Scheme & Syllabus of

Bachelor of Science in Medical Technology (Anesthesia & Operation Theatre Technology)

(B.Sc. MT (AOTT))

Batch 2021 onwards

By

Board of Study Medical & Allied Health Sciences

Department of Academics

IK Gujral Punjab Technical University

IK Gujral Punjab Technical University

VISION

To be an institution of excellence in the domain of higher technical education that serves as the fountainhead for nurturing the future leaders of technology and techno- innovation responsible for the techno-economic, social, cultural and environmental prosperity of the people of the State of Punjab, the Nation and the World.

MISSION

To provide seamless education through the pioneering use of technology, in partnership with industry and society with a view to promote research, discovery and entrepreneurship and To prepare its students to be responsible citizens of the world and the leaders of technology and techno-innovation of the 21st Century by developing in them the desirable knowledge, skill and attitudes base for the world of work and by instilling in them a culture for seamlessness in all facets of life.

OBJECTIVES

- To offer globally-relevant, industry-linked, research-focused, technology- enabled seamless education at the graduate, postgraduate and research levels in various areas of engineering & technology and applied sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global technological needs, is motivated to give its best and is committed to the growth of the Nation.
- To foster the creation of new and relevant technologies and to transfer them to industry for effective utilization.
- To participate in the planning and solving of engineering and managerial problems of relevance to global industry and to society at large by conducting basic and applied research in the areas of technologies.
- To develop and conduct continuing education programs for practicing engineers and managers with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core competence of the University.
- To develop strong collaborative and cooperative links with private and public sector industries and government user departments through various avenues such as undertaking of consultancy projects, conducting of collaborative applied research projects, manpower development programs in cutting-edge areas of technology etc.
- To develop comprehensive linkages with premier academic and research institutions

within the country and abroad for mutual benefit;

- To provide leadership in laboratory planning and in the development of instructional resource material in the conventional as well as in the audio- visual, the video and computer-based modes;
- To develop programs for faculty growth and development both for its own faculty as well as for the faculty of other engineering and technology institutions;
- To anticipate the global technological needs and to plan and prepare to cater to them;
- To interact and participate with the community/society at large with a view to inculcate in them a feel for scientific and technological thought and endeavor.
- To actively participate in the technological development of the State of Punjab through the undertaking of community development programs including training and education programs catering to the needs of the unorganized sector as well as that of the economically and socially weaker sections of society.

ACADEMIC PHILOSOPHY

The philosophy of the education to be imparted at the University is to awaken the **"deepest potential"** of its students as holistic human beings by nurturing qualities of self-confidence, courage, integrity, maturity, versatility of mind as well as a capacity to face the challenges of tomorrow so as to enable them to serve humanity and its highest values in the best possible way.

Department of Allied Health Sciences

VISION

- To impart knowledge of health & medical education & help in making India a centre of Medical Education & Health Care.
- To establish & develop world class self-reliant institute for imparting Medical and other Health Science education at under-graduate & post-graduate levels of the global competence.
- To serve & educate the public, establish guidelines & treatment protocols to be followed by professionals while treating in hospitals.
- To develop and provide professionally qualified health workers for augmenting the nation's human resources through Bio-Medico-Socio-epidemiological scientific research.

MISSION

- To strive incessantly to achieve the goals of the Institution.
- To impart academic excellence in Allied Health Education.
- To practice medicine ethically in line with the global standard protocols.
- Having a revolutionary impact on students by focusing on deep inter-disciplinary knowledge, getting technical as well as Theoretical concept of Health Sciences, focusing on leadership, communication and interpersonal skills, personal health and well-being.
- Creating best of educational experience by engaging with partners outside the traditional borders of University campus. By engaging in a network of Hospitals & other Healthcare providing facilities to create a job oriented
- Cultivating productive community by attracting and retaining diverse, best talent and such an environment where research, innovation, creativity and entrepreneurship can flourish.
- To give students the best knowledge by the most innovative methods and also provide hospital exposure to work in different fields of Paramedical Sciences.
- To create a well-qualified and highly trained world class Technicians & Assistants who will aid in delivering high-class care & helping in betterment of mankind.

TITLE OF THE PROGRAM: B.Sc. MEDICAL TECHNOLOGY
(Anesthesia & Operation Theatre Technology)

YEAR OF IMPLIMENTATION: New Syllabus will be implemented from July 2021 onwards.

DURATION: The course shall be three years, with semester system (6 semesters, with two semesters in a year). The Choice based credit system will be applicable to all the semesters.

ELGIBILITY FOR ADMISSION: Candidates who have passed 10+2 with Physics, Chemistry & Biology as main subjects.

INTAKE CAPACITY: 30 (Thirty)

MEDIUM OF INSTRUCTION: English.

PROGRAM EDUCATIONAL OBJECTIVES:

The Program Educational Objectives are the knowledge skills and attitudes which the students will acquire during post-graduation.

PEO1	Those who choose this stream are going to study about Anaesthesia & Surgical Equipments, Critical Care, Pain Management etc.
PEO2	Ability to analyse, Monitor & give care to a Surgical/Anaesthetized patient.
PEO3	Understand the fundamentals and applications of Anaesthesia, Surgical & Critical Care Equipments.
PEO4	Ability to Assist an Anaesthesiologist through General or Regional Anaesthesia.
PEO5	Ability to have knowledge of BLS & ACLS and ability to deliver it whenever required.
PEO6	Able to detect any Changes in patient's physiological status & able to tackle all types of Complications.
PEO7	Learn and Understand different Anesthetic & Surgical Procedures & their benefits as well as complications.
PEO8	Ability to Assist the Surgeon throughout Surgery & other important procedures.

PROGRAM OUTCOMES: At the end of the program, the student will be able to:

PO1	Have a lifelong knowledge of Anaesthesia, Surgery & all the Equipments used in it along with basic knowledge of applied science.
PO2	Anaesthesia & Surgical Technicians/Assistants will work in Operation Theatres, ICUs etc. along with Anesthetists and Surgeons & thus will be having a great & Important role in Healthcare.
PO3	After completion students can go for higher studies such as Masters in same stream or any other relevant streams as well.
PO4	This Program will build technical knowledge in the student so that he/she will be able to assist an Anesthetist/Surgeon in every aspect of Anaesthesia, Surgery & other related fields.
PO5	Engage in lifelong learning and adapt to changing professional and societal needs.
PO6	This Program can do an overall development of the student to be able to have all the technical aspects about Anaesthesia, Surgery along with their advanced knowledge.

