course	BASICS OF CARDIOVASCULAR TECHNOLOGY- LAB	L	Т	Р	С		
Year	II	II Semester		2	1	0	3		
Pre-Requisite	Nil	Nil Co-requisite Nil							
Course Objectives	1. Students can une 2. Students can lea								

	Course Outcomes								
CO1	To understand the Basic Function of Heart								
CO2	To understand the Gross Anatomy and Physiology of the Heart.								
CO3	To understand the Non-invasive ECG techniques								
CO4	To understand the purpose of ECG machines and related equipment								

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	History taking	Including the patient's demographic Data, Family history and Medical History.		
2	General Physical Examination and assessment of vital signs	20	601.4	
3	Basic Systemic Examination	Vital sign measurement Pulse palpation and auscultation Vein observation Chest inspection, and palpation	30	COI-4
4	Demonstration of ECG	Concepts of ECG		
Refe	erence Books:			
1. A	Textbook of Electrocardiography -	Goldberger.		
2. N	anda's A Textbook of Echocardiogram	aphy.		
3. A	Text of Cardiac Catheterization & I	Interventions. Dr. W. Grossman's D. Baim.		

4. A Textbook of Cardiovascular Medicine. Dr. Bruanwald's.

1.

e-Learning Source: https://www.slideshare.net/DJASMINEPRIYA/histopathology-introduction https://www.ijohsjournal.org/article.asp?issn=2231-6027;year=2018;volume=8;issue=2;spage=63;epage=67;aulast=Theresa 2.

3. <u>HTTPS://WWW.SLIDESHARE.NET/VARUGHESEGEORGE/HEMATOXYLIN-AND-EOSIN-STAINING-67250220</u>

		Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
СО	101	102	105	101	105	100	10,	100	10)	1010	1011	1012	1501	1502	1505	1501	1505	1500
CO1	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	-	1
CO2	1	3	1	3	-	-	-	1	3	-	-	3	3	2	-	2	-	1
CO3	1	3	1	2	-	-	-	1	2	-	-	2	3	1	-	1	-	1
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	-	1
CO5	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	-	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation	Attributes & SDGs
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Course Code	Course Title		Attributes										
CV208	BASICS OF	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Professional Value Ethics		No.				
	CARDIOVASCULAR TECHNOLOGY-LAB	1	ſ	ſ	1		1	ſ	3,4				