PROGRAM SPECIFIC OUTCOMES:
At the end of the program,

PSO1	Students will be competent to work in Hospital Operation Theatres, Critical Care Units and Emergency sections.
PSO2	Students will be skilled in problem solving, critical thinking and will be able to assist the Surgeon or Anesthetist.
PSO3	The students will acquire in-depth knowledge of Anesthesia, Surgery, Critical care and pain Management.
PSO4	Students will be able to have all the relevant knowledge of Anesthesia & Surgery and will be able to do various procedures required.
PSO5	This Program will create a great source of manpower which can aid in our health sector especially in Trauma, Emergency, ICU & Operation Theatres.
PSO6	Students will be able to explore new areas of research in both Anesthesia & Surgery and can also go for higher studies.
PSO7	Students will be able to integrate knowledge of various types of Surgical Procedures & Anesthetic procedures along with their in-depth knowledge.

Bachelors of Science in Medical Technology - Anesthesia & Operation Theatre Technology (B.Sc. AOTT):
It is an Under Graduate (UG) Programme of 3 years duration (6 semesters)
Eligibility for Admission: 10+2 with Physics, Chemistry & Biology as main subjects.

Courses & Examination Scheme:

First Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BAOTT 101-21	Core Theory	Human Anatomy & Physiology-I	3	1	0	40	60	100	4
BAOTT 102-21	Core Theory	Basic Anesthesia Technology	3	1	0	40	60	100	4
BAOTT 103-21	Core Theory	General Microbiology	3	1	0	40	60	100	4
BAOTT 104-21	Core Practical/Laboratory	Human Anatomy & Physiology-I Laboratory	0	0	4	60	40	100	2
BAOTT 105-21	Core Practical/Laboratory	Basic Anesthesia Technology Laboratory	0	0	4	60	40	100	2
BAOTT 106-21	Core Practical/Laboratory	General Microbiology Laboratory	0	0	4	60	40	100	2
BTHU101-18	Ability Enhancement Compulsory Course (AECC)-I	English	1	0	0	40	60	100	1
BTHU102-18	Ability Enhancement Compulsory Course (AECC)	English Practical/Laboratory	0	0	2	30	20	50	1
HVPE-101-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules	3	0	0	40	60	100	3
HVPE-102-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules (Lab/ Seminar)	0	0	1	25	--**	25	1
BMPD 102-18		Mentoring and Professional Development	0	0	1	25	--**	25	1
	TOTAL		**13**	**03**	**16**	**460**	**440**	**900**	**25**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

**The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only.

Second Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BAOTT 201-21	Core Theory	Human Anatomy & Physiology-II	3	1	0	40	60	100	4
BAOTT 202-21	Core Theory	Surgical Equipments & Technology	3	1	0	40	60	100	4
BAOTT 203-21	Core Theory	Biochemistry & Pathology	3	1	0	40	60	100	4
BAOTT 204-21	Core Practical/Laboratory	Human Anatomy & Physiology-II Laboratory	0	0	4	60	40	100	2
BAOTT 205-21	Core Practical/Laboratory	Surgical Equipments & Technology Laboratory	0	0	4	60	40	100	2
BAOTT 206-21	Core Practical/Laboratory	Biochemistry & Pathology Laboratory	0	0	4	60	40	100	2
EVS102-18	Ability Enhancement Compulsory Course (AECC) -III	Environmental Science	2	0	0	40	60	100	2
BMPD 202-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**11**	**03**	**13**	**365**	**360**	**725**	**21**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Third Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
	Core Theory		3	1	0	40	60	100	4
	Core Theory		3	1	0	40	60	100	4
	Core Theory		3	1	0	40	60	100	4
	Core Practical/Laboratory		0	0	4	60	40	100	2
	Core Practical/Laboratory		0	0	4	60	40	100	2
	Core Practical/Laboratory		0	0	4	60	40	100	2
	Skill Enhancement Course-I		1	0	0	40	60	100	1
	Skill Enhancement Course-Laboratory		0	0	2	30	20	50	1

		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**10**	**03**	**15**	**395**	**380**	**775**	**21**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Fourth Semester

Course Code	Course Type	**Course Title**	**Load Allocations**			**Marks Distribution**		**Total Marks**	**Credits**
			L*	T*	P	Internal	External		
	Core Theory		3	1	0	40	60	100	4
	Core Theory		3	1	0	40	60	100	4
	Core Theory		3	1	0	40	60	100	4
	Core Practical/Laboratory		0	0	4	60	40	100	2
	Core Practical/Laboratory		0	0	4	60	40	100	2
	Core Practical/Laboratory		0	0	4	60	40	100	2
	Skill Enhancement Course-II		1	0	0	40	60	100	1
	Skill Enhancement Course- Laboratory		0	0	2	30	20	50	1
		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**10**	**03**	**15**	**395**	**380**	**775**	**2 1**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Fifth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
	Skill Enhancement Course-III		1	0	0	40	60	100	1
	Skill Enhancement Course- Laboratory		0	0	2	30	20	50	1
	Open Elective-I		3	1	0	40	60	100	4
	Elective-I		3	1	0	40	60	100	4
	Elective-II		3	1	0	40	60	100	4
	Elective-I Laboratory		0	0	4	60	40	100	2
	Elective-II Laboratory		0	0	4	60	40	100	2
	Project	Minor Project	0	0	2	Satisfactory / Un Satisfactory			2
		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**10**	**03**	**13**	**335**	**340**	**675**	**21**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Sixth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
	Skill Enhancement Course-IV		1	0	0	40	60	100	1
	Skill Enhancement Course- Laboratory		0	0	2	30	20	50	1
	Open Elective-II		3	1	0	40	60	100	4
	Elective-III		3	1	0	40	60	100	4
	Elective-IV		3	1	0	40	60	100	4
	Elective-III Laboratory		0	0	4	60	40	100	2
	Elective-IV Laboratory		0	0	4	60	40	100	2
	Project	Major Project	0	0	6	Satisfactory / Un Satisfactory			6
		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**10**	**03**	**17**	**335**	**340**	**675**	**25**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Total Marks of B.Sc. Program : 4525
Total Credit of B.Sc. Program : 134

NOTE :

ONLY FOR BOS

The course types and their number are fixed as mentioned in the scheme however respective BOS can shuffle the courses as required.

EXAMINATION AND EVALUATION

THEORY				
S.No.		Weightage in Marks		Remarks
1	Mid-Semester Examination	20	15	MSTs, Quizzes, assignments, attendance, etc. Constitute internal evaluation. Average of two mid-semester exams will be considered for evaluation
2	Attendance	5	5	
3	Assignments	5	5	
4	End-Semester Examination	70	50	Conduct and checking of the answer sheets will be at the department level in case of university teaching department of Autonomous institutions. For affiliated colleges examination will be conducted at the university level
	Total	**100**	**75**	
PRACTICAL				
1	Daily evaluation of practical performance/ record/ viva voce	30		Internal Evaluation
2	Attendance	5		
3	Internal Practical Examination	15		
4	Final Practical Examination	25		External Evaluation
	Total	**75**		

PATTERN OF END-SEMESTER EXAMINATION

I. **Part A** will be One Compulsory question consisting of short answer type questions [Q No. 1(a-j)] covering whole syllabus. There will be no choice in this question. It will be of 20 marks comprising of **10 questions of 2 marks each**.

II. **Part B** will be comprising of eight questions [2-9]. Student will have to attempt any six questions from this part. It will be of 30 marks with **6 questions of 5 marks each**.

III. **Part C** will be comprising of two compulsory questions with internal choice in both these questions [10-11]. It will be of 20 marks with **2 questions of 10 marks each**.

SYLLABUS OF THE PROGRAM

The syllabus has been upgraded as per provision of the UGC module and demand of the academic environment. The contents of the syllabus have been duly arranged unit wise and included in such a manner so that due importance is given to requisite intellectual and laboratory skills. The application part of the respective contents has been appropriately emphasized.

SEMESTER-I

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY **DEPARTMENT OF ALLIED HEALTH SCIENCES**				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 101-21**			
Subject Title:	**HUMAN ANATOMY & PHYSIOLOGY-I**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of basic anatomy & physiology of Human body.			

Details of the Course

Unit	Contents	Contact Hours
I	**Introduction to human body:** Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology. **Cellular level of organization:** Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine	12
II	**Tissue level of organization:** Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues. **Integumentary system:** Structure and functions of skin **Skeletal system:** Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system. Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction. **Joints:** Structural and functional classification, types of joints movements and its articulation.	12

III	**Nervous system:** Organization of nervous system, neuron, neuroglia, classification and properties of nerve fiber, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. **Central nervous system:** Meninges, ventricles of brain and cerebrospinal fluid, structure and functions of brain (cerebrum, brain stem and cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)	11
IV	**Peripheral nervous system:** Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves. **Special senses:** Structure and functions of eye, ear, nose and tongue and their disorders. **Endocrine system** : Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.	10

Course Outcomes and Mapping

At the end of the course, the student will be able to

CO1: Know about different anatomical structures of Human Body
CO2: Knowledge about Cellular & Tissue level organization.
CO3: Understanding about Skeletal system & Bones.
CO4: Knowledge about Neurons & Nervous System.
CO5: To study about Endocrine System & Hormones.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	3	1	1	2	3
CO2	3	3	3	2	2	1	2
CO3	3	3	3	2	2	1	2
CO4	3	3	3	2	2	1	2
CO5	4	2	4	3	3	2	3

Reference

S. No.	Name of Book	Author (s)	Publisher
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY DEPARTMENT OF ALLIED HEALTH SCIENCES				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 102-21**			
Subject Title:	**HUMAN ANATOMY & PHYSIOLOGY-I LAB**			
Contact Hours:	**L:0**	**T:0**	**P:3**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about Anatomy and Physiology of Human Body.			

Details of the Course

Unit	Contents
I	1. Identification of various Planes and Sections of a Human Body 2. Identification and knowledge of positioning of Various Organs in different cavities in the human Body 3. Morphological & Anatomical Structure of Organs:- Liver, Heart, Kidney, Nephron, Lungs, Neuron, Ovary.
II	7. Hemoglobin percentage and color index. 8. Blood groups 9. Artificial respiration and C.P.R.

At the end of the course, the student will be able to

CO1: Know about different anatomical structures of Human Body

CO2: Knowledge about Blood, CPR, Pulmonary Function Test and other associated processes.

CO3: Examine about the Location of various organs and organ systems of our body and their associated structures

CO4: Understanding the different functions that are going in a human body and all physiological actions.

CO5: Identification of various Organs of body & Their location.

Course Outcomes and Mapping

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	3	1	1	2	3
CO2	3	3	3	2	2	1	2
CO3	3	3	3	2	2	1	2
CO4	3	3	3	2	2	1	2
CO5	4	2	4	3	3	2	3

Reference Books:

S. No.	Name of Book	Author (s)	Publisher
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY **DEPARTMENT OF ALLIED HEALTH SCIENCES**				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 103-21**			
Subject Title:	**BASIC ANESTHESIA TECHNOLOGY**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of basic science of Anesthesia & Anesthetic Equipments.			

Details of the Course

Unit	Contents	Contact Hours
I	**Preanesthetic Checkup (PAC)**-History, pre-operative, Intra operative & post-operative care **Anaesthesia techniques** Historical background, Types of Anaesthesia, Choice of Anaesthesia General Anaesthesia-Indication of general anesthesia Endotracheal intubations General Anesthesia Techniques Local Anaesthesia Techniques Blood Transfusion Monitoring in the Operation Theatre Positioning of Patient	12
II	**Anaesthesia Instrument** Anaesthesia Instrument planning for various surgical procedure and Auxiliary instrumentation, Boyle's apparatus, face mask, types of circuits, T-piece, Circle system Supply of compressed gases, liquid oxygen, storage & supply system, reducing pressure valves, Vaporizers. Intubation equipment **Artificial airways (oral and Nasal endotracheal tubes, Tracheostomy tubes)** Parts of airway and features, Types, sizes and methods of insertion, Indications for use Care of long-term airways and complications.	12
III	Monitoring devices (ECG pads, oximeters, etc.) Labor analgesics -Technical terms used Methods of Pain Control- Patient Controlled Analgesia, Multimodal Technique, Epidural Analgesia. Manual Resuscitators: Types of resuscitator bags Methods of increasing oxygen delivery capabilities while using oxygen with resuscitator bags. Recent advances in CPR, BLS	11

IV	Suction apparatus- foot operated, electrically operated AMBU bag & laryngoscope, Endotracheal tubes, Catheters, Face masks – Types, sizes and its usage, Venturi masks Anaesthesia Ventilators & Monitoring. Spinal Anesthesia- techniques & agents Epidural Anesthesia- techniques & agents	10

Course Outcomes and Mapping

At the end of the course, the student will be able to

CO1: Know About Basic Science of Anaesthesia
CO2: Understanding the Various Equipments involved in Anaesthesia
CO3: Examine the Anaesthesia Basics & Equipment Functioning
CO4: Know about various Drugs & Techniques used in Anaesthesia
CO5: Understand the working & use of Boyle's Apparatus & Other Equipments in Daily Anaesthetic Use.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	4	3	4	2	2	3
CO2	2	3	4	4	2	2	2
CO3	4	4	4	4	4	2	4
CO4	3	4	3	2	4	3	3
CO5	4	4	4	4	4	2	4

REFERENCE BOOKS

S. No.	Author(s)	Title	Publisher
1	G. Smith & A.R. Aitkenhead's	Textbook of Anaesthesia	ELSEVIER
2	Ajay Yadav	Short Textbook of Anaesthesia	JP Brothers
3	Anshul Jain	Essentials of Anesthesia & Critical Care	JAYPEE
4	Arun Kumar Paul	Drugs & Equipments in Anaesthetic Practice	Elsevier

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY DEPARTMENT OF ALLIED HEALTH SCIENCES				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 104-21**			
Subject Title:	**BASIC ANESTHESIA TECHNOLOGY LAB**			
Contact Hours:	**L:0**	**T:0**	**P:3**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of basic science of Anesthesia & Anesthetic Equipments.			

Details of the Course

Unit	Contents
I	1. Observation & Demonstration of Preparation of Anaesthetic equipments. 2. Anesthesia Machine.
II	1. Face Masks 2. AMBU Bag 3. Spinal & Epidural Needles

At the end of the course, the student will be able to

CO1: Know About Basic Science of Anaesthesia
CO2: Understanding the Various Equipments involved in Anaesthesia
CO3: Examine the Anaesthesia Basics & Equipment Functioning
CO4: Know about various Drugs & Techniques used in Anaesthesia
CO5: Understand the working & use of Boyle's Apparatus & Other Equipments in Daily Anaesthetic Use.

Course Outcomes and Mapping

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	4	3	4	2	2	3
CO2	2	3	4	4	2	2	2
CO3	4	4	4	4	4	2	4
CO4	3	4	3	2	4	3	3
CO5	4	4	4	4	4	2	4

Reference Books:

B.Sc. Medical Technology (Anesthesia & Operation Theatre Technology)

S. No.	Author(s)	Title	Publisher
1	G. Smith & A.R. Aitkenhead's	Textbook of Anaesthesia	ELSEVIER
2	Ajay Yadav	Short Textbook of Anaesthesia	JP Brothers
3	Anshul Jain	Essentials of Anesthesia & Critical Care	JAYPEE
4	Arun Kumar Paul	Drugs & Equipments in Anaesthetic Practice	Elsevier

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY DEPARTMENT OF ALLIED HEALTH SCIENCES				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 105-21**			
Subject Title:	**GENERAL MICROBIOLOGY**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of Microbiology, microbes, sterilization etc.			

Details of the Course

Unit	Contents	Contact Hours
I	**Introduction to microbiology & microscopy:** Brief history of microbiology. Morphology of bacteria: anatomy of a bacterial cell including spores, flagella and capsules. Characteristics of bacteria and fungi. **Introduction, history and types of microscopes.** Structure and working of simple and compound microscope. Principles of dark field, fluorescent, phase contrast and electron microscope. **Hospital acquired infections.** Definition, types, routes of infections. Air and water bacteriology. Hand washing and scrubbing. Importance and methods. Role of Operation theatre Technologist in reducing hospital acquired infections.	12
II	**Nutrition and Growth of Bacteria:** Nutritional Requirements and Preparation of Culture Media, Bacteria Cell Division, Growth Phase, Batch and Continuous Culture, Growth of Aerobic and Anaerobic Bacteria. **Culture media:** Introduction, classification of culture media (solid media, liquid media, semisolid, Media, simple media, complex media, synthetic/defined media, routine culture media, basal media, enriched, enrichment, Selective, Indicator/differential media, sugar fermentation media, transport media, preservation media, aerobic media, and anaerobic media).	12

III	**Antiseptics and disinfectants:** Definition, classification, properties, mode of action and uses of various disinfectants. Factors affecting disinfectants. Precautions while using the disinfectants**.** **Sterilization**: Principles and Methods of sterilization**,** Physical (Heat, Temperature, Radiation, Filtration) and Chemical Agents (Alcohol, Aldehyde, Halogens, Phenols, Gases) to Control Growth of Microbes	11
IV	**Collection and Transportation of Specimens, Disposal of Laboratory/ Hospital Waste:** General Principles, Collection, Transportation (Urine, Feces, Sputum, Pus, Body Fluids, Swab and Blood), Non- Infectious Waste, Infected Sharp Waste Disposal, Infected Non- Sharp Waste Disposal.	10

Course Outcomes and Mapping

At the end of the course, the student will be able to

CO1: Introduction about Microscopes, Microscopy & Microbiology.
CO2: Study about Nutrition & Growth of bacteria in a media.
CO3: Study about Culture media, Disinfectants & Antiseptics.
CO4: Study about Sterilization & various methods of Sterilization.
CO5: Knowledge about Collection and Transportation of Specimens, Disposal of Laboratory/ Hospital Waste.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	4	3	2	4	3	3
CO2	2	3	3	1	1	2	3
CO3	3	3	3	2	2	1	2
CO4	3	3	3	2	2	1	2
CO5	4	4	3	4	2	2	3

REFERENCE BOOKS:

S. No.	Author(s)	Title	Publisher
1	Panikar & Satish Gupta	Medical Microbiology	Universities Press
2	D.R Arora& B. Arora	Text book of Microbiology	CBS Publishers
3	Anantha Narayan and Panikar	Text book of Microbiology	Universities Press
4	Michael J. Pelczar, JR. E.C.S Chan & Noel R. Krieg	Text book of Microbiology	Tata Mc Graw Hill

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY DEPARTMENT OF ALLIED HEALTH SCIENCES				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 106-21**			
Subject Title:	**GENERAL MICROBIOLOGY LAB**			
Contact Hours:	**L:0**	**T:0**	**P:3**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of Microbiology, microbes, sterilization etc.			

Details of the Course

Unit	Contents
I	1. Use of microscope in the study of bacteria. 2. Culture media and its use in diagnostic bacteriology. 3. Sterilization- Methods & advantages.
II	5. Principles and interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, and Rheumatoid Factor. Rapid tests for HIV, HCV and HBsAg (excluding technical details).

At the end of the course, the student will be able to

CO1: Introduction about Microscopes, Microscopy & Microbiology.
CO2: Demonstration of different methods of Sterilization.
CO3: Study about Culture media, Disinfectants & Antiseptics.
CO4: Study about Vaccines & their types.
CO5: Knowledge about common Serological tests.

Course Outcomes and Mapping

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	4	3	2	4	3	3
CO2	2	3	3	1	1	2	3
CO3	3	3	3	2	2	1	2
CO4	3	3	3	2	2	1	2
CO5	4	4	3	4	2	2	3

Reference Books:

S. No.	Author(s)	Title	Publisher
1	Panikar & Satish Gupta	Medical Microbiology	Universities Press
2	D.R Arora& B. Arora	Text book of Microbiology	CBS Publishers
3	Anantha Narayan and Panikar	Text book of Microbiology	Universities Press
4	Michael J. Pelozar, JR. E.C.S Chan & Noel R. Krieg	Text book of Microbiology	Tata Mc Graw Hill

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Radiology Imaging & Technology**			
Subject Code:	**BTHU101-18**			
Subject Title:	**English**			
Contact Hours:	**L:1**	**T:0**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	**To learn effective communication both oral & written.**			

Unit	Contents	Contact Hours
I	Theory of Communication Types and modes of Communication	4
II	Language of Communication Verbal and Non-verbal (Spoken & verbal), Personal, Social and Business Barriers and Strategies, Intra-personal, Inter-personal and Group communication	10
III	**Reading and Understanding** Close Reading, Comprehension, Summary Paraphrasing, Analysis and Interpretation, Translation(from Hindi/Punjabi to English and vice-versa), Literary/Knowledge Texts	10
IV	Documenting, Report Writing, Making Notes, Letter Writing	8

Reference Books

1. *Fluency in English* - Part II, Oxford University Press, 2006.
2. *Business English*, Pearson, 2008.
3. *Language, Literature and Creativity*, Orient Blackswan, 2013.
4. *Language through Literature* (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas
5. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
6. *Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Radiology Imaging & Technology**			
Subject Code:	**BTHU102-18**			
Subject Title:	**English Practical**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	**To learn effective communication both oral & written.**			

Sr. No.	Contents	Contact Hours
I	**Interactive practice sessions in Language Lab on Oral Communication** Listening Comprehension Self Introduction, Group Discussion and Role Play Common Everyday Situations: Conversations and Dialogues Communication at Workplace Interviews Formal Presentations, Effective Communication/ Mis-communication Public Speaking	

Reference Books

1. *Fluency in English* - Part II, Oxford University Press, 2006.
2. *Business English*, Pearson, 2008.
3. Practical English Usage. Michael Swan. OUP. 1995.
4. *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
5. *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Radiology Imaging & Technology**			
Subject Code:	**HVPE-101-18**			
Subject Title:	**Human Values, De-addiction & Traffic Rules**			
Contact Hours:	**L:3**	**T:0**	**P:0**	**Credits:3**
Examination Duration (hours)	**3**			
Objective(s):	**To develop a sense of social responsibility, traffic rules and about menace of drugs.**			

Unit	Contents	Contact Hours
I	**Course Introduction – Need, Basic Guidelines, Content and Process for Value Education** Understanding the need, basic guidelines, content and process for Value Education Self Exploration–what is it? – its content and process; 'Natural Acceptance' and Experiential Validation-as the mechanism for self exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for 27ulfilment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario Method to 27ulfil the above human aspirations: understanding and living in harmony at various levels	
II	**Understanding Harmony in the Human Being – Harmony in Myself!** Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' – *Sukh* and *Suvidha* Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I'	

	Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure *Sanyam* and *Swasthya* Practice Exercises and Case Studies will be taken up in Practice Sessions.	
III	**Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship** Understanding harmony in the Family- the basic unit of human interaction Understanding values in human-human relationship; meaning of *Nyaya* and program for its 28ulfilment to ensure *Ubhay-tripti*; Trust (*Vishwas)* and Respect (*Samman)* as the foundational values of relationship Understanding the meaning of *Vishwas*; Difference between intention and competence Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship Understanding the harmony in the society (society being an extension of family): *Samadhan, Samridhi, Abhay, Sah-astitva* as comprehensive Human Goals Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj)*, Universal Order (*SarvabhaumVyawastha)*- from family to world family! Practice Exercises and Case Studies will be taken up in Practice Sessions	
IV	**Understanding Harmony in the Nature and Existence – Whole existence as Co-existence** Understanding the harmony in the Nature Interconnectedness and mutual 28ulfilment among the four orders of nature-recyclability and self-regulation in nature Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space Holistic perception of harmony at all levels of existence Practice Exercises and Case Studies will be taken up in Practice Sessions.	
V	**Implications of the above Holistic Understanding of Harmony on Professional** Natural acceptance of human values Definitiveness of Ethical Human Conduct	

	Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order Competence in professional ethics: Ability to utilize the professional competence for augmenting universal human order Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems Strategy for transition from the present state to Universal Human Order: At the level of individual: as socially and ecologically responsible engineers, technologists and managers b) At the level of society: as mutually enriching institutions and organizations	

Reference Books

Text Book

R R Gaur, R Sangal, G P Bagaria, 2009, *A Foundation Course in Value Education*.

Reference Books

1. Ivan Illich, 1974, *Energy & Equity,* The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
3. A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
6. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.
7. Subhas Palekar, 2000, *How to practice Natural Farming*, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limits to Growth*

– *Club of Rome's report*, Universe Books.

9. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers* , Oxford University Press

10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including Human Values)*, Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, *Foundations of Ethics and Management*, Excel Books.
12. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, *http://uhv.ac.in*
2. Story of Stuff, *http://www.storyofstuff.com*
3. Al Gore, *An Inconvenient Truth*, Paramount Classics, USA
4. Charlie Chaplin, *Modern Times*, United Artists, USA
5. IIT Delhi, *Modern Technology – the Untold Story*

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Radiology Imaging & Technology**			
Subject Code:	**HVPE102-18**			
Subject Title:	**Human Values, De-addiction & Traffic Rules Lab/Seminar**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	**To develop a sense of social responsibility, traffic rules and about menace of drugs.**			

Sr. No.	Contents	Contact Hours
I	One each seminar will be organized on Drug De-addiction and Traffic Rules. Eminent scholar and experts of the subject will be called for the Seminar atleast once during the semester. It will be binding for all the students to attend the seminar	

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Radiology Imaging & Technology**			
Subject Code:	**BMPD 102-18**			
Subject Title:	**Mentoring & Professional Development**			
Contact Hours:	**L:0**	**T:0**	**P:1**	**Credits:1**
Examination Duration (hours)	**3**			
Objective(s):	**To learn the life long learning skills.**			

Sr. No.	Contents	Contact Hours
I	**Part-A (Class Activities)** 1. Expert and video lectures 2. Aptitude Test 3. Group Discussion 4. Quiz (General/Technical) 5. Presentations by the students 6. Team building Exercises 7* A part of above six points practicals on Fundamentals of Computers are also added as per Annexure-I	
II	**Part-B (Outdoor Activities)** 1. Sports/NSS/NCC 2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.	

Evaluation shall be based on performance for Part – A & B

Mentors/Faculty in-charge shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

SEMESTER-II

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY **DEPARTMENT OF ALLIED HEALTH SCIENCES**				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 201-21**			
Subject Title:	**HUMAN ANATOMY & PHYSIOLOGY-II**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of basic anatomy & physiology of Human body.			

Details of the Course

Unit	**Contents**	**Contact Hours**
I	**Alimentary system**: mechanism and physiology of digestion and absorption structure &function (Mouth, Tongue, Teeth, Oesophagus, Pharynx, Stomach, Intestine, Rectum, Anus; Digestive glands; physiology of digestion of carbohydrates, lipids& proteins, Structure and function of Liver. **Urinary system**: Main parts, Structure & function of kidney, structure of nephron, physiology of excretion & urine formation, urine, additional excretory organs.	12
II	**Circulatory system**: Composition and functions of blood, anatomy and physiology of Heart**,** circulation of blood, Cardiac cycle and conducting system of Heart**,** the blood pressure, arteries and veins **Respiratory system-**Organs of respiration and their histology, Respiration (definition and mechanism), Gas exchange in the lungs, Regulation of respiration, Basal metabolic rate. Pleural Cavity & intrapleural pressure.	12
III	**Reproductive system**-Male and female reproductive system, Histology of gonads, The ovarian cycle and ovulation, Fertilization, spermatogenesis. **Lymphatic system**- Introduction, Structure and function, Lymph nodes, Spleen, Thymus gland, Tonsils.	11

IV	**Body fluids and their significance:** Important terms, types of body fluid, total body water, avenues by which water leaves and enters body, general principles for fluid balance, cardinal principle, how body fluids maintain Homeostasis, Electrolytes & ions Function of electrolytes, how electrolyte imbalance leads to fluid imbalance.	10

Course Outcomes and Mapping

At the end of the course, the student will be able to

CO1: Know about different anatomical structures of Human Body.
CO2: Study about Digestive system & various organs involved in it.
CO3: Knowledge about Urinary System & functioning of Kidney.
CO4: Study about Circulatory & Respiratory system & also about reproductive & Lymphatic system.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	3	1	1	2	3
CO2	3	3	3	2	2	1	2
CO3	3	3	3	2	2	1	2
CO4	3	3	3	2	2	1	2
CO5	4	2	4	3	3	2	3

Reference

S. No.	Name of Book	Author (s)	Publisher
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY DEPARTMENT OF ALLIED HEALTH SCIENCES				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 202-21**			
Subject Title:	**HUMAN ANATOMY & PHYSIOLOGY-II LAB**			
Contact Hours:	**L:0**	**T:0**	**P:3**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about Anatomy and Physiology of Human Body.			

Details of the Course

Unit	Contents
I	1. Identification of axial bones. 2. Identification of appendicular bones. 3. To study the special senses using specimen, models, etc. 4. To study the nervous system using specimen, models, etc. 5. To study the endocrine system using specimen, models, etc
II	1. Recording of body temperature. 2. To demonstrate positive and negative feedback mechanism. 3. Determination of bleeding time 4. Determination of clotting time.

At the end of the course, the student will be able to

CO1: Know about different anatomical structures of Human Body
CO2: Understanding about various Organs which are responsible for controlling our body functions
CO3: Examine about the Location of various organs of our body and their associated structures
CO4: Understanding the different functions that are going in a human body and all physiological actions.
CO5: Identification of various Organs of body & Their location.

Course Outcomes and Mapping

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	3	1	1	2	3
CO2	3	3	3	2	2	1	2
CO3	3	3	3	2	2	1	2
CO4	3	3	3	2	2	1	2
CO5	4	2	4	3	3	2	3

Reference Books:

S. No.	Name of Book	Author (s)	Publisher
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY **DEPARTMENT OF ALLIED HEALTH SCIENCES**				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 203-21**			
Subject Title:	**SURGICAL EQUIPMENTS & TECHNOLOGY**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of basic science of Surgery & Surgical Equipments.			

Details of the Course

Unit	**Contents**	**Contact Hours**
I	Sterilization & disinfections, Methods of Sterilization- Physical & Chemical, New Methods of Sterilization, Principles of autoclaving, Fumigation of O.T. General surgical, principles & instruments. The surgical patient, operation room techniques Instruments used for preparing surgical instruments trolley- cheatles forceps, rampley's sponge holding forceps, mayo's towel clip, Esmarch's bandage, tourniquet, pneumatic tourniquet.	12
II	Incision making method & Instruments-bard parker knife handle, major abdominal incision, Classification of Instruments. Artery forceps & their types, Kocher's forceps, tissue forceps, electric cautery. Retractions- single hook retractors, Cat paw retractor, Czerny's retractor, nerve hook retractor, Morris retractors, Devers retractors, Doyen's Retractor. Self-retaining retractors.	12

III	Wound management & closure: Scissors & its types, disinfectants, dressing procedure, different types of bandages, surgical needle & needle holders, types of suture materials. Types of suturing, Modern wound closing techniques – Adhesive tape, Glue, Staples etc.	11
IV	Suction apparatus in surgery, Surgical instruments used for Surgery, Positioning of patient for surgery- Supine, Trendelenburg, Anti-Trendelenburg, Lateral, Prone, Sitting. Common surgical procedures in surgery, I/V fluid administration	10

Course Outcomes and Mapping

At the end of the course, the student will be able to

CO1: Know About Basic Science of Surgery.
CO2: Understanding the Various Equipments & Instruments involved in Surgery.
CO3: Examine the Surgical instrument & Equipment Functioning.
CO4: Know about various Positions used in Surgical Procedures.
CO5: Understand the process of sterilization & its types.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	4	3	3	3
CO2	2	2	2	3	2	3	2
CO3	4	4	4	4	4	2	4
CO4	3	3	2	3	2	2	3
CO5	4	4	4	4	4	2	4

REFERENCE BOOKS

S. No.	Author(s)	Title	Publisher
1	Ajay Yadav and Arora	Synopsis of medical instruments	Jaypee
2	Raymond Maurice Kirk	Basic Surgical Techniques	ELSEVIOR
3	Alexis Thomson, Alexander Miles	Manual of Surgery	Morrison and Gibb
4	Ajay kumar Agarwal and neelabhaarwal	Surgical instruments	Jaypee

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY DEPARTMENT OF ALLIED HEALTH SCIENCES				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 204-21**			
Subject Title:	**SURGICAL EQUIPMENTS & TECHNOLOGY LAB**			
Contact Hours:	**L:0**	**T:0**	**P:3**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of basic science of Surgery & Surgical Equipments.			

Details of the Course

Unit	Contents
I	• Observation & Demonstration of Preparation of Surgical equipments. • Working of Fumigator. • General Surgical Instruments
II	• Suture Materials • Suturing Techniques • Surgical Positioning

At the end of the course, the student will be able to

CO1: Know About Basic Science of Surgery.
CO2: Understanding the Various Equipments & Instruments involved in Surgery.
CO3: Examine the Surgical instrument & Equipment Functioning.
CO4: Know about various Positions used in Surgical Procedures.
CO5: Understand the process of sterilization & its types.

Course Outcomes and Mapping

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	4	3	3	3
CO2	2	2	2	3	2	3	2
CO3	4	4	4	4	4	2	4
CO4	3	3	2	3	2	2	3
CO5	4	4	4	4	4	2	4

Reference Books:

S. No.	Author(s)	Title	Publisher
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2	Raymond Maurice Kirk	Basic Surgical Techniques	ELSEVIOR
3	Alexis Thomson, Alexander Miles	Manual of Surgery	Morrison and Gibb
4	Ajay kumar Agarwal and neelabhaarwal	Surgical instruments	Jaypee

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY **DEPARTMENT OF ALLIED HEALTH SCIENCES**				
Course Name	**B.Sc. Medical Technology**			
Subject Code:	**BAOTT 205-21**			
Subject Title:	**BIOCHEMISTRY & PATHOLOGY**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	The aim and objective of this course is to know about introduction of Biochemistry, Metabolism & Pathology.			

Details of the Course

Unit	**Contents**	**Contact Hours**
I	Nomenclature of compounds containing halogen, alcohols and phenols. Ethane, Propane, Ether, aldehydes, Ketones, Carboxylic acid, Cyanides Isocyanides, Nitrogen compounds and amines. Nature of radiation and radioactive substances. Catalysis, Amino-acids, peptides, proteins and enzymes. Haemoglobin, blood and respiration 6. Vitamins and hormones 7. Carbohydrate metabolism 8. Brief knowledge about "Disturbances of carbohydrate metabolism, glucose tolerance test, diabetic ketosis, insulin tolerance, abnormal sugar in urine".	12
II	Protein metabolism, Disturbances of protein and nitrogen metabolism Fat metabolism, its disorders, ketosis and high plasma cortisol. Disorders of liver and bilirubin metabolism, plasma bilirubin. Liver function test. Calcium, phosphorous, sodium and potassium in the body, their significance and general precautions. Renal function tests. Disturbance in water and sodium metabolism. Acid-base equilibrium. Blood gases	12

III	Cellular adaptation, Cell injury & cell death. Introduction to pathology Overview: Cellular response to stress and noxious stimuli. Cellular adaptations of growth and differentiation. Overview of cell injury and cell death. Causes of cell injury. Mechanisms of cell injury. Reversible and irreversible cell injury. Examples of cell injury and necrosis. Inflammation. General features of inflammation Acute inflammation Chemical mediators of inflammation Chronic inflammation.	11
IV	Immunity disorders. General features of the immune system Disorders of the immune system Hyper sensitivity reaction – I, II, III, IV Infectious diseases. General principles of microbial pathogenesis Viral infections – HBV, HCV, HIV, CMV Bacterial infections Staphylococci, /streptococci, E.Coli, Salmonella, Tuberculosis. Fungal infections, Parasitic infections, TORCH infection.	10

Course Outcomes and Mapping

At the end of the course, the student will be able to

CO1: Introduction about different organic compounds/ Nutrients.
CO2: Study about metabolism of carbohydrates and other nutrients.
CO3: Study about Renal & Liver Function Tests.
CO4: Study about Immunology & cell injury.
CO5: Knowledge about Disorders, infections & various diseases.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	4	3	2	4	3	3
CO2	2	3	3	1	1	2	3
CO3	3	3	3	2	2	1	2
CO4	3	3	3	2	2	1	2
CO5	4	4	3	4	2	2	3

REFERENCE BOOKS:

S. No.	Author(s)	Title	Publisher
1	U. Satyanarayan and U.Chakrapani	Biochemistry	Elsevier
2	M N Chatterjee and R. Shinde	Text book of Medical Biochemistry	Jaypee Brothers
3	Harshmohan	Textbook of Pathology,7th edition	Jaypee Publications
4	Robbins	Text book of Pathology, 3rd edition	Elsevier Publications

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY
DEPARTMENT OF ALLIED HEALTH SCIENCES

Course Name	**B.Sc. Medical Technology**
Subject Code:	**BAOTT 206-21**
Subject Title:	**BIOCHEMISTRY & PATHOLOGY LAB**
Contact Hours:	**L:0 T:0 P:3 Credits:2**
Examination Duration (hours)	**3**
Objective(s):	The aim and objective of this course is to know about introduction of Biochemistry, Metabolism & Pathology.

Details of the Course

Unit	Contents
I	1. Carbohydrate Metabolism. 2. Protein Metabolism 3. Fat metabolism
II	1. Cell Injury demonstration. 2. Immunity & types.

At the end of the course, the student will be able to

CO1: Introduction about different organic compounds/ Nutrients.
CO2: Study about metabolism of carbohydrates and other nutrients.
CO3: Study about Renal & Liver Function Tests.
CO4: Study about Immunology & cell injury.
CO5: Knowledge about Disorders, infections & various diseases.

Course Outcomes and Mapping

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	4	3	2	4	3	3
CO2	2	3	3	1	1	2	3
CO3	3	3	3	2	2	1	2
CO4	3	3	3	2	2	1	2
CO5	4	4	3	4	2	2	3

Reference Books:

S. No.	Author(s)	Title	Publisher
1	U. Satyanarayan and U.Chakrapani	Biochemistry	Elsevier
2	M N Chatterjee and R. Shinde	Text book of Medical Biochemistry	Jaypee Brothers
3	Harshmohan	Textbook of Pathology,7th edition	Jaypee Publications
4	Robbins	Text book of Pathology, 3rd edition	Elsevier Publications

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Medical Technology**			
Subject Code:	**EVS102-18**			
Subject Title:	**Environmental Studies**			
Contact Hours:	**L:2**	**T:0**	**P:0**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	**To learn the basics of Environmental issues.**			

Unit	Contents	Contact Hours
I	Introduction to Environmental Studies Multidisciplinary nature of Environmental Studies: Scope & Importance Need for Public Awareness Ecosystems Concept of an Ecosystem: Structure & functions of an ecosystem (Producers, Consumers & Decomposers) Energy Flow in an ecosystem: Food Chain, Food web and Ecological Pyramids Characteristic features, structure & functions of following Ecosystems: • Forest Ecosystem • Aquatic Ecosystem (Ponds, Lakes, River & Ocean)	12
II	Natural Resources Renewable & Non-renewable resources Forest Resources: Their uses, functions & values (Biodiversity conservation, role in climate change, medicines) & threats (Overexploitation, Deforestation, Timber extraction, Agriculture Pressure), Forest Conservation Act Water Resources: Their uses (Agriculture, Domestic & Industrial), functions & values, Overexploitation and Pollution of Ground & Surface water resources (Case study of Punjab), Water Conservation, Rainwater Harvesting, Land Resources: Land as a resource; Land degradation, soil erosion and desertification. Energy Resources: Renewable & non-renewable energy resources, use of alternate energy resources (Solar, Wind, Biomass, Thermal), Urban problems related to Energy	14

III	Biodiversity & its conservation Types of Biodiversity: Species, Genetic & Ecosystem India as a mega biodiversity nation, Biodiversity hot spots and biogeographic regions of India Examples of Endangered & Endemic species of India, Red data book Environmental Pollution & Social Issues Types, Causes, Effects & Control of Air, Water, Soil & Noise Pollution Nuclear hazards and accidents & Health risks Global Climate Change: Global warming, Ozone depletion, Acid rain, Melting of Glaciers & Ice caps, Rising sea levels Environmental disasters: Earthquakes, Floods, Cyclones, Landslides	12
IV	Field Work Visit to a National Park, Biosphere Reserve, Wildlife Sanctuary Documentation & preparation of a Biodiversity (flora & fauna) register of campus/river/forest Visit to a local polluted site : Urban/Rural/Industrial/Agricultural Identification & Photography of resident or migratory birds, insects (butterflies) Public hearing on environmental issues in a village	25

Reference Books

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R.1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999.*Global Ethics and Environment*, London, Routledge.
4. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll.*Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science,* 339: 36--- 37.
7. McCully, P. 1996. *Rivers no more: the environmental effects of dams*(pp. 29---64). Zed Books.
8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971.*Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012.*Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India*. *Tripathi 1992*.
14. Sengupta, R. 2003. *Ecology and economics*: An approach to sustainable development. OUP.

15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.

16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology*: *Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998. *Land of the Tiger*: *A Natural History of the Indian Subcontinent*.
18. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. 2006.*The Creation: An appeal to save life on earth*. New York: Norton.

20. World Commission on Environment and Development. 1987.*Our Common Future*. Oxford University Press.

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Medical Technology**			
Subject Code:	**BMPD-202-18**			
Subject Title:	**Mentoring & Professional Development**			
Contact Hours:	**L:0**	**T:0**	**P:1**	**Credits:1**
Examination Duration (hours)	**3**			
Objective(s):	**To learn the lifelong learning skills.**			

Sr. No.	Contents	Contact Hours
I	**(Class Activities)** • Expert and video lectures • Aptitude Test • Group Discussion • Quiz (General/Technical) • Presentations by the students • Team building Exercises 7* A part of above six points, practicals on Fundamentals of Computers are also added as per Annexure-I	
II	**(Outdoor Activities)** Sports/NSS/NCC Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.	

Evaluation shall be based on rubrics for Part – A & B

Mentors/Faculty in-charges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.